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THE
EXTRA PHARMACOPŒIA

MARTINDALE
AND
WESTCOTT

FOURTEENTH EDITION

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THE
EXTRA
PHARMACOPŒIA
OF
Martindale and Westcott.

REVISED

BY

W. Harrison Martindale, Ph.D., F.C.S.

AND

W. Wynn Westcott, M.B. Lond., D.P.H.
H.M.'S CORONER FOR NORTH-EAST LONDON.

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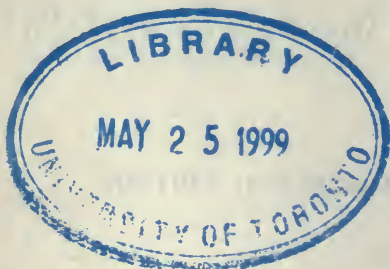


TABLE OF CONTENTS.

	PAGE
Preface to the Fourteenth Edition	xviii
Introduction	xix
Abbreviations	xx
Weights and Measures	xxiv
Metric Weights and Measures and their Equivalents in the British Pharmacopœia	xxvi
Approximate Equivalent Doses	xxvii
Materia Medica, Official and Non-Official, alphabetically arranged	1-687
Supplementary List of Drugs	687
Synopsis of Indian and Colonial Addendum	732
'Patent' or Proprietary Medicines	740
Physiological Standardisation, Note on	752
Vaccines and Antitoxins	752
Animal Organotherapy	818
Gambius' Table of Proportion of Dose according to age	835
Mineral Waters, alphabetically arranged, giving the Nature, the chief Chemical Constituents, the Medical Uses and Season	836
British Health Resorts	845
Irish Health Resorts	846
Notes on Antiseptic Power of some Chemicals and Disin- fectant Preparations for Surgeons' use	847
Analytical Memoranda—	
i. Chemical and Microscopic Examination of Urine, Blood, &c.	858
Water Analysis Notes (Chemical)	886
Milk Analysis Notes	887
Butter Analysis	891
Poisoning by Gases (Carbon Monoxide & Dioxide)	891
Ptomaines	892
ii. Examination of Stomach Contents	893
iii. Bacteriological Notes	897
Preparation of Culture Media	919
Embalming	921
Bacteriological Examination of Water	922
Neutralisation Table	924
International (1910) and B.P. Atomic Weights	925
Periodic Table of Elements	926

	PAGE.
Approximate melting points of some Fats and Waxes and	
Mixtures	927
Thermometric Equivalents	928
Freezing Mixtures	929
Percentage and grains per ounce equivalents	930
Poisons and Pharmacy Act, 1908	930
Schedule of Poisons, etc.	931-933
Drop Measure Table	934
Glossaries of Words and Phrases likely to occur as Directions	
in Foreign Prescriptions	935
General Index and Posological Table	941
Therapeutic Index of Diseases and Symptoms... ..	1017
Poisons and Antidotes	1051

PREFACE.

THE present—the 14th—Edition of this work has been called for somewhat sooner than we anticipated. Its form, so long adhered to, has undergone a change necessitated by the large volume of new matter introduced, therapeutic literature of the last two years having yielded an exceptionally valuable garnering. Had this Edition been issued in its original shape it would have contained over 1800 pages—instead of somewhat more than half the number here presented: it would in fact have been upwards of 2 inches in thickness. It is believed that our readers will find the new style more convenient than the one which adherence to the old form would have involved. It has been necessary to print in an addendum to the book an *Organic Analysis Chart*—the outcome of some Laboratory work which we have conducted.

Our NEW CHAPTERS are upon the following subjects:—

Acidi Lactici Bacilli.—In addition to a very full résumé of the literature concerning Lactic Acid Bacilli Therapy, the conclusions of a considerable amount of experimental work in which we have been engaged are given. Statements are made occasionally to the effect that dry preparations of Lactic Acid Bacilli cannot be relied upon either for therapeutic effect or for curdling milk, and that moist cultures are preferable. In our opinion such statements are erroneous. There is, in fact, no difficulty in desiccating cultures of Lactic Acid Bacilli so as to render them capable, even after prolonged keeping, of not only curdling milk, but also of producing the maximum amount of acidity on incubating for ten hours at 40 to 45° C. Much has been written to discount the treatment, and again there has been no mean amount of over-laudation. Midway there is probably a common-sense value in soured milk dietary, and we believe that anyone reading the chapter will arrive at the same conclusion. In our bacteriological work we noticed that *B. Caucasicum* appeared predominantly in the cream after 10 hours' incubation, and we concluded that the bacilli rise with it before growing subsequently throughout the curd,—this was confirmed on many occasions. The results of our experiments on Medicated Curdled Milk are also of interest as showing the limits of certain chemicals which we found could be added to the milk prior to incubation.

Organic Arsenic Compounds.—In this chapter we record the experience of workers with various Arsonates and Arsinates, as also the latest untoward results. It is to be regretted that a treatment, starting as this has done, on sound *fundamenta* should be brought into disfavour by accidents resulting from over-dose. Caution will have to be exercised with these 'non-toxic' bodies. Attention has been mainly directed to the Aromatic Organic Arsenic bodies. We make a few suggestions from the Aliphatic series in addition. With regard to the use of Organic Arsenic in trypanosomiasis we would refer our readers to the abstracts of the Official Reports,—the outlook is apparently not hopeful. The table which we have prepared showing the composition, the Arsenic content and solubility of the Arsenic bodies so far used in medicine and some which have not yet been used, will, we think, be valuable to those making a special study of the subject.

Iontophoresis, *i.e.*, the electrical introduction into the tissues of medicaments in the ionised condition.—The word *ion*, meaning a traveller, was given by Michael Faraday to the nascent particles of the elements produced in the dissociation of a molecule of a substance in solution. This chapter, it is hoped, will be useful as giving the principles of the subject in a concise form with references to recent original articles which have appeared, and which heretofore were scattered in various communications to scientific journals. Working notes on the various drugs used are provided. There can be little doubt that this method of employing medicinal chemicals has many advantages, *e.g.*, localisation of the treatment to the actual sphere of disease, its relative painlessness and its simplicity.

Radium.—This chapter has been so completely rewritten as to be virtually a new one in this Edition. Professor Soddy's invaluable work has been freely consulted and used, as have a number of articles in scientific journals. The Presidential Address to the Röntgen Society, 1910, deals fully with the question of standardisation of Radium. That manufacturers' products vary, is in our knowledge, and exact estimations by physicists of the γ activity do not seem, up to the present time, to be capable, without an experimental error of a few per cent. Thus the position in this regard is not so satisfactory as could be wished. The Atomic Disintegration of Uranium and its products is well seen in Professor Rutherford's graphic representation which with his permission we have reproduced. We may here quote a few of Professor Soddy's words—"Any one radio-element like Radium being considered any instant among its innumerable hosts of atoms, most of which are destined to last for hundreds, some for thousands of years, a comparatively very small proportion every second fly apart, expelling α -particles, and becoming emanation atoms. Next second the lot falls to a fresh set to disintegrate, and so the process goes on, α -particles being expelled as a continuous swarm, and yet so small a fraction of the whole changing that the main part of the Radium remains unchanged, even after hundreds of years." We have, for convenience, in adding new references, divided some of our matter into sections: (1) **Sealed Glass Tube Results**; (2) **Metal Tube and Metal Screen Results**; later follow a number of **General References**. The last word on the matter so far as malignant disease is concerned (see p. 608), seems to be that, though several cases of epithelioma have been reported as treated with partial success, very few have been known to have been cured. Radium is, however, admirable for rodent ulcers of small or moderate extent. It will also heal small epitheliomatous ulcers. From the General Superintendent's Report of the Cancer Research Fund (*vide ibid.*), we take the statement that "the vital powers, both of normal and cancer tissues, are abolished by Radium rays, and selective action doubted." We may here throw out a small hint on the subject of "Applicators." Our Continental friends strongly recommend a varnish form of "applicator" for medical use. All praise should be accorded the thorough manner in which they attacked the "Applicator" problem, as also the adjustment of the lead screen adjunct (which was of equal importance, seeing that the Radium was worn so near

the skin),—but when we were assured on high authority that the manufacture of the varnish was an important scientific secret, and the sealed glass tubes, first used in this country by Mackenzie Davidson, were held up to public ridicule, it became a question of who would laugh last. We believe that any pharmacist, or indeed oil and colorman could make the varnish, but note (p. 604). “Attempts to use the α -rays from these films involve risk of loss of emanation and weakening of activity of the preparation, for no coating, thin enough to allow α rays to penetrate, is likely to be perfectly gas-and-water-tight—F. Soddy.” Note, also, that a medical worker, Deane Butcher (*ibid.*), although advocating the French varnish, says “the disadvantage is, on a hot day, or with sweating patients, the varnish may come off.” We need not labour the point further, but refer our readers to the chapter in question. It is obviously a simple matter to spread the Radium in fine (dry) powder beneath a screen of any desired metal and thickness, and to seal it hermetically so as to prevent the access of moisture. We might add that Radium Radiation has recently proved exceptionally valuable in the treatment of eye diseases. The work of L. Barlow, which we have abstracted, tends to prove the interesting fact that there is some *causal* relation between radioactivity and the carcinomatous process. In conclusion, we may say, advisedly, that much harm has been done by exaggerating claims of the healing power of Radium Rays (*cf.* Bashford, Cancer Research Fund.—B.M.J. ii./09,151).

In addition we desire to draw attention to the following **New Pharmaceutical and Chemical preparations**, and allied matters which have recently received our attention :

Acetone.—Its surgical use for cleansing the skin prior to operation.

Acidum Carbonicum.—‘Refrigeration.’

Acidum Cresotinicum.

Alcohol Injections.

Amysal (Unguentum Amyl Salicylatis Co.) similar in effect to Methysal Balm, but of less odor.

Antimonii et Sodii Tartras in trypanosomiasis.

Bismuthi Hydroxydatum.—(May form a useful substitute for the Carbonate).

Belladonna.—Data upon its cultivation and standardisation of preparations.

Bismuthi Nucleinas.—As an intestinal astringent.

Blood Pressure in Man.—Nitroglycerin, Erythrol Nitrate, Pulvis Soda Nitritus Co. and other Vasodilators all tend to keep pressure down and are advised by an eminent authority. By our detection of high raised tension in middle life, changes in the arteries leading to arteriosclerosis may be prevented and life be prolonged.

Calcii Permanganas.—In gastric ulcer.

Carbonis Tetrachloridum.—Owing to a recent death where this preparation was used as a dry shampoo its poisonous effects are dealt with.

Chlorine as a disinfectant.—We give a reference to a statement that Chlorine is so efficient that two parts per million are sufficient to sterilise water. 25,000 gallons can be sterilised for one penny.

Coal Tar Emulsion Disinfectants.—The “Lancet’s” Commission’s Recent Report on this subject is exceedingly interesting and has evoked some experimental work on our part. The question as to whether Disinfectants containing Coke Oven Oils, are non-poisonous as the law permits them to be classed, is open to doubt, and in any case ‘Phenoloid’ bodies appear to be of a composition not clearly defined or recognised.

The remarks on **Cocaine** for dental anæsthesia should be carefully followed by those having occasion to use it for the purpose. From time to time one finds patients with an idiosyncrasy incompatible with Cocaine. We consider a small dose of Cocaine, if given with reasonable and customary precautions, as a safe anæsthetic for the purpose, especially with a little Adrenalin added if excessive bleeding be anticipated. A Committee appointed by the Home Office recently reported on the question of deaths resulting from the administration of anæsthetics (March, 1910). It recommends (*inter alia*) no general respirable anæsthetic should be administered by any person who is not a registered medical or dental practitioner and that registered Dentists should be confined to the use of nitrous oxide for dental operations, and should not employ the general respirable anæsthetics of longer duration. With regard to the local use of Cocaine the Departmental Committee ‘with some hesitation’ agreed that ‘no restrictions on the use of local anæsthetics (except when used intra-spinally) appeared to them to be practicable or desirable.’ It is further added ‘fatal accidents have not been numerous’ by this method.

Another debated question is *whether Cocaine Hydrochloride Solutions may be boiled* with impunity. This we answer in the affirmative after noting results of actual trials. Surgeons may safely use sterilised solutions.

Coumaric Preparations.—Several new formulæ for sub-cutaneous injection.

Dechlorination or Salt-free Diet. This method of treating nephritis and œdema seems to have been attended with good results. The limiting of salt has also been extended to the treatment of chlorosis.

Elixir and Emulsion of Lecithin. Liquid palatable preparations of of Lecithin possessing certain advantages. Nervous breakdown has been well treated with Lecithin.

Elixir Pini Terpin Hydratis (Simplex).—Terpin Hydrate requires a considerable proportion of Alcohol to retain it in solution.

Elixir Sodii Brom-aceto-salicylatis. For use in rheumatic and neuralgic pains.

Ergot, Active principles of.—It is worthy of note that physiological tests with identical samples of a preparation of Ergot by three different physiological experts yield three totally distinct reports. *p.*—**Hydroxy-phenyl-Ethylamine** appears to be present in Ergot. It is also the active constituent in Placental Extracts and is advocated for use in shock, and for producing contraction of the uterus in labour.

Extractum Belladonnæ cum Dextrino Exsiccato.

Formidin.—**METHYL-DI-SALICYLIC IODIDE.** An intestinal antiseptic liberating Salicylic Acid in alkaline solution.

Glucose Injections.—By this means a Carbohydrate Food is given with little demand on the alimentary tract. The free instillation of fluid thus used is often of value.

Glycetracta.—These preparations, since their appearance in our last Edition, have been employed to some extent. We give some important additional information.

Guttæ Chloroformi cum Menthol Compositæ.—**INSUFFLATOR DROPS.**—For use in chronic tympanic and Eustachian catarrh.

Heart Tonics (*Digitalis*, *Strophanthus* and *Squill*) and their Physiological Standardisation. There would appear to be much need for unification in physiological standards (see *Digitalis*). The best circumstances for formation of Digitoxin in that plant do not appear to be known.

Injectio Bismuthi Subnitratis (BECK'S BISMUTH PASTE).

Hydrargyrum.—This chapter has been completely revised so as to bring it into line with the most recent advances. Though in France a 40% Injection (*c.f.* HUILE GRISE FR. Cx.) is used we recommend a 10% *preparation* as being more easy of manipulation. We record results of some experiments which we conducted to determine the best suspending agent for finely divided Mercury.—*Vide* **Injectio Hydrargyri Intramuscularis**.

Unguentum Hydrargyri Nitratis.—We have attacked the problem of the manufacture of this Ointment and provide a formula which has advantages over existing methods.

Injectio Iodoformi Æthereæ. In phthisis.

Iodine as a skin disinfectant.

Ipecacuanha, recent pharmaceutical work on.

Liquor Bismuthi frequently causes trouble on keeping by deposition and slight decomposition which occur. With this we experimented and the conclusions drawn, if followed, will prevent further trouble with the preparation.

Liquor Pepsini et Caffeinæ. The presence of Caffeine is stated to increase the activity of Pepsin.

Malt Extract. Method of Standardisation. Much has been done in improving methods of manufacture of Malt Extract and statements have appeared pointing to the fact that some malt preparations on the market are much more active than others.

Mistura Belladonnæ, Xanthoxyli et Hyoscyami.

Morphine Habit.—Methods of combating. We give some further recommendations.

Mucilago Bismuthi for "X" Ray diagnosis.

Nutrimenta.—In this chapter we give a note classifying the Suchs as also the Amido Acids, so as to be handy for reference. It is disconcerting to learn that nearly a quarter of the milk samples taken at random in the Metropolitan area were tuberculous. We give elsewhere a Utopian recommendation that tuberculous cows throughout the Kingdom should be slaughtered, owners being recompensed out of State funds!

"Upper Milks" are employed in America by reason of their richness. It is just a question whether "Upper Milks" would not be more likely to be contaminated with Bacterial infection than the lower portion. We were among the first to recommend Dried Milk for infant feeding. It has obvious advantages over the bacterial culture too often passing as milk (some scheme for London in the absence of Mr. John Burns' Bill or one more workable as *un fait accompli* is much needed). Some recent experimental work confirms that Dried Milk is a useful feeding medium where diarrhœa occurs. So much of a complex nature is written on the subject of Infant feeding that we note with relief the recommendation to simply scald the milk and dilute with water in the usual proportion (p. 478). Another problem is "whether Infants are capable of digesting foods containing starch." The answer appears to be that the secretion of amylolytic ferment can be trained early and that such training, within limits, is desirable. Preparations of **Milk Whey** (*Lactalbumen*) have lately been brought very prominently under the notice of the profession. We have been at some trouble to reach a simplification of the matter and refer our readers to the paragraphs on this subject.

Olea Essentialia, (*P. Off.*)—We give here Saponification and Acetylation processes which have been recommended for consideration before inclusion in the British Pharmacopœia.

Oleum Morrhuæ.—From an interesting paper on the subject of Cod Liver Oil in tuberculosis, its value is shown to depend on a definite chemical basis.

Opium.—Moderate doses of Laudanum and other preparations are given in speechfright. A rather important point is raised regarding the use of Opium in cholera. For recent recommendations regarding use and non-use of Opium the chapter should be consulted.

Oxygen.—The monograph has been revised. Oxygen has been coming more and more into use of late,—in fact we were informed recently that its use had developed into abuse in certain quarters, and that it was necessary to have Oxygen dispensed diluted with air in the case of some patients. We are fully in accord with the writer, who points out the necessity of improving the apparatus and method of giving Oxygen at the bedside.

Pigmentum Guaiacol is said to be a more certain diaphoretic than Pilocarpine.

Pilula Quininæ Hydrargyri et Opii.—Beneficially employed in the treatment of syphilis.

Potassium Permanganate.—A useful disinfectant resuscitated. 1 in 1,000 solution is efficient.

Pulvis Calci Glycerophosphatis cum Lacte Exsiccato.

A mode of administering Calcium Glycerophosphate and Milk Solids, as a restorative and nutritive.

Quinine base.—The fact that this is comparatively tasteless commends itself as a substitute for the excessively bitter salts, especially for children. Quinine Hydrochloride in the form of Giemsa's Injection has been advocated in malaria and syphilis. Quinine Nucleinate is also advised in

syphilis. A bacteriologist thinks that the treatment of a common cold, by a few grains daily *per os*, is not likely to reach the nasal mucus to disinfect it. A more direct attack is clearly required.

Radiology.—The value of this chapter has been enhanced by the addition of some references on the treatment of acne, leukaemia, malignant disease, Graves' disease, venereal sores, and ringworm. The fulguration of cancer has been recommended. It causes much pain (deep anaesthesia is necessary), but it is an obviously powerful method of disorganising cancerous tissue.

Santonin.—A new method of administering which is given should be tried where an anthelmintic is required. The initial treatment with garlic would seem to render the parasite more vulnerable.

Scarlet 'R' is stated to have remarkable power in forming new skin.

Scopolamine-Morphine Anaesthesia, Recent Work on. This appears to be increasing in favor. We give careful records of methods of procedure which vary with individual operators.

It may be noted that Commercial Scopolamine Hydrobromide, though often less laevorotatory, is physiologically hardly less active than the pure laevo salt.

Sodium Acid Phosphate has been recommended to be given not only as a solvent of Calcium Oxalate Stone, but also in cases where there is Calcium Oxalate deposit to prevent its concretion.

Stovaine Solutions of various formulæ for Intraspinal Anaesthesia. There are needs for caution in their use. See also Tropacocaine and Novocain, both with Strychnine.

Theobromine Diuretic Compounds.—We give several new compounds which the pharmacist can prepare with little difficulty.

Thiosinamin.—We give a large number of references to the use of this substance,—more particularly in the form of its solution with Sodium Salicylate. With regard to improvement following its use in tinnitus aurium and other ear trouble, we are rather inclined to think its value has as yet not been fully substantiated.

We give subsequently a method of making an **Injectio Thiosinamin et Antipyrin** with which we have been engaged. Antipyrin increases the solubility of many organic substances.

Paraphenylendiamine.—Its dangers when used as a hair dye, and the only remedy for untoward results from its use.

Vapor Acidi Carbolici Co. Lees—In incipient phthisis.

Veronal.—There have been several untoward results with this hypnotic. Five grains is usually sufficient as an ordinary dose in insomnia.

Patent or Proprietary Medicines.—Of these we give details of about 100 more than in our last Edition. It should be noted that occasionally differences have been found to exist between two samples of the same Patent Medicine,—their composition may be found to vary from time to time. It does not necessarily follow that an article sold in one country has the same composition as an article sold simultaneously under the same name

in another country.—B.M.J. i./10,339. Many of the Patent Medicines to which we give B.M.J. references are described *in extenso* in 'Secret Remedies, what they cost and what they contain,'—a work issued by the British Medical Association. It has been suggested that there should be State Regulation of Proprietary Medicines and Foods, *i.e.*, that these preparations should be compulsorily labelled with a full statement of contents in the same manner as is required by the "Pure Food and Drugs Act" in the United States of America.

Vaccine Therapy continues to grow in popularity both in this country and in the Colonies. Sir A. E. Wright has dealt with the question as to the possibility of producing and maintaining the necessary increased output of protective substances without periodic examination of the blood. In certain cases this procedure is safe, in others again a method of control (Opsonic Index estimation) is essential. It has been forecast that Vaccine Therapy "may largely replace the pharmacy of the past." Of more vital import to the pharmacist would appear the possible supplanting of the pharmacy of the present and immediate future. Personally we are not pessimistic as to the outlook for Pharmacy. Whatever happens, the most ardent opsonist will, we think, continue to use, *e.g.*, narcotic, purgative and febrifuge drugs, will employ local stimulants and internal and external antiseptics to diseased tissues and so forth *ad lib.*, indeed in the Vaccines themselves which he uses, the opsonist does not ignore the action of Phenol as 'preservative' Again, the man who is inclined to ignore drugs completely, we refer to the aseptic surgeon, who in his own particular sphere, according to information received from quarters where he is most in evidence, is, even now, no mean user of antiseptic methods, though plain non-medicated gauze has figured more largely in his requirements of late to the exclusion of 'Cyanide' and other medicated dressings. The medical man will, we think, find the **Table of Vaccines**, which we have arranged on p. 755, useful. This gives, at a glance, the approximate initial and limit doses as also the time for repetition of doses. For further information reference should be made to the monographs on the diseases in the subsequent pages. **Acne Bacillus Vaccine** containing the specific acne bacillus—the outcome of work at St. Mary's Hospital,—is new to this section of the book. Vaccines of the organisms producing catarrhal affections have also been used both for treatment and to confer immunity, with favorable reports. This brings us to the consideration of the advisability of giving Vaccines by the mouth as distinct from the usual hypodermic method. It is well known that His late Majesty King Edward VII, received great benefit from a course of Vaccine Therapy by this method. It has been stated that he had never felt better in health and spirits than after the Vaccine treatment which he had undergone to prevent his contracting influenza or pneumonia on his journey to Biarritz. Tuberculin has been given *per os*, and immunity has been conferred by minute doses.

Cancer.—The Imperial Cancer Research Fund's last report affords the most recent information on the progress of the investigation of cancer. 'Seven years ago no one would have conceived it possible that portions of the mammalian organism could be kept growing for a period four times the length of life of the whole animal.' We give other abstracts of important

communications on the origin of cancer. The possibility of chemical irritants being causative of cancer is an interesting question.

Colon Bacillus and Gonococcus Vaccines have been employed with good results.

With regard to **Pneumococcal Vaccine** (which ranks high in the list of Vaccines arranged approximately according to their immunising power), in cases where pneumonia is said to supervene upon influenza, it would appear that in reality the infection is a double one from the beginning, and the administration of a dose of Pneumococcal Vaccine is, therefore, advised as early as possible during the influenza attack. There could be no better recommendation of Pneumococcal Vaccine than the fact that Sir A. E. Wright was a sufferer from chronic bronchitis for 30 years, which left him entirely after a few doses of his own pneumococci. **Streptococcic and Staphylococcic Vaccines** have their respective uses. For erysipelas 2 million Streptococci is a routine dose, yielding remarkably good results, and furunculosis is curable with Staphylococcic Vaccine. Nine cases of boils out of ten can be cured by doses of 100 million staphylococci.

Wassermann's Test for assistance in diagnosis of **Syphilis**. We have been at some trouble in describing the details of this test and trust that we have made the mode of procedure explicit. In preparing the **Antigen** the pharmacist will probably prove himself of use to the pathologist. The suspension of washed blood corpuscles required, as is well known, will not keep for any length of time. We give a bibliography of the test, ranging from the 'original Wassermann' down to the final simplification of Fleming. This latter in fact is the basis of our description of the test.

Trypanosomiasis.—We have brought the matter thoroughly up to date. Sir H. Hesketh Bell's readable report forms a valuable referendum to the disease. It has been found that the *Glossina palpalis* is capable of retaining its infectivity for a period of two years. Spreading, as sleeping sickness did in a mysterious manner, apparently from the Congo basin, there are signs that Nature is working out a cure for herself to some extent as mysterious as its arrival,—perhaps by attenuating the virulence of the trypanosome, at any rate deaths from sleeping sickness in 1909, so we are told, were only 450 as against 5,000 in 1907.

Tuberculosis.—A pregnant feature is the fact that tuberculosis flourishes in not a few countries where feeding from milk from cows or other animals appears unknown. With the death of the discoverer of the tubercle bacillus, Robert Koch, the contention that bovine tuberculosis is not identical with human will probably not be carried on with such vigour. Differences between the two types of bacilli are well known to exist. The rivalry between the English and German dosage of the tuberculin continues. The English dosage is now, however—at any rate in this country—much the more popular of the two,—with this no ill effect can follow, and much good may result. We have already mentioned incidentally the use of **Tuberculin T.R. given by the mouth**. This is stated to be useful (small doses) in the slighter cases of surgical tuberculosis and other tuberculous conditions. By the administration of Tuberculin an agent is provided "closely related to the infecting organism in the hope that nature's own effort at immunisation may be reinforced."

This brings us to the **Graduated Labour Treatment** to which we give some references. With regard to the **Estimation of the Opsonic Index**,—here again workers have been at variance. The pro-opsonists have made it their duty to refute the statement of those who deem the estimation erroneous. Sir A. E. Wright admits that the Index forms an incomplete evaluation of protective power, but it is the only possible one to be had at present. 'Protective substances in the treatment must be brought into effective operation at the site of infection'—this seems to be the key to the opsonic situation.

We give many other abstracts of interesting and valuable opsonic contributions. Regarding the **Tuberculin Reaction** rivals, common sense dictates that the Calmette test must be more dangerous than a skin reaction, but even the skin reaction may develop into pustules. The **Tuberculin Ointment** is a further useful modification.

In our **Organotherapy** chapter the **Pituitary Extract** calls for attention. It is stated to have special action on uterine muscle. It keeps blood pressure raised and it is valuable in surgical shock. It has been put forward as likely to be the 'drug of the future' in cases of shock due to anæsthesia.

Thyroid Gland has new references to its use in myxœdema. The results with the drug in this affection are 'unparalleled by anything in the whole range of curative measures.'

Our chapter on the **Notes on Antiseptic Power of Chemicals** has been enhanced by several useful 'latest results' (c.f. also the "Lancet" Commission Report, p. 17, *et. seq.*), and we have on this occasion specified some really powerful substances. In our last Edition we left the selection open.

The chapter devoted to **Analytical Memoranda** has been revised by incorporating new tests and classifications by authorities in this domain so as to render it as useful as possible to the medical practitioner and student, for whom the chapter is more particularly intended. We refer to the notes on **Albumin, Blood, Bile, Glycosuria, Ammonia Excretion, Ethereal Sulphates, Organically combined Phosphorus**, etc., etc.

The subject of **Preservatives in Milk, Cream, Butter**, has also engaged our attention, and we have outlined the present rather unsatisfactory state of the law.

The **Stomach Contents Examination** chapter and the **Bacteriological Notes** required revision. Points of doubt were submitted to a skilled pathologist for decision. With regard to *B. Coli*, it is interesting to note the organism could not be found in the air in London. The method of staining of the *Gonococcus*, advocated in the "Treatment of Venereal Disease in the Army" receives some criticism, whilst other stains are added. The sections on *B. Tuberculosis* and *B. Typhosus* have also some interesting additions.

We have added **Mendeléeff's Table** on up-to-date lines, having incorporated "*x*" and "*y*." "*X*" is the Ether which Mendeléeff supposes to have a molecular structure. It is assumed to possess a low density and atomic weight estimated at 0.000,000,000,053.

Organic Analysis Chart.—In an addendum, bound separately, as already mentioned, we give the results of examination of some hundreds of organic chemical substances used therapeutically. This Chart, the outcome of some months work in our laboratory, it is claimed will assist the analyst in identifying the substances in question by a simple process of elimination. We have deviated from the usual "tree" form of chart, as the spread out branches take up too much space for a work of these dimensions—the arrangement in columns, will, we think, be found satisfactory.

The **International Atomic Weights** of several elements have been altered since our last Edition, *e.g.*, Cl, S, I, Mg, K and Na, were altered in 1909, and As and Cr were altered for 1910. This necessitated a revision of the **Molecular Weights** throughout the book. The work entailed was considerable, and though for pharmaceutical purposes "rounded-off" figures are usually sufficient, such approximations are not officially recognised and the introduction of them on our part would probably fail to find favour. The fact remains that Pharmacopœia Authorities would do well to correspond on the matter and arrange "rounded-off" International Standards for *Pharmaceutical purposes*. The said Pharmaceutical Standards should, we suggest, be officially adopted in the Pharmacopœias in question on their next revisions, and should remain in force for some years. This small but necessary step should come as a boon to many. We would go so far as to say—confine the figures to whole numbers, with perhaps not more than "0.5's" in the first place of decimals—where necessary. It is an unsatisfactory state of affairs, that Pharmacopœias of different nations adopt International Atomic Weights current at the time of their issue, as they are unfortunately rendered out of date by the annual alterations in the 'I. Wts.' Hence we throw out our suggestion of *International Pharmaceutical Atomic Weights*.

We acknowledge, as in our last Edition, hearty thanks to Mr. F. Filmer de Morgan, F.C.S., who has taken up the subject of calculating molecular weights, and who has also rendered valuable assistance in proof reading. We also acknowledge, equally heartily, the services of Mr. J. C. Batalha Reis, who assisted in abstracting current literature.

We have recently been experimenting with the *flavoring of Medicines*. The chapter on **Glyl and Syl Flavoring Agents** will, we think, appeal to medical practitioners and pharmacists. The use of Glyls and Syls should tend to uniformity. Several of them are more efficient in covering the taste of nauseous drugs than flavorings used hitherto and they are more convenient in use. Their extended use will, we have no doubt, produce further suggestions. Though the words "Glyl" and "Syl" are registered Trade Marks, the property of one of the authors, it is intended to permit pharmacists to make the preparations in question themselves for the flavoring of prescribed medicines. Trade Marks in general (carefully indicated in our pages) are otherwise to be most rigorously observed.

Pills.—A problem which we attacked, and which, though apparently simple, is bound up with technical difficulties, is the devising of a pill coating which shall pass undissolved through the stomach and shall be soluble in the alkaline intestinal juices. More than 25 years ago Keratin was advised

for this purpose on good authority and though shortly after its introduction grave doubts were expressed as to its utility—Sodium Salicylate pills, for example, could not be effectually coated with it,—nevertheless, keratin coating has been used continuously since that time. Our experiments point to its inefficacy *as usually employed*, but we are not in a position at the moment to recommend a perfect substitute. We commend the latter portion of the chapter on *Pilulæ* to the attention of pharmacists. *Formalised Gelatin* has also been recommended as a capsule coating for the same purpose, and here even greater difficulties present themselves. Apart from the fact that the hardening action of Formalin upon gelatin probably continues after the capsules have been removed from the fluid one has to consider the drying up of a capsule mass as such. It is no mean difficulty to arrange the time of 'treatment' with Formalin so that the physiological conditions shall be satisfied.

Poisons.—The pharmacist is frequently called upon to supply poison substances without a medical man's prescription. In view of the exacting nature of the Poisons and Pharmacy Act, 1908, it is of importance to be able to determine the position of any poison in the Schedule thereto, which is in two parts. For the Schedule and some details of the Act, *vide* p. 930 *et seq.* We have been at great pains to indicate throughout our pages by means of the (H) (Part I.) and (P) (Part II.) the part of the Schedule in which each Poison falls. These signs precede the names of every poison in the book,—*once* as a general rule under its main heading. We encountered some chemical and pharmacognostic difficulties before we could draw conclusions (they are principally on chemical grounds rather than legal interpretations), but considerations of space have in most cases prevented us from giving our reasons for deciding on either (H) or (P) where doubt exists. We would emphasize one or two points out of many which have occurred to us. A member of the Public cannot obtain $\frac{1}{100}$ grain of Cocaine Hydrochloride as such without the stringent (H) formalities, but he can legally acquire *any quantity* of Cocaine Hydrochloride in just under 1% solution under (P) conditions. Indeed our friend Glyn-Jones would go so far as to say that, as the Schedule is now worded, any preparation of Cocaine, *e.g.*, a 50% solution of a salt of Cocaine, is merely a (P) poison, unless it can be shown to be a preparation of *Coca*. Again, though Cocaine, as such, cannot be obtained by the layman without compliance with the regulations relating to (H) poisons, legally any quantity of the practically equally dangerous Cocaine substitutes can be acquired. These drugs frequently find mention in the columns of the daily press. Again, Mercuric Chloride cannot be bought by the public except under (H) restrictions, but any quantity of an aqueous solution (an ounce will dissolve in a pint!) can be legally obtained as a (P) poison. Then again the "man in the street" can purchase any amount of the crude drugs, *Coca*, *Conium*, *Gelsemium*, *Ipecacuanha* and *Jaborandi*, though preparations of these are stringently barred. With regard to the "Preparation or admixture containing" clause in Part II. we cannot refrain from pointing out that if one lays stress on the word "containing" as our legal confrère would do, it virtually annuls Part I. To distinguish, say, between a preparation of Atropine and a preparation (of several medicines) to which a small

proportion of Atropine is added, we find to be inoperable,—we fail to see where one class begins and the other ends. We should therefore point out that in our pages a simple preparation of, or a compound mixture containing a salt of Atropine is (B). We adhere strictly to the wording of the Schedule. We have known it claimed on the strength of this clause that a preparation “containing” Antimony, Arsenic and Picrotoxin is a Part II. poison! Needless to say, though the legal restrictions may be insufficient pharmacists are fully alive to the necessity of guarding against misuse of dangerous drugs. In distinguishing between poisonous and non-poisonous alkaloids we took the dose in each case into consideration: there were exceedingly few which could be said to be in any way on the borderland between poison and non-poison. We think the dissection of poisons thus into two broad classes may be of general interest apart from considerations of the Act—inasmuch as our preparations are of a most varied description. We quite expect that differences of opinion will exist in some cases—we have indicated our opinions.

Since our last issue several countries have issued New Editions of their respective PHARMACOPEIAS. We refer to the FRENCH CODEX (1908), P. SVECICA, 9th Edition, 1908; PHARMACOPEA HUNGARIA, 3rd Edition, 1909; FARMACOPEA D'ITALIA, 3rd Edition, 1909. From each of these we have made some translations and abstracts, and hereby tender our acknowledgments. The French Codex (Masson et Cie, Editeurs, Paris, 120, Boulevard St. Germain) has especially interested us, *e.g.* in regard to its maximum, single and *pro die* doses. The physician frequently desires to know to what extent he may ‘push’ the dose of a drug in treatment—especially is this of importance in the case of a cumulative drug. We have, therefore, extracted a number of these comparative doses, using the letters Fr. Cx. when referring to the French Codex material. We are inclined to think that our Pharmacopœial authorities would do well to make use of this system of indicating doses, but the matter has probably already received their attention. The Austrian, Danish, German, Italian, Dutch, Belgian, Hungarian and Swiss Pharmacopias make use of max. single and *pro die* doses. For the benefit of those unaccustomed to our book we might add that the affixing of the letters Fr. Cx., P. Hung., or indeed any of the abbreviations of the Pharmacopœias to the names of well-known chemicals and galenical preparations does not necessarily indicate that our subsequent monograph embodies information from all or any of the pharmacopœias in question,—on the contrary it indicates that the drug is dealt with in such a pharmacopœia, to which the reader is referred if he requires further information. We mention this to prevent misunderstanding regarding points of difference which arise in the national works in question as to such items as melting points, solubilities, doses, methods of standardisation, &c.

With regard to other Standard Works of Reference which have recently appeared, a complete enumeration is impossible, inasmuch as the nature of our work necessitates the constant use of the contributions of Specialists in their various spheres, but we may mention,—

R. W. Allen—“Vaccine Therapy, Its Theory and Practice.” 1908.

At the time of going to press a third edition (1910) had just been published.

G. E. Brooke—"Tropical Medicine, Hygiene and Parasitology," 1908.

J. Dixon Mann—"Physiology and Pathology of Urine," 1908.

F. Francis and J. M. Fortescue-Brickdale—"The Chemical Basis of Pharmacology."

W. S. Glyn-Jones—"The Law of Poisons and Pharmacy," 1909.

B. Fischer and C. Hartwich-Hager—"Handbuch der Pharmaceutischen Praxis."

S. Leduc—"Electric Ions and their use in Medicine." Translation by R. W. Mackenna, 1908.

H. Lewis-Jones—"Medical Electricity."

Elie Metchnikoff—"The Prolongation of Life."

G. S. Newth—"Text Book of Inorganic Chemistry," 1909.

E. Schmidt—"Ausführliches Lehrbuch der Pharmaceutischen Chemie."

F. Soddy—"The Interpretation of Radium," 1908.

As in past years, we provide frequent references to the leading Scientific Journals,—the "British Medical Journal," "Lancet," "Medical Press and Circular," "Practitioner," "Pharmaceutical Journal," "Chemist and Druggist," "British and Colonial Druggist," "Nature," "Journal of the Röntgen Society," and many others,—indeed the **abstracts** added from scientific papers which have appeared during the last two years number **over 2,000**. These references should form a useful guide to those requiring more information regarding up-to-date methods of treatment.

The deliberations of the Pharmaceutical and allied Sections of **The International Congress of Applied Chemistry**, which met in London in May, 1909, have also received our attention. The standardisation of Drugs, both chemically and physiologically, was much discussed.

We have frequently, in our pages, alluded to the recommendations of the **Committee of Reference in Pharmacy** to the Pharmaceutical Committee of the General Medical Council, in connexion with the revision of the British Pharmacopœia. We may here draw attention to the recent communications by Umney and others, on the subject of the Essential Oils of the Pharmacopœia. Proposed Official Monographs are given by us with the letters "*P. Off.*" to distinguish from "*Off.*" i.e., those at present Official.

A 2nd Report issued at Simla by the Indigenous Drugs Committee—a Government publication to which we refer as 'I.D.C.',—though dealing with a few specified drugs, is of value in that it gives the results of actual trials of these drugs on man.

The foregoing is a brief outline of some of the work entailed in the preparation of the present Edition. We sincerely trust that our labours may have resulted in the production of a book of general utility both to Medical men, Pharmacists, Analysts and others engaged in allied branches of science.

W. HARRISON MARTINDALE,

10, New Cavendish Street, W.

WM. WYNN WESTCOTT,

396, Camden Road, N.

July 18th, 1910.

INTRODUCTION.

HEREIN medicines are viewed from a pharmaceutical and medical aspect; references to their use, with the doses employed, are given in *précis*. The area of selection is limited by personal experience. Modern official drugs are still noticed, and older ones are introduced when unofficial preparations of them are in use, or their preparations have undergone alteration. In the Supplementary List of Drugs will be found those to which medical attention has been more or less directed, but which have not come into very extended use. The List contains in addition a number of those official drugs and preparations for which we deemed the small type and condensed paragraph suitable, with a resulting saving of space. The Index forms a copious Posological Table. The doses are based on personal experience, or are culled from the best authorities. The terms *Drachm* and *Ounce*, when applied to liquids, are understood to be the Fluid Drachm and Fluid Ounce respectively, as defined by the British Pharmacopœia. Except in some foreign formulæ where liquids are ordered to be weighed, when parts are referred to (solubilities included), it is to be understood that ounces and fluid ounces, grains and grain-measures, or grammes and cubic centimetres are to be employed. In regard to the formulæ for hypodermic injections and several others, as a minim is not equal to a grain-measure, and as hypodermic syringes and dispensing measures are graduated in minims, for practical purposes the use of 'parts' is generally avoided when referring to these small quantities. They are therefore ordered in grains and minims or ounces (*i.e.* fluid ounces); thus *Injunctio Morphine Acetatis Hypodermica* contains 1 grain of Morphine Acetate in 6 minims. Exceptions to this rule are clearly indicated. Specific gravities and solubilities have been determined at 15.5° C. (60° F.). (U.S.P. mostly employs 25° C.)

Percentage solutions are sometimes mentioned, by which it is intended that 100 grain-measures of the finished solution shall contain *n* grains of the substance, or that 100 Cc. shall contain *n* Gm.; *e.g.* a 50 per cent. solution of Cocaine Hydrochloride will contain 50 grains in 100 grain-measures, and will dilute with an equal volume of liquid to form a 25 per cent. solution. For conversion table, *v.p.* 93

ABBREVIATIONS.

When the reference is to a periodical, the number put first is the number of the volume; then follow the last two figures of the year, and the last number refers to the page, thus, B.M.J. 1/09, 1000.

- Allen.—Allen's Commercial Organic Analysis.
 Allen, R. W.—Vaccine Therapy. Its Theory and Practice, R. W. Allen, M.D., B.S., 2nd Edition, 1908, also 3rd Edition 1910.
 Am.Jl.Ph.—American Journal of Pharmacy.
 Arzn.—Arzneimittel die im Deutschen Arzneibuch nicht enthalten sind, 1897.
 Batty Shaw.—Organotherapy, or Treatment by means of Preparations of Various Organs, H. Batty Shaw, M.D., F.R.C.P., 1905.
 Beddoes.—Syphilis, Its Diagnosis, Prognosis, Prevention and Treatment. T. P. Beddoes, 1909.
 Bouchardat.—Formulaire Magistral, Paris, 1904.
 B. & C. D.—British and Colonial Druggist.
 B.M.J.—British Medical Journal.
 Berl. Klin. Woch.—Berliner Klinische Wochenschrift, Organ für praktische Aerzte, Berlin.
 B.M.J.E.—British Medical Journal Epitome.
 Bosanquet.—Serums, Vaccines and Toxines in treatment and diagnosis, W. Cecil Bosanquet, M.D., 1904 and 2nd Edition. 1909.
 B.P.C.—British Pharmaceutical Codex. 1907; B.P.C. 1894 or 1901 Formulary of the British Pharm. Conference. B.P.C. Supp. 1908,—Supplement to 1907.
 Brompton H.—Pharm. Brompton Hospital, 1899.
 Brooke.—Gilbert E. Brooke, Tropical Medicine, Hygiene and Parasitology. Griffin and Co., London, 1908.
 Brunton.—Text-Book of Pharmacology, Therapeutics, and Materia Medica, by Sir T. Lauder Brunton, M.D., 1891.
 B.S.H.—Pharmacopœia of the British Skin Hospital, 1884.
 Can. Form.—The Canadian Formulary of Unofficial Preparations, 1908.
 Caspari.—Pharmacy for Students and Pharmacists, C. Caspari, jun., 1906.
 C.D.—Chemist and Druggist, London.
 C.H.W.—Formule of Chelsea Hospital for Women, 1900.
 C.L.T.E.—Central London Throat and Ear Hosp. Pharm. 1901.
 Chem. News.—Chemical News.
 Clin. Jl.—Clinical Journal.
 Comptes Rend.—Comptes Rendus Hebdomadaires des Séances de L'Académie des Sciences.
 C.R.—Proposed changes in the next issue of the British Pharmacopœia in accordance with the International Agreement for the Unification of Pharmacopœial Formulas for Potent Drugs signed at Brussels, Nov. 29, 1906, from an advanced report to the Pharmacopœia Committee of the General Medical Council. Adopted by the Committee of Reference in Pharmacy, March 4, 1907.
 C.R., 1908,—Report of the Committee of Reference in Pharmacy to the Pharmacopœia Committee of the General Medical Council in connection with the Revision of the British Pharmacopœia.
 C.X.—Charing Cross Hosp. Pharm., 1904.
 Cushny.—Text Book of Pharmacology and Therapeutics, Arthur R. Cushny, M.A., M.D., 1906.
 D.M.W.—Deutsche Medizinische Wochenschrift. Leipzig
 Disp.—Art of Dispensing, Peter MacEwan, Ph.Ch. F.C.S., 1908.
 D.—Dorland's Illustrated Medical Directory. 1909.
 E.L.—Pharm. of East London Hospital for Children, 1903.
 E.—Pharm. of Evelina Hospital, Southwark, 1906.

- Ed. M. J.—Edinburgh Medical Journal.
- F. E.—Farmacopea Española Septima Edicion, 1905. Madrid.
- F. I.—Formula Internationalis, International Agreement for Unification of Formulas signed 1906—*cf.* C. R. *antea*.
- F. N.—Formulaire des Medicaments Nouveaux. Bocquillon-Limousin, 19th Ed., 1908, and previous Editions. Paris.
- Fr. CX—Codex Medicamentarius Gallicus, Pharmacopée Française. Paris, 1908. Masson et Cie., 120 Boulevard Saint Germain.
- G.—The Essentials of Materia Medica and Therapeutics, by Sir A. B. Garrod, M.D., and N. J. C. Tirard, M.D., 1890.
- G. H.—Pharmacopœia of Guy's Hospital, 1899.
- Gho-h.—Treatise on Materia Medica and Therapeutics, by the late R. Ghosh, L.M.S. Cal Univ. Edited by C. P. Lukis, M.B., F.R.C.S., Lieut.-Col. I. M.S., 1904.
- Glyn Jones.—The Law of Poisons and Pharmacy. W. S. Glyn-Jones, 1909.
- Gould.—The Practitioner's Medical Dictionary, by G. M. Gould, A.M., M.D., 1907.
- G. N. C.—Pharm. Gt. Northern Central Hospital, 1908.
- Gt. Orm. H.—Gt. Ormond St. Hosp. Children Pharm., 1907.
- Hager.—Handbuch der Pharmaceutischen Praxis. 1907.
- H.—Text Book of Practical Therapeutics. H. bart Amory Hare. Edn. XII., 1909.
- Herschell.—Soured milk and pure cultures of lactic acid bacilli in the treatment of disease. 2nd edition, George Herschell, M.D., 1909.
- H. W.—W. Hale White, M.D., Materia Medica, Pharmacy, Pharmacology and Therapeutics, 1909.
- I. C. Add.—Indian and Colonial Addendum (1909) to the British Pharmacopœia, 1898.
- I. D. C.—Indigenous Drugs Committee, 2nd Report, Simla, 1909. Government Monotype Press.
- I. M. G.—Indian Medical Gazette.
- I. Wts.—International Atomic Weights, 1910.
- Int. Cong.—VIlth International Congress of Applied Chemistry, London, May, 1909 (papers read at).
- J. C. S. A.—Journal of the Chemical Society. Abstracts.
- J. C. S. T.—Journal of the Chemical Society. Transactions.
- J. R. S.—Journal of the Roentgen Society.
- K. C. H.—King's College Hospital Pharmacopœia, 1901, and additions 1907.
- L.—The Lancet, London.
- Leduc.—Electric Ions and their use in Medicine, Prof. S. Leduc; translation by R. W. Mackenna, M.A., M.B., etc., 1908.
- Lewis Jones.—Medical Electricity. Lewis Jones, M.A., M.D., 1906.
- L. H.—Pharmacopœia of the London Hospital, 1908.
- L. L.—London Lock Hospital Pharmacopœia, 1896.
- Luff.—Pathology of Gout, 3rd Edition, 1907, Arthur P. Luff, M.D.
- M. Arch.—Merck's Archives. New York.
- M.—Annual Report of E. Merck.
- M. A.—Medical Annual, 1901 to 1910.
- M. Am.—Merck's 1907 Index (New York).
- Mann.—J. Dixon Mann, M.D., F.R.C.P., Physiology and Pathology of the Urine. 1908.
- Marshall.—Manual of Prescribing, by C. R. Marshall, M.D., 1908.
- Med Rec.—Medical Record, New York.
- M. C.—Medical Chronicle, Manchester.
- Mid. H.—Pharm. Middlesex Hospital, 1899.
- M. P. C.—The Medical Press and Circular.
- M. T. G.—The Medical Times and Gazette.
- Murrell.—"What to do in Cases of Poisoning," William Murrell, M.D., 1907.
- Na.—"Nature," London.
- N. E. H.—Pharm. of the North-Eastern Hosp. for Children, 1904.
- Newth.—G. S. Newth, F.T.C., P.C.S., Test Book of Organic Chemistry, 1902.
- N. F.—National Formulary of Unofficial Preparations Issued by the American Pharm. Association. Edn. iii., 1906.
- N. H. W.—Pharmacopœia of the New Hospital for Women London, 1904.

- P. Off.*—Proposed official monograph or wording, *e.g.* referring to *Essentia Oils*, Hill and Umney. *P.J.* i./10, 177. *C.D.* i./10, 271.
- Partridge.—The Bacteriological Examination of Disinfectants, 1907.
- Pereira.—Elements of Materia Medica and Therapeutics, Jonathan, Pereira, M.D., F.R.S., L.S.
- P. Austr.*—Pharmacopoea Austriaca, vii.; 1906.
- P. Aus. Add.*—“Additamenta.”
- P. Belg.*—Pharmacopoea Belgica, Editio Tertia, 1906.
- Ph. Bor.*—Pharmacopoea Borussica. (Russian.) 1902.
- P. Dan.*—Pharmacopoea Danica, 1907.
- P.G. iv.*—Pharmacopoea Germanica, editio iv., 1900.
- P. Helv.*—Pharmacopoea Helvetica, Ed. IV., 1907.
- P. Hung.*—Pharmacopoea Hungarica, Editio tertia, 1909.
- Ph. Ital.*—Italian Pharmacopoeia, 3rd edition, 1909.
- P. Svec.*—Pharmacopoea Svecica (Swedish), Ed. ix., 1908.
- Ph.*—Pharmacopodia. White and Humphrey, 1909.
- Ph. Form.*—Pharmaceutical Formulas, 1905. Peter MacEwan, Ph.Ch., F.C.S., “The Chemist & Druggist.”
- Ph. Ital.*—Italian Pharmacopoea, 3rd, edition, 1909.
- Ph. Lond.*—Pharm. Londinensis, 1867.
- Ph. Ned.*—Pharmacopoea Nederlandica, Editio Quarta, 1906.
- Ph. Notes.*—Pharmacy Notes from various parts of the world. W. H. Martindale, 1907.
- Pharmacol.*—Chemical Basis of Pharmacology, Francis Francis, D.Sc., Ph.D., and J. M. Fortescue-Brickdale, M.A., M.D. (Oxon), 1908.
- P.J.*—Pharmaceutical Journal and Pharmacist, London.
- P. J. F.*—Pharmaceutical Journal Formulary.
- P. Jap.*—Pharmacopoea Japonica, III., 1907.
- P.L.*—Pharmacopoeia Londinensis, 1851.
- Pr.*—The Practitioner, London.
- Pres.*—The Prescriber, monthly, Thos. Stephenson.
- Proc. Chem. Soc.*—Proceedings of the Chemical Society.
- R.*—Handbook of Therapeutics, by Sydney Ringer, M.D., and Harrington Sainsbury, M.D.
- R.F.H.*—Pharmacopoeia of the Royal Free Hospital, 1904.
- R.D.H.*—Pharm. of Royal Dental Hospital, 1907.
- R.O.H.*—Pharmacopoeia of the Royal London Ophthalmic Hospital, 1901.
- Smale and Colyer.—Diseases and Injuries of the Teeth, 1901.
- Schmidt.—Ausführliches Lehrbuch der Pharmaceutischen Chemie, Vol. I., 1898, and Vol. I., Part I., 1906, also Vol. II., 1901. Dr. Ernst Schmidt, Geh. Reg. Rath, Professor of Pharmaceutical Chemistry, Marburg University.
- St. Bart.'s H.*—Pharm. St. Bartholomew's Hospital, 1900.
- St. G. H.*—Pharm. St. George's Hospital, 1907.
- St. J. H.*—Pharm. St. John's Hospital for Skin Diseases, 1904.
- S.H.*—Pharm. Samaritan Free Hospital, 1906.
- St. M.'s H.*—Pharm. of St. Mary's Hospital, 1904.
- St. Th. H.*—Pharm. St. Thomas' Hosp., 1902.
- Secret Remedies.*—Secret Remedies, What They Cost and What They Contain.—Brit. Med. Association, Lond., 1909.
- Soddy.—Interpretation of Radium.—F. Soddy, M.A., London, 1909.
- System of Dietetics.*—Edited by G. A. Sutherland, by various authors.
- T.H.*—Pharmacopoeia of the Hospital for Diseases of the Throat (Golden Square), 6th ed. 1901.
- Th. Gaz.*—Therapeutic Gazette, Philadelphia.
- Tibb's.—Theory of Ions, a consideration of its place in Biology and Therapeutics.—William Tibbles, M.D. (hon. caus.), Chicago, 1908.
- Tilley.—Diseases of the Nose and Throat.—Hubert Tilley, B.S. (Lond.), F.R.C.S. (Eng.), 1908.
- U.C.H.*—Pharm. of the University College Hospital, 1907.
- U.S.*—Pharmacopoeia of the United States, 1900 (Official September, 1905).
- U.S.D.*—Dispensatory of the United States, 19th Edition, 1907.
- Vic. Park.*—Pharm. City of London Hosp. (Chest), 1908.
- V.H.C.*—Pharm. Victoria Hosp. for Children, 1904.
- N.N.R.*—New and Non-official Remedies, 1910, Chicago-Amer. Med. Assn.
- N.S.D.*—National Standard Dispensatory, 1905.

Off.—*Official*—in the British Pharmacopœia.

Oph.—"The Ophthalmoscope," London.

W.—Pharmacopœia of the Hospital for Women, Soho Square, 1907.

W.H.—Westminster Hospital Pharmacopœia, 1903.

Y.B.P.—The Year-Book of Pharmacy, 1903, 1904, 1905, 1906, 1907.

FURTHER ABBREVIATIONS.

Edn. XIII.—Thirteenth Edition of the work (1908). For References and comments unavoidably deleted.

B.Pt.—Boiling Point.

M.Pt.—Melting Point.

Sp. Gr.—Specific Gravity at 15.5°C., unless otherwise stated.

★ in connection with a text heading signifies that the name which it precedes is a Registered Trade Mark, *e.g.*, ★Acidol. The ★ is only applied to the heading and is not repeated throughout the book.

O.R.—Optical Rotation of Essential Oil (100 m.m. tube) @ 20°C., unless otherwise stated.

R.I.—Refractive Index of Essential Oil at 25°C., unless otherwise stated.

WEIGHTS AND MEASURES.

THE British Pharmacopœia in 1898 adopted a dual system of weights and measures in all its formulæ, namely, the Imperial Weights and Measures and the Metric System.

"Except for wholly insignificant fractional differences, a preparation made according to either system will contain the same proportions of ingredients; but, as a matter of course, the two systems cannot both be used in the same operation."

"The Pharmacopœia, as hitherto customary, employs Imperial measuring vessels graduated at 62° F. (16·7° C.), and the official names of Imperial capacity-units as defined at that temperature, together with the official names of metric capacity-units as defined at 39·2° F. (4° C.); while it employs metric measures and volumetric vessels graduated at 60° F. (15·5° C.)."

In this work are given formulæ in 'proportional parts,' solids by weight, and liquids by *measure*, as the dispensing of liquids in Great Britain is always conducted by measuring. Exceptions to this rule are in the abstracted formulæ, and those from unofficial sources (in order not to interfere with the strict accuracy of either); that is, the denomination in other formulæ is omitted. In those, therefore, in which 'proportional parts' are used, the quantities of solids and liquids at 60° F. (15·5° C.) may be taken respectively in grammes and cubic centimetres, ounces and fluid ounces, grains and (to be strictly accurate) grain measures, but minims in place of the latter will, for practical purposes, often be used, and only cause one-eleventh *minus* error.

In the body of the work (but not in the Secondary List or Index) the approximate doses of each drug and preparation in terms of the metric system follow those of the Imperial system. For all practical purposes, a fluid drachm may be considered as 3½ cubic centimetres; 60 grains as 4 grammes; the avoirdupois ounce (about 28½ grammes) may be taken as 30 grammes; the fluid ounce as 30 cubic centimetres; and the pound avoirdupois as half a kilogramme (approximately it is nine-twentieths).

In further trying to think in the metric system, prescribers may consider the English grain as 65 milligrammes (0·065 gramme), 1½ grains as 10 centigrammes, and 17 minims as approximately 1 cubic centimetre. (See table, pp. xxvi. and xxvii.)

The following approximations will also be useful:—

85 minims = 5 Cc.* =	1 teaspoon.
255 minims = 15 Cc.* =	{ 3 teaspoons
	{ 1 tablespoon.
1020 minims = 60 Cc. =	{ 12 teaspoons
	{ 4 tablespoons
	{ 1 wineglass.
	{ 16 tablespoons (about),
250 Cc. = 50 teaspoons =	{ 4 wineglasses,
	{ 1 tumbler.

* These quantities are respectively those recognised by the FR. CX. for a coffee-spoonful (teaspoonful) and a tablespoonful (Cuillerée à Soupe).

According to the P. BELG.—

La cuillerée à café holds 4 Gm. of water.

La cuillerée à dessert holds 10 Gm. of water

La cuillerée à bouche ou à Soupe holds } as also in FR. CX.
15 Gm. of water.

U.S. teaspoon = 4 Cc.

„ dessertspoon = 8 Cc.

„ tablespoon = 16 Cc.

The word gramme is contracted to **Gm.**, and the words cubic centimetre to **Cc.** The contraction **Gm.** in heavy type and with a capital initial letter distinguishes it from gr., the usual contraction for grain. The latter is only used in the index.

A further exception is made in the case of hypodermic injections. To avoid, also, too great confusion of the two systems the contents of the unofficial ophthalmic lamels are not given in metric terms.

It would be of general advantage if the English term minim (commonly but erroneously understood to be a drop of liquid) were abandoned as it has been in all other scientific work. A drop, as the late W. Martindale suggested (P.J. 1876,679), might be considered as $\frac{1}{10}$ of a cubic centimetre, or about $\frac{1}{2}$ of a minim.

Of mobile liquids, such as Ether, Chloroform, Tincture of Digitalis, Almond Oil, and Oleic Acid, a drop is much smaller than that of water (varying, of course, with the neck of the bottle from which it is dropped). In the case of Oleic Acid, Almond, Olive, and other light oils, the 'drop,' on an average, weighs half a grain, and in place of weighing small quantities of these, two drops may for practical purposes be considered as the equivalent of one grain.

* At the International Agreement respecting the Unification of Pharmacopœial Formulas for Potent Drugs signed at Brussels on Nov. 29, 1906, it was agreed that the normal Drop Measure officially recognised shall have an external diameter of 3 mm., and give (at the temperature of 15° C.) 20 drops of distilled water per Gm.

The Farmacopea Oficial Española, 1905, gave a drop measure table, v.p. 934 (number of drops per Gm. of different medicaments). The French Codex also gives a very complete Table of this description.

The measure of 1,000 cubic centimetres recognised by the Pharmacopœia is not the same thing as a litre, which is the volume of 1,000 grammes of distilled water at its temperature of maximum density, 4° C. and 760 mm. barometric pressure (B.P. p. 430), whereas the measure of 1,000 cubic centimetres, B.P., is the volume occupied by 1,000 grammes of distilled water at 15.5° C., the difference being that 1 cubic centimetre is stated to be equal to 0.99984 millilitre, a millilitre therefore equals 1.00016 Cc. In the operations of the Pharmacopœia the volume of 1,000 grammes at 15.5° C. is directed to be employed in the place of the standard litre.

Operations conducted in the Metric System entail far less mental calculation, and hence involve very much less likelihood of error.

The sizes of bottles in most frequent use in France are:—
1,000, 500, 250, 200, 125, 100, 50 and 25 cubic centimetres.

Mixtures may be prescribed in 125, 200, or 250 Cc., or where it is desired to prolong the treatment 500 Cc. is a convenient size; and drops should be ordered in quantities of 60, 80, and 15 Cc.

Memoranda.

Ratio of circumference of a circle to its diameter = π = 3·14159. Circumference of a circle = $2\pi r$.

Area of a Triangle with base a and height h = $\frac{1}{2} a h$.

Volume of a Cube with length l = l^3 .

Volume of a Cylinder = $\pi r^2 h$. If r and h be in inches this divided by 277·278, the result is in gallons (water).

Volume of a Pyramid = $\frac{\pi r^2 h}{3}$

Volume of a Sphere = $\frac{4}{3} \pi r^3$

1 gallon of Water weighs 10 pounds; 1 gallon contains 277·278 cubic inches

**METRIC WEIGHTS AND MEASURES AND THEIR EQUIVALENTS IN
THE BRITISH PHARMACOPŒIA.**

1 Gramme (Gm.)...	... = 15·4323564 grains.
1 Centigramme (Cgm.)...	... = 0·154323 grain.
1 Milligramme (Mgm.)...	... = 0·015432 grain.
1 Litre ...	... = 35·196 fluid ounces.
1 Cubic Centimetre (Cc.)	... = 16·95 minims (nearly).
1 Metre ...	... = 39·370113 inches.

The Gramme has its decimal multiples—Decagramme, Hectogramme, and Kilogramme; and divisions—Decigramme, Centigramme, and Milligramme. The Litre and Metre have their corresponding decimal divisions—Decilitre, Centilitre, and Millilitre,—and Decimetre, Centimetre, and Millimetre.

In Continental States, where this system is now generally adopted for the dispensing and preparing of medicines, all liquids are weighed, and the terms Gramme, Centigramme, and Kilogramme only are used. This avoids the possibility of errors, which the similarity of the names Decagramme and Decigramme might lead to.

In Germany the quantities of the ingredients in prescriptions are written in decimal proportions, the gramme being understood to be the unit; the name of the integer is generally not mentioned, thus:

Rhubarb 35· means 35 grammes of Rhubarb.

“ 0·35 ” 35 milligrammes

The following abbreviations are officially used in all French educational establishments:—

Myriamètre, mm	Décistère, ds.	Kilolitre, kl.
Kilomètre, km.	tonne, t.	Hectolitre, hl.
Hectomètre, hm.	Quintal métrique, q.	Décalitre, dal.
Décamètre, dcm.	Kilogramme, kg.	Litre, l.
Mètre, m.	Hectogramme, hg.	Décilitre, dl.
Decimètre, dm.	Déagramme, dag.	Centilitre, cl.
Centimètre, cm.	Gramme, g.	Millilitre, ml.
Millimètre, mm.	Décigramme, dg.	Hectare, ha.
Décastère, das.	Centigramme, cg.	Are, a.
Stère, s or m ³ .	Milligramme, mg.	Centiare, ca or m ² .

APPROXIMATE EQUIVALENT DOSES.

WEIGHTS. IMPERIAL TO METRIC.

grain	Gm.	grain	Gm.	grains	Gm.
$\frac{1}{100}$	= 0·00065	$\frac{1}{3}$	= 0·02	12	= 0·8
$\frac{1}{80}$	= 0·001	$\frac{1}{2}$	= 0·032	15	= 1·0
$\frac{1}{60}$	= 0·0013	$\frac{3}{4}$	= 0·05	20	= 1·3
$\frac{1}{50}$	= 0·0016	1	= 0·065	24	= 1·5
$\frac{1}{40}$	= 0·002	grains		30	= 2·0
$\frac{1}{32}$	= 0·0022	$1\frac{1}{2}$	= 0·1	40	= 2·6
$\frac{1}{25}$	= 0·0026	2	= 0·13	60	= 4·0
$\frac{1}{20}$	= 0·0032	3	= 0·2	90	= 6·0
$\frac{1}{16}$	= 0·004	4	= 0·26	120	= 8·0
$\frac{1}{12}$	= 0·0054	5	= 0·32	$\frac{1}{2}$ ounce	
$\frac{1}{10}$	= 0·0065	6	= 0·4	(av.)	= 15·0
$\frac{1}{8}$	= 0·008	7	= 0·46	1 „	= 30·0
$\frac{1}{6}$	= 0·01	8	= 0·52	(or nearer 28·35)	
$\frac{1}{5}$	= 0·013	9	= 0·6	1 pound	
$\frac{1}{4}$	= 0·016	10	= 0·65		= 453·59

WEIGHTS. METRIC TO IMPERIAL.

1 kilogramme	...	...	...	...	= 2 lb. $3\frac{1}{4}$ oz.
500 Gm.	...	...	...	...	= 1 „ $1\frac{1}{8}$ „
100 „	...	...	...	...	= $3\frac{1}{2}$ oz.
25 „	...	...	...	...	= $\frac{7}{8}$ „
10 „	...	...	...	...	= $\frac{1}{8}$ „
1 „	...	...	...	...	= 15·43 grains.
$\frac{1}{2}$ „ or 500 milligrammes	...	...	...	...	= 7·7 „

MEASURES. IMPERIAL TO METRIC.

minim	Cc.	minims	Cc.	fluid oz.	Cc.
$\frac{1}{2}$	= 0·03	15	= 0·9	1	= 30·0
1	= 0·06	17	= 1·0	fluid ozs.	
minims		20	= 1·2	2	= 60·0
2	= 0·12	25	= 1·5	4	= 115·0
3	= 0·18	30	= 1·8	5	= 140·0
4	= 0·24	40	= 2·4	6	= 170·0
5	= 0·30	50	= 3·0	8	= 230·0
6	= 0·35	60	= 3·5	10	= 280·0
7	= 0·42	80	= 4·7	20	= 568·0
8	= 0·5	90	= 5·3	gallon	litres.
9	= 0·54	100	= 6·0	1	= 4·546
10	= 0·6	120	= 7·0		
12	= 0·7	240	= 15·0		

MEASURES. METRIC TO IMPERIAL.

1 Cc.	...	...	...	= 17 minims
1 litre	...	...	...	= 1 pint 15 fl. oz. approx.

MEASURES OF LENGTH.

1 micron	= $\frac{1}{1000}$ millimetre or $\frac{1}{1000000}$ metre
1 millimetre	= 0·039370 inch
1 centimetre	= 0·3937 inch
1 decimetre	= 3·937 inches

STATE OF NEW YORK

Year	Population	Area	Value
1870	1,000,000	50,000	100,000
1871	1,050,000	51,000	105,000
1872	1,100,000	52,000	110,000
1873	1,150,000	53,000	115,000
1874	1,200,000	54,000	120,000
1875	1,250,000	55,000	125,000
1876	1,300,000	56,000	130,000
1877	1,350,000	57,000	135,000
1878	1,400,000	58,000	140,000
1879	1,450,000	59,000	145,000
1880	1,500,000	60,000	150,000
1881	1,550,000	61,000	155,000
1882	1,600,000	62,000	160,000
1883	1,650,000	63,000	165,000
1884	1,700,000	64,000	170,000
1885	1,750,000	65,000	175,000
1886	1,800,000	66,000	180,000
1887	1,850,000	67,000	185,000
1888	1,900,000	68,000	190,000
1889	1,950,000	69,000	195,000
1890	2,000,000	70,000	200,000

Year	Population	Area	Value
1891	2,050,000	71,000	205,000
1892	2,100,000	72,000	210,000
1893	2,150,000	73,000	215,000
1894	2,200,000	74,000	220,000
1895	2,250,000	75,000	225,000
1896	2,300,000	76,000	230,000
1897	2,350,000	77,000	235,000
1898	2,400,000	78,000	240,000
1899	2,450,000	79,000	245,000
1900	2,500,000	80,000	250,000
1901	2,550,000	81,000	255,000
1902	2,600,000	82,000	260,000
1903	2,650,000	83,000	265,000
1904	2,700,000	84,000	270,000
1905	2,750,000	85,000	275,000
1906	2,800,000	86,000	280,000
1907	2,850,000	87,000	285,000
1908	2,900,000	88,000	290,000
1909	2,950,000	89,000	295,000
1910	3,000,000	90,000	300,000

STATE OF NEW YORK
 DEPARTMENT OF COMMERCE
 BUREAU OF STATISTICS
 ALBANY, N. Y.
 1911

ACIDUM ACETICUM.

Acidum Aceticum Glaciale (*Off.*). Contains 99% Hydrogen Acetate. $\text{CH}_3\text{COOH} = 59.58$ (60.03 I. Wts.). Sp. Gr. 1.058.

A colourless liquid crystallising when sufficiently cooled and remaining crystalline until the temperature rises above 60°F . The Sp. Gr. is increased by the addition of 10% of water (distinction from an acid containing 46%, which has the same Sp. Gr.). P. AUSTR. and P. BELG. have Sp. Gr. 1.064, *i.e.* 96%. (PH. NED. 97.2%.)

FR. CX.—Sp. Gr. 1.0553 at $15^\circ \text{C} = 100\%$.

Tests and Trade varieties P.J. i./07, 404.

Uses.—Is not given internally. It is applied to corns and warts. Has caustic action, but gives much pain.

Antidotes.—Chalk and water, alkalis, magnesia, washing soda, and then demulcents such as olive or almond oil, milk, or white of egg.

The Sp. Gr. 1.058 given by the B.P. is correct, but the M. Pt. is not.—P.J. ii./09, 69.

Cancerous subcutaneous nodules can be destroyed by injecting with this Glacial Acid, but may reappear some weeks later.—B.M.J. i./09, 593.

Acidum Aceticum (*Off.*).

Dose.—5 to 15 minims (0.3 to 0.9 Cc.).

This contains 33% of Hydrogen Acetate, Sp. Gr. 1.044. U.S. has strength 36% and Sp. Gr. 1.045 at 25°C . P. AUSTR. designates 'Dilutum' the acid with Sp. Gr. 1.041 (30%); PH. NED. 'Acidum Aceticum' 30%.

A product of the destructive distillation of wood and of the oxidation of ethylic alcohol.

Incompatibles.—Alkalis. (Hydrates, Carbonates, etc.)

Use.—Externally for ringworm.

Acidum Aceticum Dilutum (*Off.*).

Contains 4.27% Hydrogen Acetate, Sp. Gr. 1.006. (PH. NED. 6% FR. CX. 10%, Sp. Gr. 1.0142 at 15°C .)

Dose.— $\frac{1}{2}$ to 2 drachms (1.8 to 7.0 Cc.).

Uses.—May be given as an antidote to poisoning by alkalis, and largely diluted is applied as a lotion for inflamed joints, &c., and to bathe the skin as a refrigerant in cases of fever. Has been taken to reduce acidity, but is not to be recommended.

Cancer of the cervix uteri douched twice daily with weak solution of Acetic Acid. Patient kept fairly well for many years.—B.M.J. ii./09, 1441.

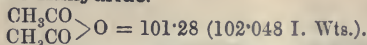
Oxymel (*Off.*).

Dose—1 to 2 drachms (3.5 to 7.0 Cc.).

Acetic Acid 1, Clarified Honey 8, Water 1, or *q.s.* to Sp. Gr. 1.320.

Acetum. *Syn.* VINEGAR. Contains about the same proportion of acetic acid as the official Dilute Acetic Acid. Varieties are those made from Malt and from White Wine.

Acetum Aromaticum, P.G.—Lavender, Peppermint, Rosemary, Juniper, Cinnamon Oils of each 1, Oil of Lemon 2, Oil of Cloves 2, Alcohol 441, Diluted Acetic Acid 650, Water 1900; all by weight. Macerate 8 days and filter.

Acetic Anhydride.—

A colourless liquid with powerful acetic odour. Sp. Gr. 1.080. B. Pt. 138° C. Made by distilling acetyl chloride with an alkaline acetate. *Tests* 95 to 98% pure, the rest being acetic acid. Not employed medicinally to any extent, but chemically, *e.g.* in the process of acetylation. Should be free from Hydrochloric Acid. Commercial Varieties.—P.J. i./07,404.

Acidum Amido-Aceticum.—*Syn.* GLYCOCOLL. $\text{CH}_2\text{NH}_2\text{COOH}$ = 74.52 (75.05 I. Wts.).

White crystals with sweet taste, soluble in water 1 in $4\frac{1}{2}$, slightly in alcohol, not in ether. M. Pt. 234° C.

Manufactured synthetically by heating monochloroacetic acid 1 with ammonium carbonate 3, to about 65° C., and finally to 130° C. Dissolve the residue in water, boil with lead oxide to remove ammonia, filter and remove the lead from the filtrate with Sulphuretted Hydrogen and evaporate to crystallise.

It is both acidic, by reason of its acid group, and basic, by reason of its amido grouping. It forms double salts with soluble metallic chlorides and nitrates.

The name ★“Glycine,” though applied in Chemistry to this body, has been given (P.J. i./07,208) to *p*-oxy-phenyl-amido-acetic Acid $\text{C}_6\text{H}_4\text{OH.NH}(\text{CH}_2\text{COOH})$ = 165.86 (167.082 I. Wts.). Stated to be *Soluble* about 1 in 30 water, but we could not confirm this. A saturated solution made in the cold yields residue corresponding to solubility of 1 in 400. A boiled solution on the other hand yields residue = 1 in 30 pointing apparently to decomposition. Used in photography as a developer.

For this purpose it is slow, but more suited for line negatives for process work and for “stand” development. The following solutions are used:—

- (1) A. Glycine 350 grains, Sodium Sulphite $2\frac{1}{2}$ ounces, Water to 20 ounces.
- B. Potassium Carbonate Solution 10%. For use, mix 1 of A with 2 of B.
- (2) Concentrated Developer.

Glycine 1 ounce, Potassium Bromide 20 grains, Potassium Carbonate 5 ounces, Sodium Sulphate 5 ounces, Water to 20 ounces,

For use mix 1 part with 3 of water.—Pharm. Form.

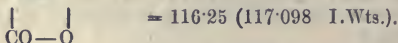
We found difficulty in dissolving in strengths stated.

Use of Glycocoll to detect levulose in presence of other sugars.—M. '08, 229.

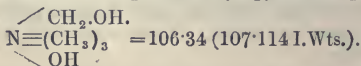
Hydrargyrum Glycocoll, Hydrargyri Amido-acetas.

$(\text{C}_2\text{H}_4\text{NO}_2)_2\text{Hg}$ = 345.84 (348.084 I. Wts.). Manufactured by dissolving freshly precipitated mercuric oxide in the acid. Injections of $\frac{1}{8}$ grain are employed.

Betaina. $\text{CH}_2\text{N}(\text{CH}_3)_3$



TRIMETHYL-GLYCOCOLL. Occurs in *Beta vulgaris*. It is formed on oxidation of Choline (a non-poisonous syrupy fluid, *v. p.* 866) :



A decomposition product of Lecithin. Has been found in a number of vegetable and animal substances. *Manufacture* of—*vide* C.D. i./10,119.

Muscarine (v.p. 689) and Neurine are allied bodies.

Acetyl-Choline causes very pronounced fall of blood-pressure. Butyryl-choline, Succinyl-choline and others have also been examined.—B.M.J. ii./o6,1789.

Betainæ Hydrochloridum.—*Syn.* ★ ACIDOL.

$C_5H_{11}NO_2 \cdot HCl = 152.44$ (153.566 I. Wts.).

Dose.—1 to 8 grains (0.065 to 0.5 Gm.).

White crystalline substance soluble in water 1 in 2; in alcohol about 1 in 20. Liberates hydrochloric acid (almost 25% of its weight), and is given with pepsin or well diluted with water.

Flavoring.—Glyl Rosæ, Glyl Menthæ Piperitæ, Syl Caryophylli; Syrupus Aurantii.

Hypodermic use is said to have cured tetanus.

Tablets are prepared to be given in half a glassful of water, containing 8 grains (0.5 Gm.) Acidol, also Acidol 0.4 Gm. (strong) and 0.05 Gm. (mild) with Pepsin 0.1 Gm. and 0.2 Gm. respectively.

ACIDUM BENZOICUM (*Off.*). U.S.

$C_6H_5 \cdot COOH = 121.13$ (122.048 I. Wts.).

Syn. BENZOYL HYDRATE.

Dose.—5 to 15 grains (0.32 to 1 Gm.).

Manufactured either from Gum Benzoin or from Toluol, the former being the more expensive.

Soluble, if pure, 1 in 400 of water; 1 in $2\frac{1}{2}$ of alcohol 90%; 1 in 7 of chloroform; and very soluble in fats, oils, alkaline solutions (forming benzoates), and in glycerin about 1 in 30. Should not develop odour of benzaldehyde, when warmed with its own weight of potassium permanganate and ten times its weight of dilute sulphuric acid (B.P. test for cinnamic acid). Solution in sulphuric acid when gently warmed should not turn darker than light brown, U.S. Commences to sublime at $100^\circ C.$ (U.S.) and melts at 120 — $122^\circ C.$ It prevents fats becoming rancid, as in Adeps Benzoatus (*Off.*) *q.v.*

Incompatible with Ferric Salts and Mercuric Chloride.

Uses.—Benzoic acid is an antiseptic, a stimulating expectorant, antipyretic and diuretic. It is given in cases of chronic cystitis, urinary calculi and incontinence, also for rheumatism, further in large doses in phthisis, diphtheria, tonsillitis and scarlet fever.

Four grains of Benzoic Acid with 1 grain of Canada balsam, or 1 minim of glycerin, make a good pill.

A one in 20 solution in alcohol relieves urticaria, and, as an Antiseptic Lotion or Gargle, 1 dissolved in 500 of water is employed, or it may be suspended with glycerin if more than will dissolve.

Uremic convulsions cease under free use of benzoates.—B.M.J. ii./o4,890; i./o6 126.

Use as Preservative.—Benzoic acid and benzoates are very harmful as preservatives, more so indeed than corresponding amounts of salicylic acid and salicylates. Use quite unnecessary.—P.J. ii./o8,253.

This opinion Wiley (America) reversed.—L. i./o9,508.

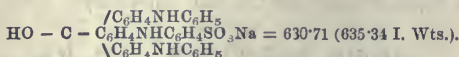
Thresh points out that to give doses in capsules as Wiley did is a very different matter from distributing the same dose over a lengthy period, as

in preserving food (L. i./09, 572). M. 1908 inclines to the use of Benzoic Acid, which he states is efficient in proportion of 1 per 1,000. Salicylic Acid has the disadvantage of sometimes giving phenol odour to the food.

Detection of, in Foodstuffs. Extract with a mixture of ether and petroleum ether in equal parts; this evaporated may contain saccharin (taste), salicylic acid (by its colour with ferric chloride), and benzoic acid—recognised by odour, crystalline form, and conversion into anilin blue by heating with Rosanilin and Anilin. This is Triphenyl-Rosanilin, $C_{38}H_{33}N_3O = 543.28$ (547.29 I. Wts.) or $C_{20}H_{16}(C_6H_5)_3N_3$ (P) = 525.4 (529.278 I. Wts.). Its Hydrochloride in commerce is called Spirit Blue, *Syn.*, Opal Blue, being soluble in spirit.

Water-Soluble-Blue is obtained by converting Spirit Blue (above mentioned) into Triphenyl-Rosanilin-Trisulphonic Acid by treatment with Sulphuric Acid, and is usually supplied as the Ammonium Salt. (Simpson.)

Nicholson's Blue is the Sodium Salt of Triphenyl-Rosanilin-Monosulphonic Acid made by sulphonating Spirit Blue (above mentioned) almost in the cold. Its composition is



Nicholson's Blue is dyed on wool or silk from a slightly alkaline or neutral bath. The goods are washed and then developed in a bath acidulated with Sulphuric Acid. The ordinary water-soluble blues dye from an acid bath.

—Dried Cranberries contain as much as 0.45% Benzoic Acid.—L. i./09, 1701.

Tablets, Compound, *v. Index.*

Benzoin (Off.)—There are two varieties known as Siam and Sumatra, the former being by far the best.

20 percent. total aromatic acid (calculated as benzoic) of which not less than $\frac{1}{2}$ shall be combined, suggested as a standard.—B. & C.D. i./05, 403. Benzoin of Commerce.—Holmes, P.J. i./07, 127.

Soluble constituents in Sumatra variety in Alcohol 90% averaged only 69%. Free Balsamic Acids as Benzoic 8.77%, combined 11.28%.—Southall's Lab. Report, 1907.

Tinctura Benzoini Composita (Off.). *Syn.* FRIARS' BALSAM, TRAUMATIC BALSAM.

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.), with yolk of egg. U.S. has approximately same composition.

Undiluted as a wound dressing. A drachm to a pint of hot water is valuable as a inhalation in acute laryngitis.

Tinctura Benzoini (Simplex), B.P.C.

One in 10 of Alcohol (90%). (U.S. 1 in 5.). One in Rose Water 40, useful as a face lotion in urticaria and in irritable conditions of the skin.

Pigmentum Benzoini. Gt. ORM. H. Benzoin 4, Storax 3, Balsam of Tolu 1, Ether 40.

Collutorium Acidi Benzoici, R.D.H.

Dose.—30 drops to half a tumbler of water.

Benzoic Acid 10 grains, Krameria Tincture 15 minims, Saccharin 6 grains, Peppermint Oil 2 minims, Cinnamon Oil 2 minims, Alcohol 90% to 1 ounce. 30 drops in $\frac{1}{2}$ tumbler of water. G.N.C. has this approx., designated Lotio Kramerie Composita.

Miller's Mouth Wash is similar.

Sphygmographic Varnish. Contains Benzoin, Balsam of Tolu and Alcohol; is used for pulse tracings.

Trochisci Acidi Benzoici (Off.).

Contain $\frac{1}{2}$ grain in each (fruit basis); those of T.H. have a red currant basis. Useful as a voice lozenge.

Ammonii Benzoas (Off.). $C_6H_5.COONH_4 = 138.07$ (139.082 I.Wts.).

Dose.—5 to 15 grains (0.32 to 1 Gm.).

In colourless laminar crystals; **soluble** 1 in 6 of cold water, 1 in 30 of alcohol, and 1 in 8 of glycerin.

C.R., 1908 advises limit of 10 parts per million of lead.

Flavoring.—Glyl Sassafras, Glyl Aurantii Amari; Syrupus Aurantii, Syrupus Tolutanus.

Useful expectorant in chronic bronchitis.

Magnesii Benzoas. $(C_6H_5.COO)_2Mg = 264.44$ (266.40 I.Wts.).

Dose.—5 to 15 grains (0.32 to 1 Gm.).

White crystalline powder. Antipyretic. **Soluble** in water 1 in 30, hardly soluble in alcohol 90%. Used as an anti-arthritis for rheumatism and cathartic in cirrhosis of the liver.

Sodii Benzoas (Off.). U.S. $C_6H_5.COONa = 143.01$ (144.04 I. Wts.)

Dose.—5 to 30 grains (0.32 to 2 Gm.).

In white granular crystals; **soluble** 1 in 2 of cold water (1 in 1.64.—P.J. i./02,552). Two varieties are in use commercially, one prepared from the acid obtained from Gum Benzoin and the other from the artificial acid—the cheaper of the two.

Flavoring.—Syl Vanillae, Glyl Carui; Syrupus Aromaticus, Elixir Simplex.

Acute lacunar tonsillitis is stated to be curable by Sodium Benzoate in 12 to 36 hours if given in 5—15 grain doses every 2 hours.—B.M.J.ii./09,193.

When raised arterial tension is a source of danger, may be given.—Brunton, L.ii./08,1132.

Tablets 2 grains each.

Effervescent Sodium Benzoate.

Dose.—1 drachm. Contains 6 grains in 1 drachm.

Aqua Hæmostatica, P. Belg. Benzoic Acid 2, Benzoin Tincture 10 Alum 80, Water to 1,000.

Pyranum.—Syn. ★ PYRENOL.

Dose.—8 to 30 grains (0.5 to 2 Gm.), thrice daily.

A white powder, said to be Benzoyl-thymol-sodium salicylate, but this is not the case. It was found to be a mixture of equal parts Sodium salicylate and Sodium benzoate with 0.2% free thymol added.—B.M.J.ii./08,204.

Soluble about 1 in $1\frac{1}{2}$ of water and 1 in 8 of alcohol 90%. Antipyretic and antineuralgic in sciatica and acute rheumatism. Large doses increase the diaphoresis in pleurisy.

Acidum Hippuricum.

$COCH.CH_2.NH.CO.C_6H_5 = 177.77$ (179.082 I. Wts.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

Syn. Benzamido-acetic acid, Benzoylglycocol.

This acid, occurring as white crystals, **soluble** in hot water (very slightly in cold—about 1 in 600), melting at $187^\circ C.$, may be prepared from the urine of herbivora, also synthetically by treating glycocol (Amido-

acetic Acid, $\text{CH}_2\text{NH}_2\text{COOH}$, *q.v.*) with Benzoyl chloride. Is employed as its salts :

Calcii Hippuras. $(\text{C}_9\text{H}_8\text{NO}_3)_2\text{Ca}, 3\text{H}_2\text{O} = 446.89$ (450.286 I. Wts.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

In shining white crystals, **soluble** 1 in 27 of water.

Sodii Hippuras. $\text{C}_9\text{H}_8\text{NaNO}_3 = 199.65$ (201.074 I. Wts.).

Dose.—5 to 30 grains (0.32 to 2 Gm.).

A soluble white powder used in gout, gravel, and calculus, as solvent for urates. A powerful depressant in arterio-scleros's.—B.M.J. i./05, 57.

Ammonii Hippuras $(\text{C}_9\text{H}_8\text{NO}_3)_2\text{H.NH}_4.\text{H}_2\text{O} = 390.36$ (393.214 I. Wts.).

Dose.—5 to 10 grains (0.32 to 0.65 Gm.).

In white crystals **soluble** in water and alcohol.

Use as Sodium Salt. Said to lessen blood pressure.—B.M.J. i./05, 57.

In raised arterial tension, where source of danger, 5 to 10 grain doses of these hippurates beneficial.—Brunton, L. ii./08, 1132.

ACIDUM BORICUM (*Off.*).

Syn. BORACIC ACID, HYDROGEN BORATE.

$\text{H}_3\text{BO}_3 = 61.49$ (62.024 I. Wts.).

Dose.—5 to 15 grains (0.32 to 1 Gm.).

In white laminar crystals, or as powder (that known as *Pulv. Acid. Boric. Subtilis* has been passed through a No. 170 sieve); with bitterish taste, made by the action of sulphuric acid on borax (and other borates.) **Soluble** 1 in about 25 of water, 1 in 3 of boiling water, 1 in 25 of 90% alcohol, 1 in 5 of glycerin at 32° F., 7 in 10 at 212° F., slightly soluble in volatile oils. Insoluble in ether.

1 Gm. boric acid dissolved in 50 Cc. water, after adding 50 Cc. glycerin requires not less than 16.2 Cc. normal sodium hydroxide to neutralise in presence of phenolphthalein. Corresponds to 99.8% pure H_3BO_3 . U.S. ($\text{H}_3\text{BO}_3 + \text{NaOH} = \text{NaBO}_2 + 2\text{H}_2\text{O}$). Suggested for new B.P.

Lead as impurity is of importance. Usual limit, 10 parts per million. C.R., 1908, advises this.

May be made into pills with glycerin of tragacanth, or with one-fifth of its weight of cream of tartar and water. Equal parts of boric acid and borax form a compound equally antiseptic and more soluble.

Incompatible with sodium salicylate in powder—a boro-salicylate apparently formed.—P.J. ii./05, 869.

Uses.—Antiseptic and antiputrefactive. In powder and crystals as dressing to wounds, sores, and skin generally. When mixed with starch it forms a useful “dusting powder” for infants, &c. A little in the socks or stockings prevents the odour of perspiring feet.

Cachets of Boric Acid contain 10 grains (0.65 Gm.), to sterilise the urine before and after bladder operations, and have been given in typhoid, also for cystitis.

50% of the acid administered is excreted in the urine within 12 hours, the other half remains in the body for 3 or 4 days, and hence may accumulate under repeated dosage.—B.M.J.E. i./06, 16.

In otorrhœa alcoholic solution of boric acid better than powder.—B.M.J. i./06,250.

With regard to the use of boric acid as a milk, cream, etc., preservative, it is asked—Can a child under one year of age take 10 grains of Boric Acid daily for months with impunity?—L. ii./03,170.

For further consideration of this subject *vide* Milk Analysis, p. 888 *et seq.*

Glycerinum Acidi Borici (*Off.*), **Glyceritum Boroglycerini**, U.S. (31 in 100.)

Heat Glycerin 9 (by weight) to not above 302° F., and add Boric Acid in fine powder 6. Continue heat with stirring until weight is reduced to 10, and add Glycerin (by weight) 10. Is the equivalent of **Boroglyceride**, which was a patented preparation. Readily miscible with water and alcohol. It is used, 1 in 40 of water, as food preservative. Useful in otorrhœa.

Pessus Boroglyceridi for vaginal use weigh 90 grains each, and contain 70 grains of Boroglyceride with gelatin 13 grains, and water *q.s.* See also **Ovules**.

Acidum Boro-Salicylicum.

A white powder soluble about 1 in 120 of water and about 1 in 8½ of alcohol 90%, has an action similar to Salicylic Acid. Strength of the combined acids 3 : 1 used by the Japanese.—B.M.J. ii./07,504. Is mostly employed as—

Sodium Boro-Salicylate.

Dose.—5 to 45 grains (0·32 to 3·0 Gm.).

Has been given in rheumatic affections.

Gauze, Boric, impregnated 20%, is in 6 yard pieces and in small sterilised cartons. (1 and 2 yd.)

Lint, Boric Acid 50%, coloured pink, 1 lb. rolls, should be kept in small sterilised cartons. (1 and 2 oz.)

Gossypium Acidi Borici, Boric Wool, 50% absorbent, pink coloured, is manufactured in 1 lb. rolls, and in convenient small sterile cartons. (1 and 2 oz.)

Liquor Antisepticus, U.S.

Average dose.—1 drachm (4 Cc.); Boric Acid 20, Benzoic Acid 1, Thymol 1, Eucalyptol 0·25, Oil of Peppermint 0·5, Oil of Gaultheria 0·25, Oil of Thyme 0·1, Alcohol 250 and Water to 1,000. Filtered through talc. Resembles ★ **Listerine**.

Lotio Acidi Borici. 4%.

A most useful soothing antiseptic lotion for the eyes, bladder, vagina, and mouth.

Cartons of Boric Acid Crystals.

Produce respectively 1 pint of 2% and Saturated Solution—sufficient for a day's use—the patient being directed to prepare a sterile solution, *e.g.*, for an eye lotion, freshly with boiling water.

Mistura Acidi Borici, L.L.

Boric Acid 10 grains, Dilute Nitro-hydrochloric Acid 10 minims, Compound Tincture of Gentian 1 drachm, Water to 1 ounce.

Pastillus Acidi Borici, T.H., v.p. 342.

Useful in aphthous affections of the mouth and throat.

Pessus Acidi Borici.

Ten grains (0.65 Gm.) in each, with oil of theobroma.

Convenient to replace douches after delivery.

Pulvis Acidi Borici Compositus, G.H.

Boric Acid 1, Zinc Oxide 3, Starch 6. For external application.

* 'Solubes' Boric Acid, 15 grains each. For dissolving in 2 ounces of water as an eye wash, or more for vaginal injection, or lotion to wounds.

'Solubes' Boro-Saline contain—

Sodium Biborate 5 grains, Sodium Chloride 5 grains.

'Solubes' Borax Compound contain—

Sodium Biborate 5, Sodium Chloride 2½, Phenol ½, Sodium Bicarbonate 2½ grains.

Ⓢ 'Solubes' Borax and Cocaine Co. contain—

Sodium Biborate 2 grains, Sodium Chloride 6 grains, Boric Acid 1 grain, Benzoic Acid ¼ grain, Menthol $\frac{1}{100}$ grain, Thymol $\frac{1}{100}$ grain, Cocaine Hydrochloride $\frac{1}{10}$ grain.

Dissolved in 2 or 3 ounces of warm water, and used as a nasal or throat spray.

Suppositorium Acidi Borici.

Three grains (0.2 Gm.) in each. Useful in pruritus.

Tablets, 5 grains (0.32 Gm.) of Boric Acid.**Unguentum Acidi Borici (Off.).**

Boric Acid, in very fine powder, sifted 1, Paraffin Ointment, white, 9. Mix. (1 to 6 in B.P. 1885.)

Suggested to first rub the powder with Olive Oil (10 minims to the ounce)—it will then mix better with the melted ointment.—C.D., Apl. 30/1910,57.

Unguentum Acidi Borici (Martindale).

	No. 1.	No. 2.	No. 3.
Paraffin (135° or 140°) ...	5	5	5
Vaseline ...	5	10	15
Boric Acid, in fine powder ...	2	3	4

Melt the paraffin and vaseline together; sift the Boric Acid into the liquid, and stir constantly till cold. These three ointments contain the same quantity of Boric Acid, *i.e.*, 1 to 5 of basis; they are also made **half** and **quarter strength**, *i.e.*, 1 of the acid to 11 and 1 to 23 of basis respectively. The ointment of full strength is used where cavities exist; the others are softer and used to superficial wounds. The No. 2 ointment is for general use.

Boric Acid ointment is applied to surface wounds, burns, eczema, chaps, pruritus ani et pudendi, and sores, as an antiseptic dressing and "healing ointment."

U.S. has Boric Acid 1, Paraffin (M.Pt. 51.6 to 57.2° C.) 1, White Petrolatum 8.

'Collapsubes,' *i.e.*, collapsible tubes (of pure tin) contain ointments, creams and lubricants, with catheter attachment for applying to the urethra, and with suitable tubes for the uterus and rectum. For general purposes 'Collapsubes' alone are provided. See Index for list.

Small size Collapsubes marked * in Index are convenient in ophthalmic surgery. With these a glass rod or camel-hair brush is supplied.

'Collapsubes' are suitable for introducing ointments into the nose. The patient should put the head well back and press the ointment into the nostrils.

'Collapsubes' containing Boric Acid Ointment No. 3 are convenient for the nursery and domestic use.

'Collapsubes' of Boric Cream are for toilet use.

Unguentum Acidi Pheno-Borici.

Contains $2\frac{1}{2}\%$ of Carbolic Acid added to either No. 1, No. 2, or No. 3 Boric Acid Ointment. In some broken skin surfaces this addition proves more healing.

Unguentum Lano-boricum Camphoratum.

Boric Acid Ointment (No. 2) $\frac{1}{2}$ ounce, Hydrous Lanolin $\frac{1}{2}$ ounce, Essential Oil of Camphor 20 minims.

For earache in children. Applied with a brush to the meatus useful.—Brunyee.

Vaselinum Acidi Borici.—*Syn.* BORIC VASELINE.

Boric Acid in fine powder 1, White Vaseline 9.

'Collapsubes' of Boric Vaseline with catheter attachment for urethral use, or with suitable tubes for uterine or rectal treatment are supplied.

Magnesii Boro-Citras.

Dose.—15 to 30 grains (1 to 2 Gm.).

In white powder or colourless scales, *soluble* in water; used as an urinary antiseptic internally for stone, gout, and rheumatism; and 1 with 2 of sugar is prescribed as **Boracite**, or compound powder of boro-citrate of magnesium. *Dose.*—60 grains *ter die*, to sterilise the urine 48 hours before operations.—L. i./o3,836.

Undergoes some dissociation in the body, and not without hæmostatic effect but inferior to the lactate *q.v.*, p 441.

Sodii Biboras. BORAX (*Off.*). Sodii Boras (U.S.) $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ = 379.12 (382.16 I. Wts.), (379.32 U.S. Wts.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

Soluble 1 in 25 water, (U.S., 1 in 17 at 25° C.) in glycerin 1 in 1, insoluble in alcohol (90%).

Incompatible with gums, mineral acids, also with cocaine hydrochloride, *q.v.*

Flavoring.—Glyl Pini, Syl Lavanduke, Syl Rosæ; Syrupus Aromaticus.

Uses.—As gargle in diphtheria, for aphthæ, cancrum oris, and gangrenous stomatitis; pruritus ani and vulvæ, in bromidrosis and fætid sweating of the feet.

Gouty affections have been treated with compresses of saturated borax solution.

Empirically for epilepsy in 8 to 15 grain doses with licorice to cover the taste. Rashes may result with this treatment.—II.

In very chronic epilepsy as an adjuvant to bromide, reinforcing its effect.—L. i./o9,908,

Mel Boracis (*Off.*).

Borax 1, Glycerin $\frac{1}{2}$, Clarified Honey 8.

Effects of Borax as Honey and Borax on an infant.—L. ii./07,369.

Sodii Boro-Tartras. *Syn.* TARTARUS BORAXATUS. PH. NED.

Dose.—30 grains (2 Gm.).

Sodium Biborate 2, Potassium Acid Tartrate 5, Water 15, evaporate until a little of the residue cooled is brittle. Powder and dry at 50° C.

Antiseptic and diuretic. May be tried for gout.

Perborates, derived from the hypothetical Perboric Acid, $\text{HBO}_3 = 59.49$ (60.008 I. Wts.).

Sodii Perboras. $\text{NaBO}_3, 4\text{H}_2\text{O} = 152.89$ (154.064 I. Wts.). A white powder with permanent qualities, prepared by the action of Boric Acid on Sodium Peroxide.

Preparation.—A 50% solution of Sodium peroxide prepared in the cold is saturated with carbon dioxide and then treated with a concentrated solution of Sodium metaborate. Sodium perborate separates when the liquid is cooled to 2°, providing sufficient water is present to keep all the alkali carbonate in solution.—J.C.S.A. ii./08,689.

Soluble in water, about 1 in 20, with decomposition.

Uses.—Antiseptic and deodorising.

Is stated to contain "10% active oxygen." This can be calculated as follows:—
 $8 (\text{NaBO}_3, 4\text{H}_2\text{O}) + 4\text{H}_2\text{O} = 2\text{Na}_2\text{B}_4\text{O}_7 + 4\text{NaOH} + 2\text{H}_2\text{O}_2 + 3\text{O}_2 + 32\text{H}_2\text{O}$

i.e., 1222.72 = 128 Oxygen available.

i.e., allowing for impurity, etc., "10%."

To produce oxygenated water, 1 kilo yields 104 Gm. or about 72 litres of active oxygen. This quantity will produce 7 to 7.5 litres of '10 volume' oxygenated water. The solution is not acid. It contains Hydrogen Peroxide and Borax.

In practice (a) 25 Gm. of the salt dissolved in a litre of water at 35° C. is said to give a '5 volume' strength Hydrogen Peroxide solution; (b) 170 Gm. with 60 Gm. Citric Acid makes a litre of '10 volume' strength.—*C.f.* B.M.J. i./05,42.

Some experiments were instituted to confirm these figures. Sodium perborate of Commerce was found to be 87% pure. It was found that (a) above gave, experimentally, only 1.6 times its volume approximately, not 5 times as stated. This, indeed, approximates theory as to above (which is virtually correct).

(b.) Experimentally, 11 volumes of oxygen were produced.

These solutions may be used to prepare antiseptic lotions, vaginal injections (about '5 volume' strength), *e.g.*, in leucorrhœa and metritis, and are useful in minor surgery. The dry salt may be used as a disinfectant, deodorant dusting powder.

Sodium Perborate Tooth Powder. Sodium Perborate 2% in Precipitated Calcium Carbonate.—B. & C.D., Jan., 1907.

* Perborol is a trade name for Sodium Perborate.

Sodium Perborate and Manganese dioxide are utilised in making oxygen baths.—L. ii./05,1338. Zinc, Calcium and Strontium Perborates are also prepared.—B.M.J. i./05,42,310.

Tonsillitis occurring as complication in typhoid treated with Sodium Perborate gargle, 2 drachms to the pint.—M.P. Feb./07,234.

*** Zymocide.**

A liquid antiseptic. Diluted 1 to 5 or 10 of water, is used as a vaginal douche, also as a toothwash, etc. Said to contain Extracts of Golden Seal and Calendula, Zinc Sulphocarbolate, Boric Acid, Witch Hazel, Sodium Thymolate, Menthol, and the Oils of Wintergreen and Eucalyptus.

ACIDUM CARBOLICUM.

(P) *Carbolic Acid and liquid preparations of Carbolic Acid and its homologues, containing more than 3% of these substances, except preparations for use as sheep wash or for any other purpose in connection with agriculture or horticulture, contained in a closed vessel distinctly labelled with the word 'Poisonous,' the name and address of the seller, and a notice of the special purpose for which the preparations are intended.*

(P) **Phenol** (*Off.*). U.S. *Syn.*—PHENYL HYDRATE, C_6H_5OH . = 93.34 (*Off.* and U.S. *Wts.*) (94.048 I. *Wts.*). *Dose.*—1 to 3 grains. (0.065 to 0.2 Gm.) *Fr. Cx.* : Max. single dose, $1\frac{1}{2}$ grains; max. during 24 hours, $4\frac{1}{2}$ grains approximately.

In colourless crystals liable to become pink*; neutral to test paper; obtained commercially from coal tar. Melts at not lower than $38.8^\circ C$. A pure Phenol is manufactured synthetically from benzene and from anilin oil.

Antidotes.—It causes more deaths from poisoning than any other drug. (It is excreted mostly in the urine in the form of phenyl-sulphuric acid.) Wash out the stomach with water by a tube several times with great care. Apomorphine is the most prompt and suitable emetic, give also magnesium or sodium sulphate (said to form Sodium Sulphocarbolate, but we doubt it†). White of egg, and large doses of any innocuous oil should be given. Calcium saccharate is also recommended. Caffeine is also an antidote.—B.M.J. ii./01,713. Turpentine has been suggested. Amyl nitrite capsules, hot-water bottles. Camphorated Oil (2 drachms) has been used with recovery.

Iodine believed to be the true Antidote. Use within obvious limits the same quantity of Tincture of Iodine as of Liquid Carbolic Acid. Three cases successful.—L. ii./07,294.

Solubility.—100 parts are liquefied by 10 of water, should form a clear liquid with 30 to 40 of water, and should be completely dissolved by 1,200 of water (*Off.*). Also soluble $3\frac{1}{4}$ in 1 glycerin, 3 in 1 chloroform (nearly), 1 in 2 olive oil, 5 in 1 ether, 6 in 1 alcohol (90%), $2\frac{1}{4}$ in 1 benzol (nearly), and 1 in about 20 vaseline.

Flavoring.—Glyl Coriandri, Syl Vanillæ; Tinctura Lavandulæ Composita, Tinctura Cinnamomi.

Uses of Phenol.—A powerful antiseptic, anti-putrefactive, caustic (alcohol is said to prevent this), and applied locally, anæsthetic. Internally for dyspepsia and flatulence, *e.g.*, with rhubarb and nux vomica extract in pill. Also for the plague, tetanus and erysipelas, in typhoid fever and diarrhœa, in pills coated to render them soluble in the intestines, *c.f.* Stearipills, and in puerperal fever, also in phthisis, bronchitis, pertussis, and for the gangrenous stage of pneumonia.

One in 80 or more of water as a vaginal injection in leucorrhœa, uterine

* A little sulphurous Acid will prevent this for a long time.

† *C.f. also Brown, Am. Med. Ass. Jl., who states these substances do not combine in vitro either in neutral, weakly acid or weakly alkaline solutions, and that the coagulable and blood-pressure effects of Phenol are not modified in the slightest degree by intravenous injections of Sodium Sulphate.*

‡ Water 1 in 14, glycerin 1 in 0.33.—P.J. ii./03,883.

ulceration, and cancer; cleanses, heals, disinfects and allays pain, and is suitable as a gargle.

Carbolic Lotion 1% keeps off mosquitos and relieves bites of same. 2% is effective for disinfecting instruments, the skin, and for artificial dentures left in soak all night.

Horticultural uses of, as wash.—P.J. ii./08,722.

References to use of Carbolic Acid.

A 10% solution with cocaine added, relieves non-suppurative middle ear diseases.—B.M.J. ii./04,1211.

Compresses soaked with 5% solution of Phenol may cause coma.—L.i./95,1362; M.C. Dec./97,208. Even 1 in 40 has caused carboloria and death when applied to penis after circumcision.—W. W. W. Also after use as lotion on leg.—L. i./03,1099. Danger when used as dressings to extremities—fingers and toes.—B.M.J. i./07,1110.

Small-pox pustules have been touched with liquid acid with good results.—L. ii./03,1153,1781.

As a pigment for erysipelas.—B.M.J. i./01,1142.

Tetanus treated by 1·5 Cc of 2% Solution injected, repeated next day, then 1 Cc, again at noon, 4 and 8. Symptoms abated.—L. ii./08,1027.

For pruritus vulvæ 3 to 10% solution in one part Alcohol and 3 parts Water, combined with prolonged alkaline baths (e.g., $\frac{1}{2}$ lb. or more of Sodium Carbonate added to the bath).—B.M.J. ii./08,632.

In surgery while strong solutions are to be avoided, weak solutions may also prove dangerous owing to great penetration of solutions containing less than 5% Carbolic Acid.—L. i./09,564.—We think this is, perhaps, a slight exaggeration. 'Carbolic Lotion' of 3 to 5% strength if used with reasonable care is safe.—W.H.M.

Sapraemia treated by swabbing out the uterus with a mixture of equal parts Carbolic Acid and Camphor.—L. ii./09,339.

In pruritus the Carbolic Acid and Tar series of drugs much employed.—B.M.J. ii./09,452.

Ⓐ **Absolute Phenol**, in 1 lb. bottles and 28 lb. tins. In the form of detached crystals melting at not lower than 40° C. (104° F.), the official not lower than 39° C. (102° F.), these are hygroscopic and have a sweet taste, and are best adapted for surgical use.

Ⓐ **Tablets** $\frac{1}{4}$ and $\frac{1}{2}$ grain for internal administration.

Ⓐ **Solubes**, 5 and 20 grains, on dissolving, produce antiseptic lotions.

Merck makes Carbolic Acid Tablets with 3 molecules Phenol to 1 molecule Potassium Carbolate—said to be more soluble.

A further variety is in crystalline masses, known as "Ice Crystals," melting at 39° to 40° C. (102° to 104° F.); this is also termed No. 1 Acid.

Ⓐ **Acidum Carbolicum Liquefactum** (Off.).

Dose.—1 to 3 minims (0·06 to 0·18 Cc.).

Ten parts of water by weight added to 100 of above—(crystallises in winter; is better with 15% at least.—P.J. ii./00,473.) (U.S. has 86·4% of acid. Sp. Gr. 1·064 to 1·069—at 25° C.) P. Austr. and Ph. Ned. have same strength as Off. This is used as a caustic.

Trouble frequently arises with liquefied phenol in the winter when there is a sudden drop in the temperature. Experiments which we conducted showed that the proportions 8-1, 9-1, 10-1 are all apt to separate.

It is suggested to increase water so as to give 50 grains of Phenol in a drachm in the next B.P.—C.R., 1908.

Ⓔ^o **Liquid Carbolic Acid, No. 2.**—For general disinfection in infectious diseases. 1 in 40 may be sprinkled about rooms. Ⓔ^o **No 4**, in 16 oz. bottles, or in bulk. Is pale straw coloured. This contains about 10% of Phenol and nearly 90% of Cresols. Solution 1 in 40 of hot water for household disinfection. Ⓔ^o **No. 5**, dark coloured, in gallon jars or bulk. For stable use, dust-bins &c. **Disinfectant Powder** contains 15% phenols (cresol crude) mixed with a dry powdered earth.

Ⓔ^o **Acidum Cresylicum.** Cresolum Crudum P.G. iv., U.S., Fr. Cx.
Syn. CRESYL, PARACRESYLOL, CRESYL HYDRATE, METHYL PHENOL, METHYL HYDROXYBENZENE, &c. $C_6H_4.OH.CH_3 = 107.25$ (108.064 I. Wts.). KRESOLUM CRUDUM P. HUNG, is "ACIDUM CARBOLICUM FLAVUM 100%."

A yellowish liquid with tar-like odour.

A mixture of ortho-, meta-, and paracresols, forming the principal constituent in crude carbolic acids. Ortho-cresol (1:2) melts at 31° C. and boils at 188° C. Meta- (1:3) is a colourless liquid, boiling at 201° C. Para- (1:4) melts at 36° C. and boils at 198° C. Fr. Cx. requires, in the following proportions: Ortho, 35; Meta 40, Para 25. The commercial article is much less soluble in water than Phenol and is not so poisonous. It is recommended for vaporization in whooping-cough.

U.S.—Sp. Gr. 1.036 to 1.038 at 25° C. When distilled 90% should boil between 195 and 205° C. A note on the varieties.—P.J. i./07,261.

Soluble 1 in 70 water, miscible with alcohol 90%, chloroform, ether, castor oil, and glycerin in all strengths. Also miscible with almond and olive oil in all proportions, but to make a clear solution we found about 1 in 2½ necessary. Used in making Liquor Cresoli Saponatus, *q.v.*

Certain names and phrases occur regarding the constituents of disinfectants which should be grasped:—

"**Tar Acids.**"—Oxygenated Hydrocarbons including Phenols, Cresols and higher Hydroxy compounds.

"**Phenoloids.**"—A vague term. These bodies appear to contain a larger proportion of hydrogen to carbon than the members of the phenol series and less than members of the cresol series.—L.H/09,1455. They probably consist of a mixture of oxidised hydrocarbons.

"**Tar Oils.**"—The neutral bodies present *i.e.*, insoluble in soda.

"**Coke Oven Oils.**"—Contain varying percentages of "Phenoloids" with "Tar Oils."

Ⓔ^o **Kresolum, Ortho Kresolum, P. Austr.**

In colourless acicular crystalline masses becoming yellow or brown. By the addition of one-tenth of water it forms Ⓔ^o **Kresolum liquefactum.**

Ⓔ^o **Trikresol**, a German specialty, is a purified mixture of the three cresols. It is a clear, colourless, oily liquid, soluble about 1 in 40 of water, and is said to have three times the germicidal power of Phenol. For surgical use, ½ to 1% solution. As an eye-wash 1 in 1,000 or 2,000.

Ⓔ^o **Trikresol-formalin.** These substances in proportion of 4 to 1 form a useful application as a dental dressing.

Ⓔ^o **Creolin Pearson** (20% Cresylic Acid), Ⓔ^o **Kelvolln** (40%.—L. i/04,369).
 *Izal† (Medical).

Dose.—15 to 60 minims in ½ to 1 ounce milk or water.

An emulsion containing 45% Izal Oil—a "Coke Oven Oil," used as a non-poisonous disinfectant and antiseptic, 1 in 200 of water. It is destructive to *B. coli* and other organisms, and has been used pure in ringworm. Internally in cholera. In an epidemic a stock emulsion with Tragacanth mucilage, made of strength 1 drachm = 15 minims, is useful. It contains Phenoloids.

* But see par. p. 11.

† Makers say not Ⓔ^o.

Capsules of Izal, (plain) 2 minims and Izal 2 minims with Cod Liver Oil 5 minims are supplied for use in phthisis.

Izal with Bismuth Subnitrate and Chloromorphia Solution is useful in dysentery. See also *Public Health*, March, 1908, for results in typhoid.

Izal Fluid, containing the same amount of impure Izal Oil is also supplied. Strength of 1 in 400 disinfected *Staphylococcus pyogenes aureus* in pus in 15 minutes—in a simple broth culture 1 in 600 will do the work in 5 minutes.

Ⓢ***Lysol**.—A dark alkaline liquid containing about 50% Cresols.

Miscible with water. Prepared by mixing Oil of Tar with Linseed Oil or with a fat and saponifying the mixture with Caustic Potash and Alcohol.—B.M.J.E. ii./60,80. *vide also infra*.

Incompatible with acids.

In lupus applied daily or every other day. One per cent. solution in aural practice and midwifery.

For otorrhœa.—B.M.J. i./03,44, Poisoning by.—B.M.J. i./00,1498 B.M.J.E. ii./08,63; ii./01,173. 100 cases B.M.J.E. ii./06,80.

Antidotes.—Egg Albumin, Oil, Butter—on no account give water.

Sweating of phthical patients treated by 3% Lysol Solution allowed to dry on after sponging. Is stated to operate well using the solution as hot as can be borne.—B.M.J.E. ii. 08,32.

Case of poisoning by drinking 3 ounces, stomach washed out about a dozen times with tepid water. Recovery under external stimuli.—B.M.J. ii./08,1495.

The following is a representative Liquor:—

Ⓢ***Liquor Cresoli Saponatus**, P.G. iv.

Melt Potash Soap 1 on a water bath, incorporate Crude Cresol 1, and warm to dissolve.

The following was found convenient by Cowley, of Brisbane: Dissolve Caustic Potash 5.75 in water 5 and Alcohol (S.V.M.) by weight 10, and heat to saponify with Olive Oil 20 by weight, then add Cresylic Acid 50.—A clear liquid neutral to phenolphthalein and soluble in water.—P.J. ii./03,202.

Ⓢ***Aqua Cresolica**. P.G. iv. is 1 of above to 9 of water.

Ⓢ***Liquor Cresolis Compositus**, U.S. Cresol 500, emulsified with linseed oil 350, and potassium hydroxide 80, in water a sufficiency to make 1,000 (all by weight). Requires care in production. We find it best to first make the soap and then add the cresol little by little to it.—Am.Jl.Ph., Feb.06,100, recommends adding the soap to the cresol.—*Ibid.*, Mar.1906,171, gives further details.

Nitardy finds the U.S. formula the best that can be produced, but directs the potash to be dissolved in water 50 Gm. in a tared dish, Linseed Oil 350 Gm. to be added and the whole mixed thoroughly. Heat on a water bath to about 70°C incorporate alcohol 35 Cc, and continue heating to saponify, then add the Cresol, stir well, cover the vessel, allow to stand, stirring occasionally, until a clear solution is formed, finally add water q.s. to 1000 Gm.—Am.Jl.Ph., May, '03. 212. 2% of any Volatile Oil may improve it.

Is said to be 1½ times as active as Liquid Phenol —L. ii./07,543.

Sommerville finds the Rideal-Walker coefficient to be 2.5.—B.M.J. i./08,300. Typhoid and Diphtheria Bacilli are stated to be killed in 1 minute by a 2% solution.—P.J. ii./07,778, L. i./08,576.

But the above liquor, however prepared, is *soluble* in water or nearly so. The Lancet Commission (*vide infra*) views the miscible products with disfavor; those forming emulsions with water as a rule being more potent.

The disinfecting power of the higher phenols increases in proportion to their position in the homologous series, but their solubility *decreases* proportionately. Bodies, therefore, with the diphenyl nucleus which have become so popular can only be used as *emulsions* made with vegetable or

with Tar Oils, glue, etc. Use of alcohol to dissolve reduces activity. An emulsion is more likely to have higher germicidal value.

'Commercial Carbolic Acid' nowadays consists of 95% cresols and higher bodies, but little phenol. Saturated solution $\frac{1}{2}$ % of Cresylic Acid of this type is weaker than 5% Phenol, which in itself is an inefficient germicide for spores.—Hewlett, L. i./09,893.

Pharm. Form. gives several formulæ for preparations of this kind, *e.g.* : "Creosote" which is rich in cresols and contains comparatively little phenols, obtained from blast furnaces 30 parts, boiled with Soft Soap 10 and Soda Solution (10%) 30, for an hour, then set aside, and the dark liquid drained from any oily portion floating on top.

Crude Carbolic Acid (or "Creosote Oils" if cheapness is desired) may be emulsified with a palm oil or resin oil soap, the necessary Carbolic Acid, Soda Ash and Water being boiled together—on any of these lines, particularly in employing resin oil, it is stated one obtains a disinfectant forming an *Emulsion* with water.

The **Lysol Patent** specification (expired) gives the following formulæ :

(i). Tar Oil 100 Gm., Linseed Oil 100 Gm., Caustic Potash Solution (1 in 2) 75 Gm., Alcohol 65 Gm. Boil in apparatus having reflux condenser until saponified.

(ii). Tar Oil 40 Gm., Common Resin 10 Gm., Caustic Potash Solution 70 Gm., Alcohol 70 Gm.

N.S.D. p. 1466 says *re* Lysol, the 190-200°C. fraction from Tar Oil is dissolved in fat and saponified after in presence of Alcohol.

Our own experiments showed that the first Lysol formula gives a fairly good emulsion with water if using a Coke Oven Oil but even when using the strongest Coke Oven Oil obtainable, the Phenoloid content is not high enough to satisfy the latest requirements, *vide* p. 17, *et seq.* The No. ii. formula does not produce a good emulsifying Disinfectant.

So far as these formulæ are concerned it may be said at once that the production of disinfectants that shall fulfil the latest requirements is not a simple matter. Their manufacture is the outcome of prolonged and extensive research, and they cannot be prepared and standardised on a small scale by the pharmacist. *c.f.* also Pharm. Form. p. 404-405.

***Cyllin Medical.** *Dose.*—1 to 5 minims (0.065 to 0.32 Cc.).

Contains 60% of certain members of a series of oxidised hydrocarbon, having a diphenyl nucleus in place of the single phenyl found in carbolic acid; it is neither caustic nor toxic, emulsifying with water, and is a deodorising bactericide. Its Rideal-Walker carbolic acid coefficient for *B. typhosus* is 20.

According to the Manufacturers, Cyllin does not contain so much as 3% of Carbolic acid or its homologues.

For lotions 1 to 200; as a douche 1 to 400.

As ointment for erysipelas, eczema, and scabies. May contain 5% with Adeps Lani. Lano-Cyllin is supplied.

Lotio Creolin—St. Th. H. Cyllin 1, Glycerin 8, Water to 160. St. J. H. 1 in 320 without glycerin, 1 to 2 drachms in a pint of water.

Capsules—1 and 3 minims keratin-coated, have been used in summer diarrhoea, dysentery, colitis and sprue.

Cyllin Dusting Powder—Substitute for Iodoform. **Gauze**—10% 1, 5 and 20 yards rolls. **Inhalant**—Antiseptic. For use in phthisis with an air inhaler. **Pastils**—contain $\frac{1}{10}$ minim in each. **Plaster**—5%. **Rectones**—(Suppositories). **Soft Soap**—Contains 5%; **Surgical Soap**—10%. Liquid Soap is also made.

Unguentum (Creolin) Cyllin Compositum—St. J.H., Cyllin $\frac{1}{2}$, Soft Soap 1, Ammoniated Mercury Ointment 4, Soft Paraffin 8.

Unguentum (Creolin) Cyllin cum Acido Salicylico—St. J.H., Cyllin 1, Salicylic Acid 1, Soft Paraffin to 6.

Cyllin Syrup.—*Dose* for adults 10 to 60 minims, for infants 5 to 10 minims. In infantile diarrhoea encouraging.—L.ii/06, 1078.

Poisoning by Cyllin in an infant. Apomorphine $\frac{1}{20}$ grain produced vomiting. Artificial respiration necessary for three hours after lavage with Albumen Water and Strychnine hypodermically to restore consciousness. B.M.J.i/09, 18.

In chronic eczema 1 in 200 as antiseptic with Lotio Calaminæ Oleosa (q.v.) B.M.J. i/09, 1311.

Ⓢ **Jeyes Fluid Disinfectant** to be distinguished from Cyllin (medical). It contains cresols, with resin soap. Solutions (1 and 2%) as antiseptic lotion, and injection 1 in 400 is said to be of value in gonorrhoea, also in ozæna.

Rideal-Walker Carbolic Acid Coefficient. (c.f. B.M.J., i/07, 841.) Rideal and Walker advocated comparison of germicidal value of different disinfectants with Carbolic Acid. The Coefficient is determined by finding experimentally the dilution of the antiseptic sample under examination, which will destroy a given organism in the same time as the standard Carbolic Acid Solution which latter may be any strength (1:100 etc.). Divide the figure showing the dilution of the sample by that representing the dilution of the Standard Carbolic Acid to obtain the Carbolic Acid Coefficient. It should be carefully noted that the figure for a disinfectant varies for different organisms.

Hewlett describes the method concisely.—I. i/09, 819.

Muir and Ritchie state that 1% is sufficient to kill spores of anthrax, etc.

The suggestion has been made to alter the Rideal-Walker Coefficient Method of examining Disinfectants by introducing organic matter into the disinfectants, as it has been claimed that the real test of a disinfectant is the strength and time of exposure which will enable it to kill organisms in the presence of a definite proportion of standard extraneous matter. Milk, urine, fæces, etc., have been suggested, but the idea has met with disfavour, particularly from the devisers of the method who have objected to the idea.

Experiments indicate that the Rideal-Walker Coefficient should be known concerning a disinfectant, and also the same Coefficient when tested in presence of organic matter—fæces blood, etc.

The **Garnet Method** of conducting the test is described.—B.M.J. ii/09, 213.

Chloro-Meta-Cresol is stated to be a potent germicide. **M-Xylenol** is even better,—a 5% solution disinfected Sputum completely in 3 hours. 10% Lysol tested in same way required between 12 and 24 hours.—B.M.J. ii/09, 213.

Schryver and Lessing's method of standardisation depending on change of electric conductivity of the fluid.—B.M.J. i/09, 1376.

Quantitative test for Phenol suggested for official requirements, *e.g.* treatment with a known excess of bromine solution and titration of residual amount by decinormal thiosulphate.—B. & C.D. ii/98, 651.

L.C.C. Report on Disinfectants:—Phenol Solution 1 in 20 and Mercuric Chloride 1 in 1,000 are true germicides for B. tuberculosis.—L. i/02, 758.

Comparative strength with Sanitas and Formalin.—B.M.J. ii/04, 18.

Disinfectants etc., should be tested 24 hours after they have been mixed. Considerable differences arise with disinfectants which separate on standing.—Lii/08, 902, 1177, 1845.

Cyllin is stated to be thrown out of solution forming an oily sediment when diluted with sea water: Sanitas Okol testing 20.5 by the ordinary Rideal-Walker test gives a coefficient of 13.6 when mixed with sea water. L.ii/08, 1942, see also L.ii/08, 1772.

Regulation of the sale of disinfectants.—Hewlett. Portion of Third Lecture.—L.i/09, 893.

* But see par. page 11.

Chick and Martin. Standardisation in presence of fæces.—There is no doubt that if faecal matter be introduced as a normal standard many reputed disinfectants must lose much of their reputation.—B. M. J. i/09, 286; 296.

The "Lancet" instituted a chemical and bacteriological inquiry into the value of Disinfectants then upon the market. The chemical examination of the COAL TAR EMULSION DISINFECTANTS gave the following:—

Disinfectant	Hypothetical Phenol Content by Bromine, termed 'B'	Proportion of Phenols or Phenoloids 'P'
*Cofectant ...	38.3	66.27
Sanitas Bactox ...	19.3	39.7
„ Okol ...	27.44	48.5
Cyllin (Bulk) ...	24.16	40.41
McDougall's M.O.H. Fluid	22.71	47.13
*Kerol ...	17.23	40.56
Izal ...	25.48	41.35
Cyllin Medical ...	12.79	32.08
Pearson's Antiseptic Fluid	12.73	20.7
Jeyes' (Chemists') ...	11.5	17.8
Lawes' ...	18.08	28.2
Zotal ...	6.7	10.0
Krysyl ...	9.87	14.16
Jeyes' No. 2 (Grocers') ...	1.87	5.13
Crude Carbolic Acid	61.65	82.65
Calvert's No. 5 ... Carbolic Acid	74.09	93.26
Trikresol	—	—
Lysol ...	40.45	50.96

② *Cofectant was found on analysis to have the following composition: Phenols or Phenoloids 66.27, Resins with fatty Acids 24.66, Water 6.4, Potash 2.67%. (Total neutral excipients 33.72%.)—L. ii/09, 1457.

A useful *Acetone-Baryta* method of examining these preparations is given,—Baryta for precipitating fatty acids, resins and neutral oils; Acetone for washing out the Oils. The Phenoloids are determined by weight and controlled by Bromine absorption. In most cases the Carbolic Acid value thus found was considerably less than the Phenolic residue found by weight—real Carbolic Acid is in fact not the basis of the preparations advertised to the public, but it was found that the wider the discrepancy the greater the germicidal power bacteriologically. Chemical analysis ought to give the value of a disinfectant.—L. ii/09, 1454.

In the estimation we learn from Mr. Vasey it is important to avoid considerable excess of Bromine which tends to oxidation of the Phenoloid and hence false values. It is best to take 0.2 to 0.5 Gm. of the Phenoloid in a large bulk of water containing excess of HCl and add Standard Bromine Solution to it from a burette until yellow colour is shown permanently. End reaction is very sharp.

The "Lancet" Commission, in view of the fact that the Rideal-Walker method has hitherto been so popular, decided that this method should be used in their preliminary work at any rate, as it would be understood by Medical men, but results were disappointing. The Commission modified

the method. The Rideal-Walker method requires attention to a large number of details which are specified. The "Lancet" used *B. Coli* as organism. Special apparatus was employed for "seeding" the disinfectants and conveying samples of the mixtures to the culture tubes.

The "Lancet" Carbolic Acid Coefficient. *The figure representing the percentage strength of the weakest lethal dilution of the Carbolic Acid control was divided by the figure representing the percentage strength of the weakest lethal dilution of the disinfectant being tested. This was done at 2½ and at 30 minutes and a mean of the resulting figures was taken as the Carbolic Acid Coefficient.*

The results were as follows :—

COAL TAR DISINFECTANTS FORMING EMULSIONS WITH WATER.—
List of Coefficients.

Cofectant	...	...	9.8	Cyllin Medical	...	...	6.4
Sanitas Bactox	...	...	9.5	Pearson's Antiseptic Fluid...	...	...	2.2
„ Okol	...	...	8.9	Jeyes' (Chemists')	...	...	1.7
Cyllin ('bulk')	...	...	8.8	Lawes'	...	...	1.6
McDougall's MOH Fluid	...	...	7.9	Zotal...	...	...	1.5
Kerol	...	...	7.7	Krysyl	...	...	1.3
Izal	...	...	7.4	Jeyes' No. 2 (Grocers)	...	...	0.75

CLEAR WITH WATER,—

Crude Carbolic Acid	...	...	...	4.2
Calvert's No. 5 Carbolic Acid	...	...	...	2.5
Trikresol	...	...	...	2.5
Lysol	...	...	...	1.7

L. ii/09, 1516.

The results (chemical) of the Commission point *inter alia* to the fact that in the case of most of the tar disinfectants the disinfectant should contain a reasonable amount of Phenols and Phenoloids (see Table above) and the dilutions with water should show Brownian movement, in other words the disinfectant should emulsify properly. The Commission finds that on deducting the percentage Bromine value in terms of Carbolic Acid ('B') from the percentage weight of Phenoloid bodies (P) the figures obtained give results, as a rule corresponding with *bacteriological* germicidal values. When these results are divided by 3 a quotient is obtained which coincides with the Carbolic Coefficient (using *B. Coli*),

i.e., $\frac{P-B}{3}$ gives the Carbolic Coefficient for *B. Coli*. In certain instances, e.g. Calvert's No. 5, Lysol and Lawes' Fluid, the chemical result comes out higher than the Bacteriological. These do not form emulsions with water, which seems to be a *sine quâ non*. The Factor $\frac{P-B}{3}$ can be rapidly determined, as already detailed, enabling a distinction to be drawn between disinfectants.

It is important to realise that B is only a hypothetical Carbolic Acid, value, e.g., if one finds a 'P' = 8 and a 'B' also = 8 it does not mean that the value of the fluid is nil $\frac{(8-8)}{3}$. It means that the fluid is the same germicidal value as the

Standard, Carbolic Acid of 8% strength and that we are dealing with a solution of pure Carbolic Acid not phenoloids at all and the germicidal efficiency would be the same as an 8% actual Phenol Solution.

The Lancet Coefficient compares % dilutions whilst the Rideal-Walker Coefficient compares the figures representing the dilutions (c.f. p. 16)—inversely.

The Commission has never found such high Carbolic Coefficients as have been given by others. Many Disinfectants have, therefore, been incorrectly praised. Even these (bacteriological) results are not conclusive; many other problems suggest

themselves, *e.g.*, foreign substances in the matter to be disinfected, temperature, type of diluent water used, type of micro-organisms to be destroyed,—more work is required.—L.ii./09,1616.

L.ii./09,1841 replies to critics^{re} the Commission report. The "Lancet" appears to justify itself on all points. It confirms that neither with the Rideal-Walker nor with the modification of the method made use of by themselves, have they under any conditions obtained (any) Carbolic Acid Coefficient figure higher than 13 amongst the disinfectants under consideration.

Sanitas Okol and Sanitas Bactox, it is contended, were examined in an old and superseded style.—L.ii./09,1850. Sanitas Fluid should not have been classed among tar disinfectants. This was an acknowledged slip.

Full description of Sanitas,—not intended as a powerful germicide.—L.ii./09,1850.

Cofectant bought in bulk is cheaper than Carbolic Acid.—L.ii./09,1858.

Jeyes' Managing Director, Ainslie Walker intimates that Jeyes' Fluid has a Rideal-Walker Coefficient ranging from 5 to 22 according to purpose required,—*e.g.*, the brands Crude Cyllin and Special Fluid Cyllin.—L.i./10,68. See also Rideal on two of Jeyes' products.—L.ii./09,1849.

(P) Phenoloid Disinfectant, *Martindale*, contains 66% of Phenoloids. It emulsifies with water.

For use to mucous membranes 0.1% is efficient or 10 minims to the pint approx.

For general disinfection—utensils, drains, cloths, etc., 1 in 200 to 1 in 500—the stronger (1 table spoonful to 5 pints), to be used where practicable.

(P) Carbolic Acid, Camphorated.

Phenol 12, Camphor 4, Water 1.

Melt or rub together till liquefied. Is not miscible with water or glycerin. Antiseptic, and local anæsthetic, serviceable in toothache.

(P) *Carbolic Acid Lotion. *Syn.* PHENOL LOTION.

Liquefied Phenol 1, Water 19 or more.

Solutio Phenols, or *Aqua Phenolata*, should contain 2% of Phenol.—C.U.D. Confirmed by F.I. *Aqua Carbolisata* P. Jap. is this.

(P) Lotio Acidi Carbolici et Cocainæ.

Carbolic Acid $\frac{1}{2}$ drachm, Cocaine Hydrochloride $\frac{1}{2}$ drachm, Cherry Laurel Water 1 ounce, Rose Water 3 ounces. For pruritus.—B.M.J.ii./04,980.

In the later stage of treatment of chronic eczema a Lotion containing Phenol, Liqueur Picis Carbonis, Glycerin and Spirit as a stimulant to growth of healthier epidermis.—B.M.J. i./09,1342.

(P) *Carbolic Oil.

Phenol 1, Olive Oil 19 (more or less, if ordered). For burns and scalds.

Scarlet Fever.—Children suffering with, disinfected by rubbing with 10% Carbolic Oil or Eucalyptus Oil. Tonsils also painted with 10% Carbolic Oil during the first 24 hours.—B.M.J. ii./08,1333.

We would suggest caution in such procedure.

(P) Lund's Oil, L.L. *Syn.* CATHETER OIL. For oiling catheters. Phenol 1, Castor Oil 4, Almond Oil 20.

(P) Oleum Lubricans St. G. H. is also Carbolic Acid 1, Castor Oil 4, Almond Oil 20.

Surgical Lubricant for catheters, &c.

Starch 4, Glycerin 35, add Water $8\frac{1}{2}$; heat to boiling, remove from flame and add Boric Acid in powder $2\frac{1}{2}$, warm to dissolve and when nearly

cold add Phenol 1. The Lubricant is supplied in 'Collapsubes.' It will not attack metal instruments if left in contact for a short time but is not intended as a coating to store them in—for this vaseline or liquid paraffin is best. Surgical Lubricant being non-greasy has the advantage over oily compounds of not attacking rubber goods, and can be removed by water.

Gargarisma Acidi Carbolici.

Aqueous Solution 1 in 100 or more. For foul breath and sore throat. E.L. 1 of Glycerol in 40.

Gauze, Carbolic, 5%, is in 6-yard pieces.

Carbolic Gauze Bandages (Lister's) recommended as slightly sticky and not likely to be wound too tightly.—B.M.J.ii./07,504.

Gossypium Carbolisatum, Carbolic Wool, Impregnate Absorbent Cotton 1 under pressure with 1 of an ethereal solution (5%) of Phenol.

Spread out and dry rapidly. Linteum Acidi Carbolici, 5%.

Catgut Ligatures are supplied raw and Sulpho-chromic in hanks, Nos. 000000 (the thinnest) up to No. 8.

Chromic or Sulpho-chromic Catgut Ligatures.

LORD LISTER'S DIRECTIONS FOR PREPARATION.—Soak the catgut 24 hours in twenty times its weight of 'preparing liquid'—made as follows:—Dissolve Chromic Acid 4 in water 240 (weight), add Sulphurous Acid Solution (*Off.*) *q.s.* to produce green colour of Chromium Sulphate $\text{Cr}_2(\text{SO}_4)_3 = 389.50$ (392.21 I.Wts.). Then add water to make 480 (weight) next add solution of Mercuric Chloride 2 in water 320 (weight). Dry the catgut on the stretch. The antiseptic Chromium Sulphate Solution, Lord Lister finds the nearest approach to the ideal to produce a ligature capable of fulfilling the necessary conditions as to strength, elasticity and asepsis.—L.i./08,148; B.M.J.i./08,125.

Ligatures are also supplied in carbolic acid solution 1 in 20, carbolised alcohol, turpentine, and various other antiseptics. Sir Watson Cheyne treats first with liquid phenol 24 hours, then keeps in 1 in 20 phenol solution, and rinses in 1 per 2,000 perchloride before use.—L.i./03,349. *c.f.* also M.P. Mar. 13, 1907, p. 298. First in Liquid Carbolic Acid for a few hours, then in 1 in 20 Carbolic Solution for a week and just before use in weak Sublimate Solution.—L.ii./08, 1802.

Immersion in Clove Oil 8 days then in Alcohol 6—8 hours, is advocated for sterilising.—Pres. Feb. '07,81.

A further method is to heat the catgut gradually in Cumene to 70° C., then in the same substance to 170° C. for two hours. Finally to rinse in petroleum benzine.

By Cumene or Cumol is intended a hydrocarbon (a) Trimethyl-benzene $\text{C}_6\text{H}_3(\text{CH}_3)_3$ [1:3:4] = 119.18 (120.086 I.Wts.) obtained by fractionation of Coal Tar; it boils between 160° and 170° C.—when pure at 169.8° or (b) Isopropyl-benzene $\text{C}_6\text{H}_5\text{CH}(\text{CH}_3)_2$. According to Schmidt this latter boils at 152° C.—the former body is, therefore, more suitable for sterilising catheters. The names Cumol and Cumene, or better *Cymene*, as distinct from Cumene above are, however, also given to *p*-Methyl-iso-propyl-Benzene $\text{C}_6\text{H}_4 \begin{cases} \text{CH}_3 \\ \text{C}_3\text{H}_7 \end{cases} = 133.1$ (134.112 I.Wts.). This is obtained from Cumin Oil, and can be made from Camphor. It boils at 175° to 176° C., has Sp.Gr. 0.8678 @ 12° C., and possesses a pleasant odour.

Hardening Treatment.—By soaking 1 hour (a) in 1 in 1000 Potassium Bichromate. These are two to three weeks—soluble or (b) more durable, *i.e.*, to last 5—6 weeks use 1% solution for same period. The gut is supplied in Xylol in sealed tubes.—L.i./07,1074.

Iodised Gut.—Raw Gut which has been previously soaked in Ether to remove fat known as "Ordinary Yellow Gut" (Hartmann's is a popular brand) is sterilised by soaking in a solution of Iodine 1, Potassium Iodide 15, Distilled Water 100 for ten days. About 4 ounces of Solution is sufficient for half a dozen

banks. The Gut is then of brown colour, in a sterile pliable condition, and ready for use—remove and place in cold boiled water prior to operation. For commercial purposes best supplied in sterilised dry bottles.

Size No. 1 is used for ligatures.

„ „ 2 „ „ small pedicles.

„ „ 3 „ „ large pedicles and abdominal wall.

Chromic Gut.—(i.e., hardened as above-mentioned, and then sterilised by the Iodine method) is used for intestinal and stomach work. No. 00 for mucous suture work. No. 000000 for peritoneal work.—Mayo Robson.

Claudius' Method.—Soaking 8 days in Iodine 1, Potassium Iodide 1, Water 100. Before using place in 3% Phenol or Normal Saline to wash the gut.—B.M.J. ii./06,738. (There is an error in the Alcoholic Solution mentioned as a substitute.)

Salkindsohn's Method is to immerse 8 days in Tincture of Iodine *Off* 1, Alcohol 50. 15. The Catgut can be kept in this solution indefinitely until required for use. No. 2 Gut is the most useful for ordinary purposes.—B.M.J. i./07,809. Large reels best for storing.—B.M.J. i./c7,866. See also B.M.J. ii./08,867.

Vide also Iodo-Acetone, p. 105.

Fr. Cx. sterilises Catgut in absolute alcohol at 120° C. for 45 minutes.

Formalin-Iodine Catgut.

Ordinary Commercial formalin gut steeped in 1% aqueous Solution of Iodine 10 days then placed in 5% Phenol till needed.

Strong and resistant.—B.M.J. ii./09, 932.

Iodine-Formalin Catgut.

Method of first iodizing catgut and then hardening its outer layers by formalin.—B.M.J. ii./09,1793.

Bacillus tetani isolated from a sample of gut.—B.M.J. i./09,1481.

Absorbable Iodine Catgut.—Catgut, defatted by ether, is well boiled in absolute alcohol for an hour, then laid in a solution of 1 part Strong Solution of Iodine and 11 parts of Water for a week. It is preserved and used from a solution of 1 part Strong Solution of Iodine and 50 parts Rectified Alcohol.—B.M.J. i./10,320.

Kangaroo Tendon, St. G. H. is washed with Ether Soap, treated with antiseptics and preserved in Alcohol.

Horsehair, St. G. H. is boiled in water 10 minutes only.

Silk Sutures are supplied on reels and in hanks, sizes 0, 1, 2, also sterilised in Absolute Alcohol and Phenol Solution. Silcock sterilised by immersing in Olive Oil for 12 hours and then boiling in the same and keeping in Carbolic Spirit.

In infantile paralysis silk ligaments cause formation of a tough tissue or tendon.—L. ii./08,252.

Silkworm Gut, extra fine, fine, medium, and stout in 10 and 14 inch lengths.

Linen thread and Celluloid Hemp Ligatures are also made, easily sterilised by boiling.—L. ii./09,83.

Christal's Method of treating Catgut with (1) Chromic Acid, (2) Sulphurous Acid and finally (3) Thymol in Spirit.—L. ii./09,83.

Silk Sutures treated with Silver and afterwards with Caoutchouc.—L. i./07,751.

Ⓔ **Glycerinum Acidi Carbolici** (*Off.*) *Syn.* Glyceritum Phenolis, U.S.

Phenol 1, Glycerin *q.s.* to 5.

Useful as a throat pigment and applied to wounds and to ringworm. In acute middle ear catarrh with good result.—B.M.J. ii./04,1210.

For earache a few drops of Solution, 6 grains to the ounce slightly warmed, invaluable.

A solution of Phenol in Glycerin is almost non-caustic and only slightly astringent.—B.M.J. ii./08,199. See Iontophoresis.

For the itching of eczema, Carbolic Acid 4 grains, Glycerin 40 minims, Alcohol 90% to 1 ounce often valuable, but caution necessary—may irritate.—L. i/09, 967.

Carbuncles well treated by applying pledgets soaked in. As soon as pus shows the epithelium is turned back and the part may be later syringed out. No fear of absorption of the Acid owing to hygroscopic action of the Glycerin.—B.M.J. i/09, 1481.

Ⓟ **Ravogli's Liniment.** Carbolic Acid 1, Glycerin 2, Alcohol 90% 16, Rose Water to 32. In skin affections.

Ⓟ **Guttæ Acidi Carbolici, St. M.'s H.** Carbolic Acid 10 grains, Glycerin to 1 ounce.

Ⓟ **Pigmentum Antisepticum.**

For Hay Fever. Glycerin of Carbolic Acid 1 ounce, Quinine Hydrochloride 30 grains, forms a useful pigment for the nasal passages.

2% Solution of Phenol in Spirit is used for diphtheritic membrane.

Ⓟ **Iodized Phenol.** **Pigmentum Iodi Carbolicum, G.H.**
Acidum Carbolicum Liquefactum et Iodum.—C.H.W.

Iodine 1, Liquefied Phenol 4. Digest till dissolved. For intra-uterine medication on cotton wool.

Useful also for ringworm of the scalp. *Carefully distinguish from.*—**Dilute Iodized Phenol Injection.**

As pigment in diphtheria, or as a gargle or inhalation a much weaker preparation is made containing Solution of Iodine (Lugol's) 2.5, Phenol 1, Boiling Water to 200. Is useful also as a nasal douche in ozæna, and for intra-uterine injection.

Physicians should carefully specify which is required.

Tuberculous sinuses of ankle joint treated by injecting this solution of strength 320 grs. Iodine in 8 ounces of Phenol Solution—afterwards binding the walls together tightly. Important to protect healthy skin. Healed in two weeks.—B.M.J. ii/09, 828.

For granular eyelids may be employed as a caustic. Applied on a small brush to the affected "Eye-lid edges" with great care, holding the eyelid away and then washing off. W.W.W.

Injectio Acidi Carbolici Hypodermica.

Dose.—5 to 20 minims. (0.3 to 1.2 Cc.).

Two per cent. has been used for tetanus, erysipelas, and phlegmonous inflammations of the skin.—Whitla.

Ⓟ **Liquor Sodii Carbolatis.**

Phenol 8, Caustic Soda 3½, Distilled Water 100.

To be diluted with 10 to 20 times its volume of water.

These proportions of Phenol and Sodium Hydroxide are nearly the quantities required by theory, and they will be found to yield a sharp and pleasant mouth wash.

Phenol is freely soluble in caustic alkaline solutions.

Ⓟ **Phenol Sodique** used by dentists is similar.

FR. CX. has Carbolic Acid 100 Gm., Sodium Hydroxide Solution 20 Gm. (30% by weight). Water to 1,000 Cc.

The Sodium Hydroxide obviously is insufficient to combine with the Phenol. The Fr. CX. preparation, in fact, contains about 8.6 Gm. per 100

Cc. *free*. Phenol, only 1.4 of the total 10 Gm. being in the combined condition, whilst the *Fr. Cx.* 1884 had the correct proportions to make Sodium Phenate.—*W.H.M.* We assume that the production is aimed at, of a more powerfully antiseptic solution with at the same time a less pungent flavor than if a simple carbolic lotion were employed.

Antiseptic Dental *‘Solubes.’

For preparing an extemporaneous mouth-wash which is antiseptic and agreeably perfumed.

Contain Boric Acid, Sodium Phenate, Thymol, Sodium Benzoate, and Aromatic Essential Oils. Employed in the prevention of dental caries and in suppurating conditions. One to be used frequently in a wine-glassful of water (preferably warm).

Pastillus Acidi Carbolici. (GLYCO-GELATIN BASIS.)

Contains $\frac{1}{2}$ grain (0.032 Gm.) phenol. Antiseptic and stimulant. For any ulcers in the mouth or throat, and for purifying the breath.

Perles and Capsules of Carbolic Acid.

Globules of gelatin containing carbolic oil, one grain (0.065 Gm.) and two grains (0.132 Gm.) of Phenol in each. *Dose*.—1 or 2.

Pilula Acidi Carbolici.

Phenol 2, Powdered Liquorice 1, Powdered Althæa 1. In grains for one pill, in grammes for 15 pills.

Smelling Salts, Carbolicised.

Phenol 24, Ammonium Carbonate 16, Strong Solution of Ammonia 44, Oil of Lavender $1\frac{1}{2}$, Camphor 3, Pine Sawdust (sifted), *q.s.* For coryza, hay fever, influenza, &c.

Anti-Catarrhal Salts.

Phenol 1, Eucalyptus Oil 1, Pumilio Pine Oil $\frac{1}{2}$, Strong Iodine Solution $\frac{1}{2}$, Camphor 1, Ammoniated Alcohol 2, Pine Sawdust 2 or *q.s.*

Resina Carbolica, R.D.H.

Resin 4, Carbolic Acid 4, Chloroform 3. Dissolve.

This is used as an obtundent and a temporary antiseptic filling. *Method*.—Syringe out all food from the cavity and remove as much decay as possible. Apply on a wool pledget. Will often relieve toothache.

Suppositorium Acidi Carbolici (*Off.*).

Phenol 1, White Beeswax 2, Oil of Theobroma, melted, 12 or *q.s.*

Trochisci Acidi Carbolici (*Off.*).

One grain (0.065 Gm.) with Tolu basis. For sores in mouth and throat.

Unguentum Acidi Carbolici (*Off.*).

Phenol 1, Glycerin 3. Dissolve and add Paraffin Ointment, white, 21. U.S. has 3% in white petrolatum. For ulcers and parasitic skin diseases.

Suggested alternative formulæ—(a) Phenol 1, Hard Paraffin 6, Soft Paraffin 18. Does not crystallise out—*L.L.*/05,513; but becomes harder than the official. (b) Phenol 4, Camphor 2, Hard Paraffin 8, Soft Paraffin 86, (c) Phenol 4 Hard Paraffin 24, Soft Paraffin 72.

Suggested that almond and olive oil be substituted for glycerin—*C.D.* 1/06,110. *Suggested* to use half the amount of Glycerin ordered and substitute equivalent in wool fat. This ointment will not ‘weep.’—*C.D.* 1/10,57.

① Unguentum Acidi Carbolici cum Cocaina.

Carbolic Acid 20 minims, Cocaine Hydrochloride 10 grains, Vaseline 1 ounce.

② Unguentum Acidi Carbolici cum Hydrargyri Perchlorido.

Liquefied Carbolic Acid $\frac{1}{2}$ drachm, Mercuric Chloride 2 grains, Olive Oil 2 drachms, Zinc Ointment to 1 ounce.

Both the above are for pruritus.—B.M.J.ii./04,980.

Unguentum Acidi Carbolici cum Menthol.

Carbolic Acid 2, Menthol 1, Cold Cream 100.

For eczema with much itching.—H.

Unguentum Triacidum St. G.H. Carbolic Acid, 1, Salicylic Acid 2, Pyrogallol 3, Glycerin of Starch 120.

Vapor Acidi Carbolici.

20 drops of Liquefied Phenol in a pint of water at 140° F. Inhaled or as a spray, in pertussis and for throat ulcers. It lessens and disinfects the over-abundant expectoration in bronchitis and gangrenous lung.

③ Vapor Acidi Carbolici Compositus, Lees.

Carbolic Acid 2, Creosote 2, Iodine Tincture 1, Spirit of Ether 1, Spirit of Chloroform 2.

Six drops to be introduced every hour during the day and twice or thrice during the night, on to the sponge of a Yeo's Respirator Inhaler. For use with considerable benefit in pulmonary tuberculosis. Allays pyrexia and cough. Also in acute pneumonia. Pr. Apl. '08,441.

Early pulmonary tuberculosis by inhalation of antiseptics from a "Burney Yeo" inhaler is recommended by Lees. It must be continuous and in operation the whole of the 24 hours, excepting meal times. The above solution is used 6 to 8 drops every hour during the day, and 2 to 3 times during the night if awake. Non-irritating, beneficial, and does not cause hæmoptysis. If hæmorrhage should occur, B. Yeo's suggestion to add turpentine should be remembered. Patient is gradually weaned from the inhalation during a few weeks, and exercise is performed. A method on these lines is calculated to abolish pulmonary phthisis. B.M.J.ii./09,1659.

④ Preservative Solution for Anatomical Specimens.

Phenol 1, Glycerin 4, Methylated Spirit 5. Used for injection into the aorta.

Acidum Sulphocarbolicum.

Syn. PHENOL-SULPHONIC or SOZOLIC ACID.

$C_6H_5.H.SO_4 = 172.80$ (174.118 I. Wts.).

Prepared by the action of strong sulphuric acid on phenol. The *para*-acid is produced in the warm (the *ortho*- when working in the cold), crystallises with difficulty, dissolves readily in water, alcohol, and glycerin, and is a strong antiseptic and disinfectant.

In gingivitis and pyorrhœa a 3% solution useful, reduces swelling, arrests flow of pus, and the gums return to their natural shape.

A 33% solution has been sold as **Aseptol**. Principally *para*-acid with only about 6% *ortho*-. To separate *ortho*- and *para*-acids utilise different solubilities of Mono-barium Salts ($-SO_3H$ Salts)—that of the *ortho*- body crystallises out first. Similarly the *ortho*-magnesium com-

pound is more soluble than *para*.—P.J. ii./07,817. Allen, vol. ii., pt. 3, '07, describes Phenol-sulphonic Acids fully.

Cupri Sulphocarbolas.—*Syn.* CUPRI-ASEPTOL. $(C_6H_4 OH.SO_3)_2$
 $Cu + 6H_2O = 514.00$ (517.886 I. Wts.)

In light green crystals, soluble in water, a useful hæmostatic or antiseptic lotion, or astringent injection, $\frac{1}{4}$ to $1\frac{1}{2}\%$.

Sodii Sulphocarbolas (*Off.*) U.S. SODIUM PHENOL-PARA-SULPHONATE
 $C_6H_4OH.SO_3ONa, 2H_2O = 230.44$ (232.142 I. Wts.) (230.45 U.S. Wts.)

Dose.—5 to 15 grains (0.32 to 1 Gm.).

In white rhombic crystals, somewhat like magnesium sulphate. Soluble 1 in 5 of water. Is useful for flatulence, cholera, the dyspepsia of phthisis, and in tonsillitis 5 to 10 grains every 2 hours have been given.

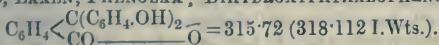
Flavoring.—Diluted has little taste.

Zinci Sulphocarbolas (*Off.*). ZINC PHENOL-PARA-SULPHONATE;
 ZINCI PHENOLSULPHONAS, U.S. $(C_6H_4OH.SO_3)_2Zn, H_2O = 426.39$
 (429.606 I. Wts.). The commercial salt contains $8H_2O$ (U.S.), making the molecular weight 551.55 (557.718 I. Wts.) (551.56 U.S. Wts.).

Crystals in rectangular colourless plates. Soluble 1 in 2 of water (1 in 2.7. P.J. i./02,552). In gonorrhœa and leucorrhœa; 2 or 3 grains per ounce for injection.

'Solubes,' 2 and 10 grains (0.13 and 0.65 Gm.), produce 2 and 10 ounces or more respectively of lotions for external use or injection.

Phenolphthalein (*Off.*).—*Syn.* *PURGEN, *LAXOIN, LAXATOL, LAXANS, LAXEN, PHENOLAX; DIHYDROXYPHTHALOPHENON.



Dose.— $\frac{1}{2}$ to 8 grains (0.032 to 0.52 Gm.).

A crystalline substance produced by inter-action of Phenol and Phthalic Anhydride. Soluble 1 in 10 of alcohol 90%, but only 1 in 600 of water.

Is useful where a prompt purgative is required, as in jaundice. Ordinarily $\frac{1}{2}$ to 3 grains is sufficient, but patients confined to bed require from 3 to 10 grains. Does not irritate the kidneys.

Up to 30 grains if necessary.—M.Am.

A useful hydragogue purgative, but may cause piles to bleed.—B.M.J. i./05,302.

Tablets, $\frac{1}{2}$, 2, and 4 gr. are made.

Under the fancy name "Purgen," is supplied as "Infants'" containing $\frac{3}{4}$ gr., "Adults' Purgen" $1\frac{1}{2}$ gr., and "Strong Purgen" $7\frac{1}{2}$ gr.

Ⓢ Tablets Phenolphthalein Compound.

Phenolphthalein 1 grain, Strychnine Hydrochloride $\frac{1}{2}\frac{1}{100}$ gr. Belladonna Extract (*Off.*), $\frac{1}{100}$ grain. A useful combination.

It is also employed as an indicator in volumetric analysis as it turns pink with alkalis. See page 893. It is not suitable for titration of ammonia. *c.f.* also Allen, vol. ii., part 3, 1907, p. 133, *et seq.* The best indicator for organic acids. Remove CO_2 by boiling, but in such cases Methyl Orange (*q.v.*) is better.—P.J. ii./08,194.

Sodophthalyl.—A sodium compound of Phenolphthalein may be given in smaller doses with equal result.—P.J. ii./09,134.

*Aperitol.—*Dose*, children $1\frac{1}{2}$ grains (0.1 Gm.), adults 6 grains (0.4 Gm.) increased. A mixture of equal parts Valeryl and Acetyl-phenolphthalein. Tablets are prepared.

Eulaxans.—One molecule of phenolphthalein and two of sodium hydroxide in combination, possibly more active than phenolphthalein itself. *Dose.*— $\frac{1}{4}$ to 3 grains, in tablets or pill.

Tribromophenol.—*Syn.* BROMOL. $C_6H_2Br_3.OH = 328.39$ (330.784 I. Wts.) ($OH : Br : Br : Br = 1 : 2 : 4 : 6$).

Dose.— $\frac{1}{2}$ to 2 grains (0.032 to 0.13 Gm.) in pill.

Obtained by the action of bromine on phenol in solution, and re-crystallized from alcohol. In long silky needles, nearly insoluble in water, soluble 1 in 3 of alcohol 90%, 1 in 1 of ether, 1 in 3 of chloroform and glycerin; also soluble in fats and oils. Melts at $185^\circ F.$ ($85^\circ C.$) Used alone is strongly antiseptic; ointment (10%), oily solution (1 in 30). Is not dissolved by gastric juice, and is used as an intestinal disinfectant and in typhoid, also in minute doses for cholera infantum.

Tribromophenol-Bismuth.—*Syn.* * XEROFORM. $(C_6H_2Br_3O)_2.Bi.OH + Bi_2O_3(?) = 1341.20$ (1348.56 I. Wts.). P. Jap. $Bi_2C_6H_3Br_3O_4$, also P. Helv.

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

A yellowish insoluble powder, with faint odour and taste, containing bismuth oxide and tribromophenol in nearly equal proportions. Used as intestinal antiseptic specially for cholera.

Gauze, Xeroform, 10%, 6 yard pieces.

Triiodophenol-Bismuth.—*Syn.* NEOFORM. $C_6H_2I_3.OBi.(OH)_2.Bi_2O_3 = 1170.34$ (1176.792 I. Wts.); (?) formula, *c.f.* the analogous Xeroform).

Yellow insoluble powder. Stated to be capable of preparation by pouring a solution of Bismuth Nitrate (cryst) dissolved in 45 % glycerin in water into an alkaline solution of Triiodophenol in equi molecular proportions and drying the precipitate at not exceeding $35^\circ C$, but the formula in this case is different. F.N., 1909.

An absorbent wound dressing, especially suitable for treating tuberculous ulcers and wounds.

Pheno-Bromate.

An American remedy stated to be a synthesis of Phenol and bromine derivatives for pain, fevers, neuralgia, etc.

Phenosalyl.

The following is similar.—Phenol 90, Salicylic Acid 20, Lactic Acid and Menthol of each 1, mix by heat. 0.2—0.4% in conjunctivitis and in eczema 1%.—M.Am.

Trichlorphenol.—*Syn.* TRICHLORPHENIC ACID. $C_6H_2Cl_3.OH = 195.91$ (197.404 I. Wts.).

White crystals, with pungent taste; soluble 1 in 1 alcohol, 2 in 1 ether, 1 in 9 glycerin, fixed and volatile oils. Locally 1 in 10 ointment or solution: antiseptic.

Para-Monochlorophenol. $C_6H_4Cl.OH = 127.53$ (128.50 I. Wts.).

Crystalline needles, *soluble* in alcohol and ether, but not in water to any extent. Melting at $37^\circ C.$ and boiling at $217^\circ C.$ The *ortho*- body boils at $176^\circ C.$ and the *meta*- melts at $28.5^\circ C.$ and boils at $212^\circ C.$

A powerful antiseptic used in treatment of lupus, phthisis, keratitis,

iritis, and is also employed in dental work as an analgesic. A paste for subsequent filling is made with powdered Cobalt and Tropicocaine Hydrochloride of each equal parts, with sufficient Para-Mono-chlorphenol and Zinc Oxide to produce a soft paste. The unpleasant taste may be moderated by Menthol.

5 to 10% in glycerin has also been used for laryngeal catarrh. Inhalations $\frac{1}{4}$ to $\frac{1}{2}$ %.

ACIDUM CARBONICUM.

$\text{CO}_2 = 43.67$ (44 I. Wts.).

CARBON DIOXIDE, CARBONIC ANHYDRIDE. Carbonic Snow has recently been revived by several important communications. For the removal of nævi and other small operations it is very useful (*vide infra*).

A few years ago inhalation of the gas for ozæna and nasal catarrh was found very effective. It is believed to act as an antiseptic in such cases.

Refrigeration. Carbon Dioxide from cylinders containing some 20-30 pounds at a pressure of 20 atmospheres, on evaporation forms the semi-solid snow with temperature -79°C. (-110°F.), which by collecting in a suitable receptacle can be formed into a stick or crayon like an ordinary candle, or may be compressed into a mould and cut any shape with a knife. The cylinders should be mounted on a stand with the stopcock on a lower level than the opposite end so that the liquid gas covers the inner orifice of the valve. The solidified gas can be pressed on the surface and hence enables the tissue to be frozen to any desired depth. The solidified gas evaporates slowly—a crayon 5 inches long by 1 inch in diameter will last 1 to 2 hours in an ordinary room. As many as thirty applications with a crayon this size have been made. The temperature of the crayon is *constant*.

In the case of an ordinary capillary nævus 1 inch in diameter, the crayon is roughly shaped to that of the nævus—or slightly larger—it is applied and firmly pressed down for, on an average, 40 seconds. If there is bone immediately beneath, a shorter time will do. For a cavernous nævus the end of the crayon is made the same size or slightly smaller than the area of the growth. A long application with deep pressure should effectually freeze the whole mass.

For moles and blemishes the method is very successful. For lupus erythematosus has favourable influence, also lupus vulgaris successfully treated. For warts, excellent (long application necessary). In keratosis accompanying X ray dermatitis, brief applications answer well.

For making Crayons a towel is folded into three and wrapped round an ordinary ruler—the ruler is then removed and the tube thus produced is bound on to the valve of the CO_2 Cylinder, the gas is turned on and the towel tube fills with the snow. The frozen gas may be equally well pressed into metal tubes or containers of any shape.

On removing the Crayon from the part to which it is applied the hard white frozen surface shows a depression according to the amount of pressure employed—the depression gradually returns to its normal shape. The treated area then becomes firmer and in two or three minutes swollen. A wheal forms with acute hyperæmia within half an hour and a vesicle usually within

an hour, applying thirty seconds or longer, this will almost certainly be followed by scarring. An intense superficial destruction is obtained by a second application immediately after the tissues have thawed out.

Boric Acid Ointment is used for after-treatment. If blister forms the fluid is removed within a few days, the crust forming should be allowed to fall off. The scar ultimately is pale, soft and pliable.

No anaesthetic is ever necessary. The thawing out is more painful than the freezing. No keloid as yet seen in the resulting scars. Ordinary frost bite lasting sixty seconds does not produce anything approaching the same degree of reaction. It is not a caustic—the whole of the treated area is still living.—E. R. Morton, L. ii./09,1658.

Lupus erythematosus greatly improved by freezing the parts round the margin. Rodent ulcer also recovered. Painless.—L. i./10,28.

J. M. H. MacLeod collects the snow in a funnel made of vulcanite or German silver. This is placed on the affected part and the snow pressed on to same by means of a piston passing down the neck of the funnel. A few seconds to half minute application according to size and condition.

Has been successful in telangiectatic or stellate nævi, pigmented and hairy moles, superficial lupus vulgaris, ditto rodent ulcer, and lupus erythematosus.—B.M.J. i./10,254 *et seq.*, also B.M.J. i./10,351.

For nævus, 10 to 30 second application on cotton wool repeated once or twice at the same sitting renewed at 8 to 10 days. Results good. Free from pain.—B.M.J.E. i./09,24.

For some older uses *vide* B.M.J. ii./98,433—as a cold application. Also B.M.J. ii./99,1178—for cardiac dyspnoea and pain of angina.

The ***Prana Carbon Dioxide Snow Apparatus** is made in two sizes, one for hospital use and the other for the physician's hand bag.

ACIDA CHLORACETICA.

Acidum Monochloraceticum. $\text{CH}_2\text{Cl.COOH} = 93.77 (94.484 \text{ I. Wts.})$.

A chlorine compound of acetic acid, in deliquescent white crystals, melting at 63°C. , or liquefied. It blisters the skin, and is a caustic for warts and corns. *Soluble* with ease in water, alcohol, and ether.

Acidum Dichloraceticum. $\text{CHCl}_2.\text{COOH} = 127.96 (128.936 \text{ I. Wts.})$.

A colourless caustic for venereal sores.

Acidum Trichloraceticum, P.G. iv., P. Helv., U.S., Ph. Ned.,

P. Jap., $\text{CCl}_3.\text{COOH} = 162.15 (163.388 \text{ I. Wts.}), (162.12 \text{ U.S. Wts.})$.

Prepared by chlorination of acetic acid, or by the action of fuming nitric acid on chloral hydrate (U.S.).

In deliquescent crystals, melting at 55°C. (lower if moist), and boiling at 195°C. , very soluble in water, alcohol and ether. This is a quick escharotic for venereal and other warts; it is also useful in throat affections. The application of a crystal produces a dry adhering eschar which is quickly thrown off. There is said to be no secondary inflammation. For use as an astringent, 1 in 1 or 2 of glycerin with a little iodine and potassium iodide.

In chronic gonorrhoea, solution 1 in 4, applied on a tampon by means of an endoscope; less painful than silver nitrate. Also, diluted, for epistaxis,

Is a delicate test for albumin, *v.* Albumin Tests.

As an astringent lotion 1% is employed.

In old chronic urethritis resisting treatment, 5% in glycerin often very beneficial.—Pr. April/09, 547.

ACIDUM CHROMICUM.

Chromic Anhydride (*Off.*). $\text{CrO}_3 = 99.38$ (100.0 I. Wts.).

Manufacture by action of strong sulphuric acid on potassium bichromate.

In deliquescent, crimson crystals. A powerful oxidising agent. **Caution:** *incompatible* with alcohol, glycerin, and other oxidisable substances.

Soluble about 5 in 3 of Water.

U.S. requires 90% pure.

Liquor Acidi Chromici (*Off.*).—1 to 3 of water.

A watery solution—1 in 4, or stronger—is applied to warts on genitals, to condylomata and lupus; and 1 in 40 to ulcerated gums, and mouth sores.

For sweating feet 5 to 10% Lotion; in leucorrhœa and ozœna 1 in 2,000.

In hæmorrhagic endometritis, curettage followed by application 1 in 8.—B.M.J. i./06, 921.

A dilute solution as caustic to ulcer in throat which proved to be due to pneumococcic invasion, but of no avail.—B.M.J. i./09, 1525.

In secondary syphilis of the pharynx the so-called snail-track ulcer is best treated with this solution (10 grains to the ounce). B.M.J. ii./09, 197.

In the treatment of mucous patches and warty syphilitic growths on the tongue 5% most useful. B.M.J. ii./09, 545.

ACIDUM CINNAMICUM.

Cinnamylic Acid — *Syn.* Phenylacrylic Acid.

$\text{C}_6\text{H}_5\text{CH}=\text{CH}.\text{CO}.\text{OH} = 146.95$ (148.064 I. Wts.).

Dose.—*Per os*, $\frac{1}{10}$ to $\frac{1}{4}$ grain (0.0032 to 0.016 Gm.).

Intravenously (in oily emulsion) $\frac{1}{10}$ to $\frac{1}{4}$ grain (0.0013 to 0.0032 Gm.).

May be manufactured by the oxidation of Cinnamon Oil or by acting upon Benzaldehyde with Acetyl Chloride. In transparent micaceous crystals, melting at about 130° C., very slightly soluble in water, soluble in alcohol, ether and oils.

Owing to its power of stimulating leucocytosis—the main source of ‘complement,’ *v.* p. 753 *et seq.*—Cinnamic Acid probably supplies indirectly (as yeast does directly) the necessary quantity of complement for combating infectious diseases.—Bosanquet.

Sodii Cinnamas.—*Syn.* ★ **HETOL.**

$\text{C}_6\text{H}_5\text{CH}=\text{CH}.\text{CO}.\text{ONa} = 168.83$ (170.056 I. Wts.).

Dose.—3 to 5 grains (0.2 to 0.32 Gm.) *per os*, or hypodermically.

Soluble 1 in 11 water, in glycerin 1 in 10 (*secundum artem*).

Solution 2 or 5 per cent. in normal saline solution, sterilised for intravenous injection, has been found beneficial in the treatment of phthisis.

The cinnamates have vasodilatory action (Oliver), and in this direction are harmless even on prolonged use—L. ii./05, 206.

They have been given internally for cystitis and influenza with benefit.

Glass Tubes of Hetol solution contain 1 Cc. each of 2 and 5% solution respectively for injection.

Glycerinum Sodii Cinnamatis.

Dose.—30 to 60 minims (1·8 to 3·5 Cc.).

A 10 per cent. solution in sterilised glycerin made by heating to not above 180° C. (356° F.) is employed for hypodermic and intravenous injection in tuberculosis and cancer. It causes a general leucocytosis.

Pulmonary tuberculosis treated by 25 mgr. or more doses intravenously, also injection of 0·1 Gm. doses in 10 Cc. normal saline prolonged over certain period. Marked improvement.—L. ii/o8,1851.

Bacilli disappeared and expectoration ceased.—B.M.J. ii/o8,1893; P.J. i/o9,328; ii/o9,120.

In tuberculosis Landerer originally showed Cinnamic Acid to be virtually specific by intravenous injection. It was used later subcutaneously or intramuscularly in larger doses leading to amelioration and cure. Possibly combines with the toxins and renders the bacilli innocuous.—L. i/o9,413.

In cancer, injections of Sodium Cinnamate, Soamin, Green Iron and Ammonium Citrate and Iodipin, to improve the blood.—B.M.J. ii/o8,1845; ii/o9,140.

Drage points out that it was his idea originally to employ the Cinnamate in cancer.—B.M.J. ii/o9,242.

In pulmonary tuberculosis Drage has obtained excellent results from the use of the Glycerin solution, and recovery in two cases of basal meningitis almost certainly tubercular. Children tolerate doses of 10–15 minims daily,—in the latter class of case given subcutaneously in the back of the neck.

Deycke found that injections of Nastin (*q.v.*) in leprosy produced a pronounced leucocytosis, while if no reaction to Nastin there was no increase in leucocytosis. He, therefore, first injected the sodium cinnamate and when the leucocytosis was well marked injected Nastin. The result was an immediate pronounced reaction. It was concluded that a benzoyl body was necessary to sensitize Nastin. Ultimately benzoyl chloride was employed.—Therapist, June 15, '09.

Sodium Phenyl Propiolate.—*Syn.* THERMIOL. $C_6H_5C : C.COONa = 166·83$ (168·04 I. Wts.). (+ Aq.)

Is supplied in commerce in 25% solution. Has been used in laryngeal and pulmonary tuberculosis by inhalation of 0·5 to 3% solutions. Note the treble linkage in the side chain indicating a more active body physiologically than the parent Benzoic Acid.

Hypodermic ★ Sterules of Glycerole of Sodium Cinnamate contain 30 minims each (2 Cc.).

Strontii Cinnamas $(C_6H_5.CH:CH.CO.O)_2Sr = 381·732$ (I. Wts.).

Dose.—2 to 5 grains (0·13 to 0·32 Gm.)

A white powder, soluble about 1 in 120 of water and about 1 in 50 of a mixture of glycerin and water equal parts, and about 1 in 100 of alcohol 90%.

This has been used similarly to the Sodium Salt.

Cinnaldehydum.—U.S. $(C_6H_5CH:CH.CO.H) = 131·07$ (B.P. and U.S. Wts.; 132·064 I. Wts.). *Syn.* Cinnamal, P. Austr.

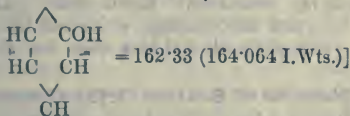
Dose.—1 minim (0·05 Cc.).

The aldehyde from cinnamon oil. A colourless (Bright Yellow, Schimmel Am. Jl. Ph., June 06, 257) liquid with cinnamon odour. Sp. Gr. 1·054 to

1.056. *Soluble* in alcohol in all proportions.—**P. Austr.** Capsules (gelatin) of Cinnamic Aldehyde 1 minim have been largely used with benefit in malignant disease.—*L. ii./07,690.*

Drage reports of value in all cases of tuberculosis, especially in pulmonary cases.

Acidum Coumaricum.—*Syn. o-Hydroxycinnamic Acid.*



Manufactured by heating coumarin 10 parts with a solution of 3.5 parts of sodium in 65 parts of absolute alcohol. The solution is then diluted with water and evaporated to small bulk. The acid is liberated by means of dilute hydrochloric acid. It is removed and dissolved in sodium carbonate. The sodium salt in solution is then freed from coumarin by shaking with ether (coumarin remaining unattacked can thus be recovered and used up again). The acid is then thrown out again with a little dilute hydrochloric acid, and is purified by recrystallisation from alcohol.

The ortho-coumaric acid forms brownish crystals, melting at 200° C., the meta- melts at 191° C., and the para- at 206° C.

It was thought that the sodium salt of this hydroxycinnamic acid would prove more powerful than the cinnamic salt which had already yielded good results in the treatment of malignant diseases (see *Glycerinum Sodii Cinnamatis*). This opinion was deduced by comparing the action of salicylic acid (hydroxybenzoic acid) with that of benzoic acid (introduction of the **Hydroxyl** grouping). Furthermore it may be noted that ortho-coumaric acid stands in the same relationship to salicylic acid as cinnamic does to benzoic acid—introduction of the **Acrylic** grouping. Ortho-coumaric acid is *soluble* very slightly in chloroform, in alcohol 1 in 12 or less, in ether 1 in 36, hardly soluble in water.

Uses.—For general treatment and as a precursor to and after operation (for three months if necessary) in malignant diseases. The sodium salt not so painful on injection as the cinnamate. The drug has a considerable action in the prevention of the proliferation of cells in cancer. It produces a marked leucocytosis.

The coumarates and compounds have action of vasodilators, and they may be taken for prolonged periods without harm.—*Olive, L. ii./05,206.*

Sodii Ortho-Coumaras. $\text{C}_9\text{H}_7\text{O}_3\text{Na} = 184.71$ (186.056 I. Wts.). This salt is best used in the form of

Injectio Sodii Ortho-Coumaratis 22% aqueous solution.

Dose.—25 minims (1.5 Cc.).

Injected thrice weekly when possible between the malignant growth and healthy subjacent tissues or in the course of lymphatics proceeding from the region of the growth, or over a large serous sac like the peritoneum.—*c.f. also B.M.J. i./05,1143.*

This solution is a clear yellow liquid perfectly stable. If desired, stronger solutions may be prepared, as the salt is very soluble in water.

Is of value in tubercular diseases; it is a matter of doubt whether sodium cinnamate or coumarate is the more active. Brilliant results have been obtained in cases of glandular and early cases of pulmonary tuberculosis. In cancer, greater difficulty is experienced, owing to the variation of the disease; but with the exception of Formalin, no drug exerts more definite action.—Drage.

Cancer, inoperable in a man of 74 well treated by this salt and sodium cinnamate with X ray irradiation. Result good. Also papilloma on middle third of left vocal cord similarly, with result that pain disappeared, voice improved, which previously had been quite out of control.—B.M.J. ii./08, 1147.

Hypodermic Sterules of Sodium Ortho-Coumarate Solution

contain 25 minims of the above and are convenient in use.

The Walker-Rideal coefficients in respect of *B. typhosus* for the coumaric acids in 40% alcohol are:—

For the ortho- 6·5; meta- 4·5; para- 4·0.—J. T. Ainslie Walker.

The following are new formulæ:—

Sodium Orthocoumarate Hypodermic Sterules. 25 minims in each with Novocain $\frac{1}{2}$ grain; also

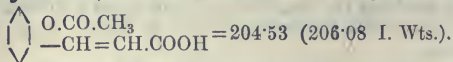
Sodium Orthocoumarate Hypodermic Sterules 25 minims in each, with Novocain $\frac{1}{2}$ grain and Adrenalin Solution 10 minims. Lovell Drage obtains good results with this injection.

'Fibrocoumarin' Hypodermic Sterules contain Sodium Orthocoumarate injection 25 minims, Thiosinamin 2 grains, and Novocain $\frac{1}{2}$ grain. This is especially suitable where tissue is cicatrised.

'Fibrocoumarin' with Adrenalin Solution 10 minims.

Drage reports that the combination of metallic salts with those of coumaric acid have not yielded the same results as those obtained with organic compounds. Excellent results have been obtained by injection into the mass of a mixture of this solution—Fibrocoumarin with Adrenalin. He recommends this as being the most active local agent which he has at present used. c.f. also Cicatricine for a simple solution of Thiosinamin.

***Tylmarin, Martindale.**—Acidum Acetyl-*o*-Coumaricum.



Dose.—5 to 10 grains (0·32 to 0·65 Gm.) thrice daily after food.

Colourless crystals melting at 150°C.

This substance constitutes a stage further in the Cinnamic and Coumaric treatment. In view of the fact that acetyl-salicylic acid (*q. v.*) was found to have many advantages over the parent chemical salicylic acid, the orthocoumaric acid has been acetylated.

Soluble only slightly in water (easily in presence of alkali, but dissociation occurs), in alcohol 90% 1 in 19, in ether 1 in 50, in chloroform 1 in 16.

Uses.—More essentially for cancerous diseases, but also for tuberculosis and as an intestinal antiseptic.

Its use has proved it a very valuable adjuvant to Sodium-Orthocoumarate in pulmonary and glandular tuberculosis. (The surgeon's knife is no

longer required; in early cases of glandular tuberculosis and in pulmonary tuberculosis, any case which can be cured by the open-air treatment can be successfully treated with this drug accompanied by injections of the 22% Solution of Sodium-Orthocoumarate, and the Glycerin Solution of Sodium Cinnamate.)—(Drage.) Administered *per os* the substance probably undergoes hydrolysis into *o*-coumaric acid and acetic acid.

The carbolic acid (Walker-Rideal) coefficient of Tylmarin in 40% alcohol in respect of *B. typhosus* was found to be 4.5.—J. T. Ainslie Walker.

Tylmarin Cachets contain 5 grains (0.32 Gm.).

Tylmarin Tablets contain 5 grains (0.32 Gm.).

Tylmarin Dusting Powder has been used locally with promising results. Drage recommends the use of it as a dusting powder in the case of cancerous growths which have broken down. Large open sores can be materially benefited by the use of Tylmarin in this way.

The only four early malignant cases, which Drage has been able to secure have succeeded.—L. ii./07,690.

Tuberculous ulceration has been treated with Tylmarin with benefit.—L. ii./06,1292.

The diminution in size of lymphatic glands secondarily infected has been very marked, and fresh invasion is prevented.

Prolongation of life and increase of comfort to the sufferer from phthisis.—L. ii./07,690.

No toxic effects have been experienced in the use of any of these methods. A patient with a sarcoma in the palate, rendering him practically deaf, received 3 injections of the Sodium Coumarate Solution and 5 grains of Tylmarin twice daily. Condition immensely improved. Two cases of carcinoma of the œsophagus improved, also cases of carcinoma of the breast. Success is more likely with definite chemicals than with undefined ones.—Drage, L.ii./08,1367.

ACIDUM CITRICUM.

$C_6H_4OH.(COOH)_3$, $H_2O = 208.5$ (210.08 I. Wts.).

Dose.—5 to 20 grains (0.3 to 1.3 Gm.).

Colourless crystals or white crystalline powder, 99.38% pure B.P. 99.5% U.S.

Lemon juice contains as much as 7 to 9% (30 to 40 grains per ounce).

Soluble.—10 in 6 of water, 1 in 2 of glycerin, 1 in $1\frac{1}{2}$ of alcohol (90%), 1 in 8 of ether, Sp. Gr. 0.735, but much less soluble in 0.720 ether.

For quantities of alkalis to be prescribed with this acid in the form of effervescent mixtures, *v. p.* 924.

Uses.—Relieves thirst in fever. Lemon juice is better than citric acid for curvy. A useful method of preserving it is to boil the juice, place in stone bottles whilst hot, and cover with a little oil before plugging with a cork. Stored upright will keep in this manner for months.

In rheumatism and given internally in jaundice.—H.

Thrombus, which had begun in left iliac and femoral veins, treated by 30 to 60 grains every 4 hours, to cause shrinking and re-establish circulation. Successful.—L. i./07,501.

Diminishes coagulability of the blood (Sir A. E. Wright). Apparatus devised showing, however, that neither the acid nor lime salts had any effect on the coagulation time.—(Addis) B.M.J. i./09,999.

Incompatible with potassium tartrate and alkaline carbonates.

Lead in minute quantity—1 in 250,000—may be present as impurity in commercial samples. C.R. 1903 advises proportion should not exceed 5 per million.

Lotio Acidi Citrici et Phenolis. Citric Acid 3 drachms, Phenol $\frac{1}{2}$ ounce, Water to 1 pint. As an antiseptic Tartar solvent, *e.g.*, in removing septic teeth.—L. ii./09,1666.

ACIDUM FORMICUM.

Syn. Aminic Acid. P.G. IV., HELV. III. $\text{H.COOH} = 45.67$ (46.016 I. Wts.).

Dose.—2 to 10 minims (0.12 to 0.6 Cc.) freely diluted, *e.g.* with mineral water. (Much larger doses have been given), Hypodermically 2 to 15 minims of 1 in 1,000 dilution. (In some instances much weaker dilution, *e.g.* 1 in 10,000 with same dose).

A colourless liquid Sp. Gr. 1.060–1.063 (24 to 25% H.COOH). Miscible with water in all proportions. In concentrated form has a caustic action.

Note:—Formic Acid is obtainable also of Sp. Gr. 1.12 = 50%, also 1.15 = 65%, also 1.2 = 85%, also 1.22 = 100% H.COOH . As a rule the 25% Acid is referred to.

Uses.—It is alleged that this acid (acting in a manner similar to cantharides) gives tone to the muscles and restrains muscular tremor, as in cases of paralysis agitans and in chorea. It increases muscular energy and abolishes the sense of fatigue. It is usually employed as one of the salts, *e.g.* in influenza, gout, rheumatism, tremors and similar affections.

In a case of severe rheumatoid arthritis which came under our notice initial hypodermic dose of 5 minims of the 1 in 1,000 solution caused such intense irritation that the treatment (with a stronger dosage) could not be proceeded with. Conclusion formed that the Sodium Salt would be better.

The injection of the Acid is painful, but a 2% solution has been employed in 1 Cc injections, 8 to 10 of such being given for rheumatism, first injecting a little Cocaine.—B.M.J. ii/08, 1056.

This acid was originally made from the Red Ant, *Formica rufa*. The stinging nettle, *Urtica dioica*, contains formic acid, and has long been employed as a tonic and diuretic.

It is stated to be produced by the growth of *B. rheumaticus* and is a considerable constituent in sweat. *c.f.* p. 779.

Rheumatism cured by applying bees to joints.—B.M.J. ii/08, 1056, 1369, 1678; i/09,719.

A "Bee Vaccinator" is intended to assist bees to sting rheumatic patients. Beekeepers are remarkably free from rheumatism and the stings have been employed for the complaint. The Apparatus designed to be of assistance to the medical attendant, consists of a glass cylinder and piston to hold the bees in the application.—C.D. ii/09,584.

As a food preservative 0.1 to 0.15% pure Formic Acid will preserve food materials.—M. 1906, 11. 5 Cc. of the German Official Acid will preserve a kilo of Raspberry Juice (B.M.J. ii./06, 839), and has been suggested as substitute for Citric, Tartaric and Phosphoric Acids in the Mineral Water trade. 3 ounces of 'Alacet' (60% Acid) for 1 gallon Lemon Syrup. The taste is equal to Syrup made with Citric Acid.

'Iodo-Formic Acid.'

(i) Stock Solution containing 10% Formic Acid. Saturate 25 Cc. of Formic Acid (40%) with excess of Iodine by shaking. Decant and dilute to 100 Cc. with Glycerin.

(ii) Containing 1% Formic Acid. Dilute 10 Cc. of the Stock Solution with 90 of water. For intramuscular injection *Dose* $\frac{1}{2}$ Cc., every 3 or 4 days then gradually increase to 2 Cc. in 2 to 3 weeks.

(iii) For internal use. *Dose* 1 tablespoonful, 10 of the Stock Solution diluted with Glycerin 90 and Water 1,400.

In chronic ulcerative phthisis good effect, cough and expectoration reduced and diminution of Bacilli.—M. 1908, 113.

Sodii Formas, $\text{H.COONa} + \text{H}_2\text{O} = 85.43$ (86.024 I. Wts.).

Dose.— $\frac{1}{2}$ to 3 grains (0.01 to 0.2 Gm.) in solution, increased if desired to as much as 4 Gm. per diem. Clement gives 3 to 4 Gm. daily vide above.—I.i./07, 1177.

A white crystalline powder soluble in water, "practically neutral to litmus. A strong reducing agent and powerful antiseptic.

Eye Drops 2% have been used—said to contract the muscles.

In rheumatism, use of. Two doses of 15 grains each improved a case.

Pain disappeared.—B.M.J. ii./08, 1059.

Useful in treatment of pneumonia.—M. 1906, 8.

Sterules, Hypodermic of Sodium Formate contain $\frac{1}{8}$ and $\frac{1}{4}$ grain.

In diphtheria 400 cases treated with 5 to 10 minim doses of 25% solution in water every 4 hours, were satisfactory, general improvement noticeable.—Edin. Med. Jl. June, 1907.

Elixir Sodii Formatis.

Sodium Formate 4, Essence of Vanilla, *q.s.*, Simple Syrup, *q.s.* to 100. If desired can be prepared stronger. *c.f. dose of Sodium Formate.*

(Caution: avoid prescribing with Mineral Acids which would decompose the salt.)

Dose.—2 drachms (7 Cc.).

Uses.—In cases of heart and kidney diseases it lessens the loss of albumin by the urine, although it has diuretic powers. Does not disagree with the stomach. Said not to be toxic. General tonic action as the acid.

Has been employed in phthisis and in pneumonia. Improves appetite, mental, and physical activity.

Ocular fatigue treated with sodium formate instillation 1 in 50 to 1 to 30. Found to augment the tone of the motor muscles of the eye-ball, and to retard the visual fatigue.—B.M.J.E. ii./05, 95.

Lumbago quite removed by two 15 grain doses of Sodium Formate. Several cases.—B.M.J. ii./07, 184.

Calcii Formas, $(\text{H.COO})_2\text{Ca} = 129.05$ (130.106 I. Wts.).

Dose.—3 to 10 grains (0.2 to 0.65 Gm.).

White crystals soluble 1 in 10 of water. More permanent than the Sodium Salt.

Sterules, Hypodermic of Calcium Formate contain $\frac{3}{4}$ Grain (0.05 Gm.)

For hæmorrhages has been found useful.—M.O8., 112.

Potassii Formas, $\text{H.COOK} = 83.5$ (84.108 I. Wts.).

Dose and use similar to the Sodium Salt.

Crystalline powder very soluble in water forming practically neutral solution.

Lithii Formas, $\text{H.COOLi}, \text{H}_2\text{O} = 69.52$ (70.024 I. Wts.). White crystalline powder freely soluble in water.

Dose.—As much as $1\frac{1}{2}$ Gm. of this salt have been given daily, and of the Sodium and Potassium Salts 3 Gm.—L. i./O5, 892.

Use.—Similar to the above and has been given in gout.

① Strychninæ Formas, $\text{C}_{21}\text{H}_{22}\text{N}_2\text{O}_2 \cdot \text{HCOOH}, 2\text{H}_2\text{O} = 413.18$ (416.244 I. Wts.).

Dose.— $\frac{1}{60}$ grain (0.0013 Gm.).

White crystalline powder soluble in water 1 in 2, in alcohol 90% 1 in 6. A nerve stimulant and muscular tonic.

There is a tendency it is said to effloresce down to $1\frac{1}{2}$ Mol. H_2O . The salt can also be obtained anhydrous.—P.J. ii./O8, 339.

② Syrupus Formatum Compositus (*Syn.* Elixir Formatum Compositum).

Dose.—1 to 2 drachms (3.5 to 7.0 Cc.). One drachm contains Formates of Sodium and Potassium each 2 grains, Calcium 1 grain, Quinine $\frac{1}{2}$ grain, Strychnine $\frac{1}{100}$ grain; Formic Acid 2 minims, Cochineal and Vanillin Solutions each $\frac{1}{2}$ minim, Lemon Oil $\frac{1}{60}$ minim, Alcohol 90%, Water and Syrup in proportion 1, 1, 6 q.s. to 1 drachm.

ACIDUM HYDROBROMICUM.

Acidum Hydrobromicum Concentratum.

$\text{HBr} = 80.35$ (80.928 I. Wts.).

Hydrobromic Acid of Sp. Gr. 1.308, colourless or straw-coloured, when diluted; one volume with three of distilled water produces an acid of official strength (10%). Should be kept from sunlight. If of Sp. Gr. 1.260 = 30%; 1.375 = 40%; 1.450 = 45%.

Acidum Hydrobromicum. P.G. iv. has Sp. Gr. 1.208, *i.e.* 25%. That of Ph. Ned. is quadrinormal with Sp. Gr. 1.224.

Incompatible as Acid Hydrochloricum. q.v.

Acidum Hydrobromicum Dilutum (*Off.*); U.S. FR. CX.

Dose.—15 to 60 minims (0.9 to 3.5 Cc.); 60 minims = 10 grains of potassium bromide approximately. Contains 10% of hydrogen bromide. Sp. Gr. 1.077. May be prepared by the action of Phosphoric Acid on Potassium Bromide. Sulphuric Acid is unsuitable owing to secondary decomposition.

It is a colourless, very sour liquid, without odour.

C. R. 1908.—Lead should not exceed 5 parts per million.

Uses.—To allay nervous excitability and exhaustion, as a solvent for quinine and preventing quinism, and as an alternative for potassium bromide and is less liable to cause acne; 8 minims will dissolve 5 grains of quinine sulphate in water. It is also given with morphine to allay after effects of this drug.

Obviates the sense of fulness of the head felt when taking iron for anæmia; also to remove the ill effects of excess of tea or alcohol; and to calm excited heart.

It is useful for tinnitus aurium and tickling hacking cough at night, in doses of 10 minims or more, and in headache, with flushing in the face and ringing in the ears. It relieves toothache.

In vertigo generally successful.—*Trans. Otol. Soc. of U.K., Vol. vi.; M.A. 1906, 197.*

In epilepsy, the dose should be full, up to half an ounce well diluted; even to 3 ounces daily.

Bon Voyage, a specialty for sea sickness, of some service, contains, *inter alia*, this acid and sodium bromide. *B.M.J. ii./09, 1818.*

Dose.—Half an ounce in a wineglassful of water every 3 hours for 24 hours before embarking, and for the first 2 days of the voyage, afterwards in half-doses if required.

ACIDUM HYDROCHLORICUM (*Off.*).

(*Poisonous*)

For retail in Great Britain and Ireland, the box, bottle, vessel, wrapper, or cover in which the acid is contained must be distinctly labelled with (1) the name of the substance; (2) the word "Poisonous"; (3) the name and address of the seller. This applies also to Nitric and Sulphuric Acids and to soluble salts of Oxalic Acid.

HCl=36.19 (36.463 I. Wts.). Sp. Gr. 1.160. Contains 31.79% HCl. Is free from arsenic (B.P. and U.S.). Ph. Ned. and P. Helv. 25%. Sp. Gr. 1.126. Fr. Cx. 33.65%. Sp. Gr. 1.171 at 15°C.

C.R. 1908.—Limit of Lead 10 per million.

Antidotes.—Alkalis, sal volatile, saccharated lime, calcium carbonate, alkaline bicarbonates, carron oil, white of egg, morphine, lime water, magnesia, milk, soap and water. Give beef tea enema and stimulants.

Incompatible with alkalis, alkaline carbonates, metallic oxides, silver and lead salts.

Use.—Escharotic. **Tests** for purity for analysis. *P.J. i./08, 10.*

Acidum Hydrochloricum Dilutum (*Off.*).

Dose.—5 to 20 minims (0.3 to 2 Cc.).

Is prepared by diluting 6 of the strong acid with water to 20. Sp. Gr. 1.052. Contains 10.58% HCl by weight (U.S. and P. Helv. 10%). Ph. Ned. is quadrinormal.

Use.—Tonic biliary stimulant. In dyspepsia, where insufficiency of acid, given before meals with Gentian. Gargle 1 in 50 to 1 in 100 for sore throat. When well diluted forms useful refrigerant drink and lotion.

Hydrochloric acid, free from arsenic, may be made by warming with pure fine copper gauze, and then distilling.—*Y.B.P. 1902, 36.*

Lupus treated by acid-cautery and ethyl chloride freezing. Good results.
—L. i./07,81.

ACIDUM HYDROCYANICUM.

Prussic Acid (SCHEELE'S STRENGTH).

① *Prussic Acid and all preparations or admixtures containing 0.1 or more % of Prussic Acid (i.e., Hydrogen Cyanide), e.g., Aqua Laurocerasi, q.v. p. 123.*

Applicable to Ireland.—② "*Prussic Acid*" only.

③ *All preparations or admixtures containing less than 0.1% Prussic Acid (Hydrogen Cyanide intended).*

Manufactured by distillation of Potassium Ferrocyanide with Dilute Sulphuric Acid.

Dose.—1 to 3 minims (0.06 to 0.18 Cc.).

Colourless liquid with powerful odour, Sp. Gr. 0.994. Contains 4% HCN.=26.85 (27.018 I. Wts.).

Antidotes.—Emetics immediately, stomach tube, brandy, or ether, fresh air, inhaling ammonia, artificial respiration. $\frac{1}{10}$ grain atropine hypodermically. Hydrogen peroxide and Chlorine Water have been given.

④ **Acidum Hydrocyanicum Dilutum** (*Off.*), U.S. PH. NED. P. BELG. FR. CX. (previously 1% only).

Dose.—2 to 6 minims (0.12 to 0.35 Cc.). FR. CX.—Max. single dose $1\frac{1}{2}$ minims (0.1 Gm.); Max. during 24 hours 8 minims (0.5 Gm.) approx.

Contains 2% HCN, Sp. Gr. 0.997. F.I. requires this strength. Keep in inverted stoppered bottles in the dark.

Flavoring.—Glyl Lavandulæ, Glyl Menthæ Piperitæ; Spiritus Menthæ Piperitæ; Syrupus Zingiberis.

Incompatible with soluble silver or iron salts.

Uses.—In dyspepsia with pain, combined with bismuth or sodium bicarbonate. To allay vomiting and cough. It is very useful as a sedative in an effervescent mixture, and as a 2% dilution as lotion to soothe the itching of pruritus ani or pruritus vulvæ, or general prurigo. Must not be used to broken skin surface.

Though largely prescribed for relief of gastric pain, Dixon says the amount of acid given is too small to have any of the local effects credited to it.—B.M.J. ii./09,540.

⑤ **Lotio Acidi Hydrocyanici cum Sodio**. L.H.

Diluted Hydrocyanic Acid 8.3, Borax 9.2, Sodium Bicarbonate 9.2, Water to 1000.

As a soothing eye lotion.

Volumetric Estimation.—Titrate about 1 Gm. (accurately weighed, kept slightly alkaline with Sodium Hydroxide throughout the test), with $\frac{N}{10}$

Silver Nitrate Solution, until a permanent Silver Cyanide precipitate is formed. The soluble double Salt, $\text{AgCN} \cdot \text{NaCN}$, is intermediate. $\text{AgNO}_3 = 2\text{HCN}$ or $1 \text{ Cc } \frac{N}{10} \text{ AgNO}_3 = 0.00537 \text{ Gm. HCN}$. B.P. directs that 1 Gm. should require

3.7 Cc. of the Volumetric Solution, i.e. = 0.019869 Gm. HCN or 1.9869%.

Borax Solution in excess is added to Hydrocyanic Acid before titration with Silver Nitrate. Suitable for Cherry Laurel Water.—P.J. ii./05,910.

Delicate Test for Hydrocyanic Acid.—A few drops of phenolphthalein solution made alkaline with Sodium Hydroxide added to liquid to be tested.

If red colour be produced on adding Cupric Sulphate Solution 1 in 2,000 (due to oxidation into phenolphthalein) Hydrocyanic Acid is proved to be present.

Phenolphthalin is made by reducing phenolphthalein with Zinc in alkaline solution.—P.J. i./05, 721.

Method of Horticultural Use.—Employing Sodium Cyanide and acid.—P.J. ii./08, 722.

ACIDUM HYDROFLUORICUM PURUM.

HF = 20·008 (I. Wts.).

Fluoric Acid of commerce is redistilled for medicinal use. Manufactured by the action of Sulphuric Acid on Fluor Spar (CaF_2) in lead or platinum vessels. It contains about 30% of the gas, emits suffocating fumes, and requires to be kept in gutta-percha or leaden bottles.

Acidum Hydrofluoricum Dilutum, B.P.C.

Dose.—5 to 15 minims.

Contains 0·2% of hydrofluoric acid. Even thus diluted should not be kept in glass bottles for use.

Goitre—of 20 cases treated with doses of 15 to 70 minims—17 recoveries and 3 failures.

Ammonii Fluoridum NH_4F = 37·042 (I. Wts.).

This salt has been suggested to diminish enlarged spleen and in goitre in doses of 5 to 20 minims of solution, 4 grains in an ounce, after meals (supply in a gutta percha bottle.) For phthisis, inhalation from a 1 in 500 solution has been recommended. It is soluble 5 in 6 of water and about 1 in 250 of alcohol 90%.

4 grains may be considered more than a maximum dose.—W.H.M.

Incompatible with Nitric Acid, Quinine Salts, Spirit of Nitrous Ether and soluble Calcium Salts, but compatible with Tinctura Ferri Perchloridi.

Solution 1 in 1,000 inhibits cancer tumour growths—1 in 2,000 however does not (experiments on mice)—B.M.J. ii./06, 1548.

Calcii Fluoridum. CaF_2 = 78·09 (I. Wts.)

Dose.— $\frac{1}{4}$ to $\frac{1}{2}$ grain (0·016 to 0·032 Gm.) suitably diluted.

White powder insoluble in water. This salt has been advocated for improvement of the teeth and building up bone, given *e.g.* as follows:—

Pulvis Calcii Fluoridi et Phosphatum.

Dose.—30 grains (2 Gm.) or approx., *i.e.* $\frac{1}{2}$ teaspoonful, twice daily with meals.

Calcium Fluoride 0·075, Potassium Phosphate 3, Sodium Phosphate 5, Magnesium Phosphate and Calcium Phosphate of each 10, Sodium Citrate 10, Milk Sugar to 100.—M./08, 174.

Fluor-rheumin consists of Fluor-phenetol 1, Di-fluor-di-phenyl 1, Soft Paraffin 10, Anhydrous Wool Fat 85. For rheumatism and influenza.—P.J. iii./09, 11.

Ferri Fluoridum. Ferric with Ferrous Fluoride.

Dose.— $\frac{1}{10}$ to $\frac{1}{2}$ grain (0·0032 to 0·032 Gm.).

A purplish grey insoluble powder, possessing hæmatinic properties, is valuable for enlarged spleen.

Quininæ Fluoridum. $C_{20}H_{24}N_2O_2$, HF=344·22 (I. Wts.).

Dose.— $\frac{1}{20}$ to $\frac{1}{2}$ grain (0·0032 to 0·032 Gm.).

In relieving enlarged spleen and in rickets.

Sodii Fluoridum. NaF=42·00 (I. Wts.).

Dose.— $\frac{1}{20}$ to $\frac{1}{2}$ grain (0·0032 to 0·032 Gm.).

Use.—Antiseptic in phthisis.

Fluoroform. CHF_3 =70·008 (I. Wts.).

A 2 to 2½% solution (the solubility is 2·8%) under the designation **Aqua Fluoroformi** is employed for pertussis, phthisis, and as a muscular tonic.

Odourless, tasteless, and non-poisonous, and does not impair digestion.

Dose.—For young children 1 teaspoonful every hour, for older children $\frac{1}{2}$ ounce.

Two patents taken out for making this.—P.J.ii/8, 258.

ACIDUM IODICUM.

HIO_3 =174·54 (175·928 I. Wts.). *Dose.*—1 to 5 grains (0·065 to 0·32 Gm.).

White crystalline powder very soluble in water. Iodic acid is a remarkable deodorant and preservative even in a 1 in 2,500 solution. It is employed in ozæna, for deodorising offensive urine, as an irrigant in empyema (strength 1 in 500) and for leg ulcers, as a mouth wash, *e.g.*, in inoperable epithelioma, and as a throat swabbing in diphtheria. It was found very useful in a case of extensive burning (1 in 500 solution). Internally a drachm of a 1 in 100 solution, well diluted, has been given in gastro-intestinal sepsis, as in typhoid fever. The calcium salt is principally employed.

Calcii Iodas. $Ca(IO_3)_2$, $6H_2O$ = 494·07 (498·026 I. Wts.). *Syn.*

CALCINOL.

Dose—3 to 4 grains (0·18 to 0·24 Gm.), three times daily in solution.

Tasteless, odourless powder, soluble in 380 parts of water at 11·5° C. Contains 51% of iodine and 16% of available oxygen. Acts equally well in an acid or alkaline medium as a deodorant and anti-putrefactive.

Uses.—Is particularly useful as a dusting powder. **Lotio Calcii Iodatis** (saturated aqueous solution) is employed in septic and suppurating wounds, and a **Gauze** (3% strength) may be used for the same purpose. Healing ensues with the production of a dry scab. A warm saturated solution is used as a vaginal douche or bladder irrigant; is eminently efficient as a mouth wash or gargle. There is a field of usefulness for it in dentistry, *e.g.*, in pyorrhœa alveolaris, &c. An ointment 10 grains to the ounce, has been found to be a veritable specific in various forms of eczema. A solution or a 10% insufflation with bismuth carbonate may be useful in otorrhœa. May prove of value in fetid breath.

Hypodermic injections of from $\frac{1}{2}$ to 2 drachms of an emulsion of 3 drachms of the Iodate in 1 ounce of glycerin have been used in tuberculous joints.

Hydrargyri Iodas. $Hg(IO_3)_2$ = 545·88 (549·84 I. Wts.).

Dose.— $\frac{1}{6}$ to $\frac{1}{3}$ grain (0·01 to 0·02 Gm.).

A white powder, strongly antiseptic. **Soluble** with the addition of Sodium Chloride to the extent of 2% in water. Potassium Iodide also

assists solubility. It has the scientific advantage of attacking disease organisms with both its component ions, and it contains only half as much Mercury as the Perchloride. In a pronounced sycoosis of hairy parts of the face an ointment containing 20 grains to the ounce produced an effectual cure.

Bismuth Subiodate, a fine white unirritating powder,

Insoluble in water. It has been used in lupus in powder form and as ointment (20 grains to the ounce), and in scrofulous glands as a dusting powder.

Sodium Iodate, $\text{NaIO}_3 = 196.42$ (197.92 I. Wts.) $1\frac{1}{2}$ grains in 5% solution (about saturated) have been injected for acute and chronic articular rheumatism.

Zinc Iodate.— $\text{Zn(IO}_3)_2 = 411.99$ (415.21 I. Wts.). White powder.

Soluble about 1 in 50. Use similar to that of calcium iodate.

ACIDUM LACTICUM.

(Off.). U.S., P.G., P. Austr., Ned., Belg., Helv., Jap.

$\text{CH}_3\text{.CHOH.COOH} = 89.37$ (90.048 I. Wts.).

Dose.—5 to 20 minims (0.3 to 1.2 Cc.), well diluted. U.S. average dose 30 minims.

A colourless, odourless, syrupy, sour liquid, obtained by the fermentation of milk sugar by the action of *Bacillus acidi lactici*. Lime or Zinc Oxide is used to neutralise the acid as formed. The respective lactates are then decomposed. It has Sp.Gr. 1.21 and contains 75% of hydrogen lactate. Fr. Cx. has Sp.Gr. 1.24 at 15°C.—is nearly pure.

C.R. 1908.—Lead should not exceed 10 parts per million.

Solubility.—Is miscible with water, alcohol, and ether; it coagulates milk and albumin.

Uses.—It is employed topically to destroy morbid growths, in diphtheria, &c., and internally for infantile and tropical diarrhoea, for diabetes, dyspepsia, and to allay cough in phthisis, and as a stomachic tonic in combination with iron and lime. Has been used locally in tuberculous ulceration of the pharynx and larynx.

In chronic catarrh of the bladder, lactic acid drinks arrest the ammoniacal decomposition of the urine, both inside as well as outside this organ, dissolve the salts and are said to stop the development of micro-organisms.

Pure acid as a paint, or in a paste with kaolin, or as a 50% injection, destroys lupus, but is painful.

Laryngeal papillomata treated with 2% solution. — B.M.J. ii/04. 1224; ii/05, 1191-1196.

Test for in vomit, &c., vide 'Examination of Stomach Contents.'

Butyric Acid— $\text{C}_2\text{H}_7\text{.COOH} = 87.4$ (88.064 I.Wts.) — (with the characteristic evolution of hydrogen) may also be produced if the fermentation proceed too long, or if the lactic acid as it is produced is not neutralised by the presence of calcium carbonate or zinc oxide.

Acidum Lacticum Dilutum (B.P. 1885). Sp. Gr. 1.040. Lactic Acid 3 ounces, Distilled Water *q.s.* to 1 pint. **Dose**.— $\frac{1}{2}$ to 2 drachms (1.8 to 7 Cc.).

In gonorrhœa a few drops of the pure acid has been injected just beneath the membrane of the cervix.

For infantile diarrhœa with green stools.—Pr. lxx.144, yields good results.—M.P. June 23/09, 629.

Laryngeal tuberculosis treated by application of (Lake's) mixture of Lactic Acid 50%, Formalin 7%, and Carbolic Acid 10%. May be diluted to $\frac{1}{2}$ strength.—L. ii./05,1278; B.M.J. i./07,1421.

Indolent ulcers in laryngeal tuberculosis curetted and treated with lactic acid: may cause pain.—B.M.J. ii./05,1191 (Opinions differ as to value of the treatment).

Ulcer on the vocal cord treated with radium on a celluloid ball without improvement but was cured with lactic acid.—Pr. Aug./09, 237.

Arguing on the theory that lactic acid is apparently a natural protective substance when produced as it is in the case of cancer of the stomach and that sour milk is a country remedy for it in Russia, the acid has been tried for the complaint externally, a dressing of 0.25 to 1% was applied and internally tablespoon doses of a 1 in 45 solution. Improvement resulted.—M. 1908, 115.

Injectio Acidi Lactici, C.L.T.E.

Lactic Acid 4 to 6 drachms, Water to 1 ounce. Is directed to be introduced by means of the submucous laryngeal syringe into the tissues of the larynx.

Nebula Acidi Lactici, T.H.

Lactic Acid 1, Distilled Water 15. Of great use in diphtheria; appears to have the effect of dissolving the membranous exudation.

Spiritus Acidi Lactici.

Lactic Acid 3, Castor Oil 2, Lavender Water 4, Alcohol 90% to 24. Suitable for treatment of alopecia areata. To be rubbed in gently at first, later with some friction.

Alopecia treated by a 30% lotion.—B.M.J.E. ii./01,92.

Calcii Lactas. $\left[\text{C}_2\text{H}_4 \left\{ \begin{smallmatrix} \text{OH} \\ \text{CO.O} \end{smallmatrix} \right\} \right]_2 \text{Ca} + 5\text{H}_2\text{O} = 305.85 \text{ (308.25 I. Wts.)}$

Dose.—1 to 15 grains (0.065 to 1 Gm.).

An opaque, white, crystalline powder antiseptic and stomachic, and given for rickets; soluble in water, 1 in 15 if freshly prepared.

Flavoring.—It is practically tasteless, if desired to flavor any Glyl or Syl may be prescribed.

Has been used (*per os*) in urticaria and chilblains. Chilblains are stated by Sir A. E. Wright to be caused by thinness of the blood, which permits of effusion into the tissues and consequent swelling and inflammation. Is useful to give prior to operation to increase coagulability of the blood, but in a case cited not suitable *per os*. Further, hypodermically produced painful coagulation locally and collapse. Strontium Lactate *per os*, then thought of. *q.v.*—L. ii./06,436.

According to Dixon given *per os* does not affect coagulability of the blood. Must be injected to produce this effect.—*c.f.p.* 202.

For chilblains in the adult 15 grain doses dissolved in 1 ounce of Chloroform Water with $\frac{1}{2}$ to 1 minim of Capsicum Tincture, thrice daily one hour before meals to be continued over six weeks. Constipation which may be expected is to be corrected by Senna Pod Infusion.

Hæmoglobinuria, œdema of the feet, boils, urticaria, erythema, lichen planus, gouty pruritus, pruritus ani also treated with success.

The salt is readily oxidised in the system with result that the organic radicle of the base is placed more fully at the disposal of the organism than in the case of the Chloride being administered.—Luff. B.M.J. i/09,261. P.J. i/09,150.

Neither this salt nor Citric Acid seemed, according to one contributor, to have an action on the coagulability of the blood.—B.M.J. i/09,999.

Scurvy, associated with diminished alkalinity of the blood brought to normal by 10 grain doses of Calcium Lactate.—Sir A. E. Wright. L. ii/08,725.

In eczema where there is much oedematous infiltration into the skin with redness and itching often given with benefit, *e.g.*, 5 to 15 grain doses thrice daily before meals, or 1 drachm doses two or three times a week. To be continued only until the symptoms of oedema and itching have subsided. If it constipates, correctives, Sulphur or Senna to be given.—B.M.J. i/09, 1344.

Color blindness well treated by Calcium Lactate. The cells of the retina thought to move in one direction in response to a red stimulus and in another to blue. Failure to move in any direction would mean absence of color stimulus in the brain. Calcium Lactate has the power of stimulating body cells, hence ought to stimulate retinal cells to respond more to color sensations. A case in which response to green was nil was able to detect things of this color after only 10 grains of the salt. Two other cases with larger doses gave equal encouragement.—B.M.J. ii/09, 315.

In epilepsy with frequent hæmorrhage successful.—Pres. 1910,18.

Tablets of Calcium Lactate contain 5 grains each.

Liquor Calcii Lactatis. *Dose.*— $\frac{1}{2}$ ounce (= 15 grains Calcium Lactate). Calcium Carbonate 4, Lactic Acid *Off.* 8, Water to 180. This has the advantage of keeping satisfactorily.

Bold treatment spread over several days with Calcium Lactate in cashet followed by a good half pint or more of water is valuable in the urticaria following operation, as also in the ordinary type of urticaria. In old people with impaired circulation Calcium Lactate is liable to thicken the blood too much, it is desirable to give a cardiac tonic to drive the blood through peripheral circulation.—Campbell Williams.

Ferri Lactas, (Ferrous) FR. Cx. P.G., P.Belg., P.Jap.
 $(C_2H_4OH.CO O)_2Fe + 3H_2O = 285.98 (287.978 \text{ I. Wts.})$.

Dose.—1 to 5 grains (0.65 to 0.32 Gm.).

In greenish-white crystals, soluble 1 in 60 of water; when taken internally is easily assimilated by the system.

Calcii Lactophosphas.

Dose.—3 to 10 grains (0.2 to 0.65 Gm.).

Crystalline powder. Is often only a mixture of equal parts of calcium lactate and (dibasic) calcium phosphate. Soluble in water. Stomachic tonic.

In cardiac disease useful (Branton).—B.M.J. i/07,617.

In coagulability of the blood, experiment showed this salt, even in 15 to 30 grain doses, produced little or no effect. *c.f.* Calcii Lactas.—L. i/08,96.

Plumbi Lactas. $(C_2H_4OH.CO O)_2Pb = 382.09 (385.18 \text{ I. Wts.})$.

A white crystalline powder, soluble in water.

Sodii Lactas. $C_2H_4.OH.CO ONa = 111.25 (112.04 \text{ I. Wts.})$. *Dose.*—5 to 10 grains (0.32 to 0.65 Gm.).

Usually in form of yellowish syrupy liquid miscible with water. Large doses are said to be hypnotic.

In scorbutic symptoms is better than sodium citrate.—L. ii/08,725.

Syrupus Calcii Lactophosphatis (*Off.*).

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.).

Add gradually Precipitated Calcium Carbonate 25 to Lactic Acid 60,

diluted with Distilled Water 240. When dissolved add Concentrated Phosphoric Acid 46, and triturate until the precipitate formed is redissolved. Dilute with a little Distilled Water, add Orange Flower Water 25, filter, and add Refined Sugar 700; dissolve without heat, strain, and add Distilled Water *q.s.* to 1,000. (U.S. has Phosphoric Acid 36, Orange Flower Water 50, Sugar 725.)

An alternative method is to dissolve the Calcium Carbonate in the mixed acids diluted with 250 of water.

Dusart's Syrup. *Dose.*—2 drachms to $\frac{1}{2}$ ounce (7 to 15 Cc.)

Calcium Carbonate 9, Lactic Acid 75% 22, Phosphoric Acid 10% 83, Water *q.s.* Dissolve the Calcium Carbonate in the Lactic Acid diluted to 108 with water with the aid of heat. Cool and add the Phosphoric Acid, and make up to 370. Dissolve in this Sugar 623, and add Spirit of Limes 7. Mix and adjust to 1,000. *All parts by weight.*—Y.B.P. 02,232.

Liquor Calcis Lactophosphatis. LACTOPHOSPHATE DE CALCIUM DISSOUS. FR. CX.—Rub Dibasic Calcium Phosphate 17, smoothly with Water 964, add Lactic Acid 19 (FR. CX. Sp. Gr. 1.24, practically pure acid)—all by weight. Shake to dissolve; filter.

Syrupus Calcii et Ferri Lactophosphatum.

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.).

Dissolve by aid of slight heat Ferrous Lactate 150 grains with Potassium Citrate 150 grains in Water 1 ounce, and add to Syrup of Calcium Lactophosphate 20 ounces. We acknowledge the N.F. for the suggestion to use Potassium Citrate. Our preparation has, however, always been 1 grain Ferrous Lactate in the drachm, *i.e.*, double the strength of that in N.F. This strength is therefore retained.

ACIDI LACTICI BACILLI.

Lactic Acid Bacilli Preparations.

Prof. Elie Metchnikoff, in his work "The Prolongation of Life," evolves his theory of arresting the growth of putrefactive (alkaline) organisms in the intestines, and hence stimulating intestinal digestion and diminishing toxic absorption from the bowel by acclimatising the (harmless) Lactic Acid Bacillus. He takes as his starting-point that the newly-born infant has sterile intestines, and on partaking of the first drop of mother's or cow's milk these commence to be infected. He then discusses the evils resulting from putrefied food, some of the recipients dying from the effects; others, if their resistance be sufficient, saving their lives after experiencing a severe attack of cholera. The word 'acid' makes its appearance—*i.e.*, in connection with the custom prevailing from early times of preserving food with vinegar—the product of bacteria to 'ward off putrefaction.' It is further pointed out that substances themselves producing a preservative acid—*e.g.*, milk—can be made into others—*e.g.*, cheese—which can be kept for longer or shorter periods of time. 'Kwass,' of which black bread is the main ingredient, is the chief beverage in Russia in the summer. It contains Lactic Acid. Other instances are given with the conclusion, Why not arrest putrefaction in the digestive tract as with the conserve?

Cohendy consumed during seventy-four days quantities of pure Lactic Bacilli cultures ranging from 280 to 350 grams, and proved that even with

a mixed diet intestinal putrefaction had decreased at the end of this time, and that the diminution persisted several weeks after taking the bacilli had ceased.

He found that with a normal diet the *Bacillus* appeared in the stools in three to four days after it had been begun to be consumed regularly with the food; that it took eight days to become properly acclimatised in the intestine, and that when this had taken place it would continue to live and thrive for twelve more days without another dose being swallowed, afterwards gradually disappearing. Regular administration caused increase in weight and bulk of faeces. (Herschell has frequently found the *Bacillus* in stools thirty days after the daily dose had been discontinued.)

Lactic Acid, as such, has been employed for years past in dyspepsia, enteritis, &c., as also in diabetes, and locally in tuberculous ulceration of the larynx.

The conclusion was that as organisms of putrefaction only increase with difficulty in neutral or acid media, the most feasible procedure would be to introduce a Lactic Acid organism (growing in a sugar medium) into the human organism to arrest the proliferation of harmful bacteria. The bacillus known as the Bulgarian *Bacillus* (*B. Caucasicum*), isolated by Cohendy and independently by Massol from 'Yoghourth,' a form of soured milk, was deemed most suitable, as it is the best acid producer. The acid it produces is the optically inactive variety. It is a hardy organism resisting the stomach juices and its own acidity to a marked degree. A method on these lines in the form of cultures has obvious advantages over the administration of the acid as such.

Buttermilk of many countries, Kephir or Koumiss, *vide* p. 482, the Egyptian 'Leben Raib,' 'Prostokwocha,' and 'Varenetz' of Russia, Yoghourth (Yohourth) of the Balkans, and many others were forerunners of the present day curdled milk treatment, which is deemed a desideratum for well-being and long life. It is believed that the Bulgarian peasant consumes as much as 10 grams of Lactic Acid daily in his diet of Yohourth.

In addition to Lactic Acid Bacilli these naturally soured milks, as a rule, contain yeasts, and *ergo* alcohol.

A small proportion of alcohol in a food preparation of this nature can, we think, hardly be objected to, furthermore, yeast is considered a useful therapeutic aid in many affections. We are not by these remarks upholding the rough and ready 'Kefir'; on the contrary, we advise the curdled milk to be made on the most scientific lines, but think it of importance at this juncture to point out that yeast in small proportion is a valuable adjunct to treatment with a pure culture of *B. Caucasicum*. Emerson, as also Herschell, advise the presence of a carefully selected strain of yeast.

The question of longevity induced by sour milk diet has been so freely discussed by the Daily Press that it will suffice in these pages to refer the reader, for example, to L. ii./o8,1399, for reference to the age at which Thomas Parr died, in the year 1685, sour milk having predominated in his diet, and to Professor Metchnikoff's work for details.

The Bulgarian *Bacillus*, according to Metchnikoff, will produce as much as 2.5 grams of Lactic Acid per 100 Cc. of milk.

Succinic, acetic and formic acids are also formed by it in small quan-

tity. This bacillus has no action on albuminoids (casein, &c.) nor fats, nor does it produce alcohol or acetone. For flavouring purposes the *B. paralactic* (*B. Güntheri*) is used in conjunction.

Günther's Bacillus is found in abundance in all spontaneously coagulated milk, and is an important Lactic Acid producer.

It modifies the texture of the curd formed, and hence is a useful addition, but it appears to die out in the finished product.

It produces pure dextrorotatory Lactic Acid (no other acid) from grape and milk sugar.

Hüppe's Bacillus is another Lactic Acid organism.

It is almost always present in milk which has soured spontaneously. This organism, sometimes called specifically the *B. Acidi Lactici*, differs from *B. Güntheri*, by its comparative ease of cultivation upon ordinary nutrient media.

Léon Maesol took cultures of the Bulgarian Bacillus to Paris, and these gave Metchnikoff the starting point for his researches on the efficacy of soured milk.—*B.M.J.* i./10,57.

The characters of the chief Lactic Acid organisms may be tabulated:—

ORGANISM AND SYNONYMS.	Appearance.	PROPERTIES.
<i>Bacterium Caucasicum</i> (Kern); <i>syn.</i> Maesol's Bacillus, <i>syn.</i> Bouchard's Bacillus, <i>syn.</i> Bulgarian Bacillus.	Large square-shaped, 5 to 6 μ \times 1 μ showing vacuoli, slightly motile. +Gram staining.	Appears to take a little time to establish itself, but ultimately is the omnipresent bacterium in milk. It is a strong lactic acid producer.
Hüppe's Bacillus: <i>syn.</i> <i>B. Acidi Lactici</i> . <i>Streptococcus Lebens</i> may be closely allied.	Coccoid shape 0.4 to 0.6 μ \times 0.6 to 2 μ . Usually in pairs, rarely longer chains, non-motile. +Gram staining.*	Causes bitterness, breaks up fat and proteolytic substances.
<i>Bacterium Güntheri</i> ; <i>syn.</i> <i>B. Acidi Paralactici</i> (Kozai).	Short rods, 1 μ \times 0.5 to 0.6 μ , with pointed ends, in pairs or short chains non-motile. - Gram staining.	Gives a smooth, non-leathery form of curd. It appears to be killed off to some extent in the curdling of milk, being probably ousted by <i>B. Caucasicum</i> .

*The Hüppe's Bacillus with which we have worked has been found to stain well by Gram's method, but opinions differ.

***Trilactine Tablets** (*Martindale*) contain *B. Caucasicum* as their principal active constituent; a proportion of Hüppe's Bacillus is also present.

These are supplied in tubes, each containing a maximum day's treatment. They are for therapeutic use or for curdling milk (*vide infra*). For the former they are best taken in conjunction with a little sugar, *e.g.*, dissolved in a little boiled (and cooled) water or malt extract.

Dose.—Three to six per diem after meals (but *c.f.* also Trilactine Milk) with a little sugar. If the patient already consumes sugar in fair quantity

this addition is not necessary. It is a good plan to crush the tablets in the sugar (or malt extract) and water, and leave to stand a few hours so as to revivify the bacilli.

The treatment, according to severity and nature of the case, extends over one to three months.

Patient must rigorously avoid.—

In the course of treatment such foods as gravy, meat jelly, meat extracts, white of egg, fat meat, high game, &c., which would act as culture-media for proteolytic bacilli.

Lactic Acid Bacilli—Curdled Milk. * Trilactine Milk.

Dose.—1 pint or more (less if not tolerated) per diem, divided into 2 or 3 portions.

After the bacilli have appeared in the stools (*vide* "Uses") one daily dose first thing in the morning or evening will suffice. It is usually preferred during or after meals, but there is an obvious advantage in taking on an empty stomach if this can be done, *i.e.*, the ferment will pass through to the duodenum with less contamination with the stomach juices. It is desirable to undergo the treatment for 3 weeks, then stop for a period before proceeding again if necessary.

N.B.—Perseverance is necessary. Do not give up the second week if patient suffers from flatulence or because constipation is increased.

Preparation of Curdled Milk.—This forms an agreeable mode of treatment with active Lactic Acid Bacilli. Absolute sterilization of the milk before introducing the lactic organisms is essential. Certain pathogenic organisms—*e.g.*, the tubercle bacillus persist if present in a sample of milk even after the milk has soured. Allen has demonstrated that milk may be so teeming with Streptococci and pus as to even kill off the *B. Caucasicum* introduced into the same and incubated over night.

An organism dividing three times an hour (as mentioned in a recent contribution on "Surgical Methods" by Sir W. Watson Cheyne), which is a fair average, will give rise to something like thirty-three million bacteria in twelve hours. To kill all organisms in milk would necessitate exposure to a temperature of 108° to 120° C., (226° to 248° F.), which would give the milk an unpleasant flavour. Pasteurising at 140° F. is not sufficient to kill *B. tuberculosis* or the spores of the butyric bacilli. Metchnikoff, therefore, advises boiling for several minutes. For safety an hour would be preferable, but previously pasteurised milk as is supplied in London and other large cities, may be used after bringing to the boil.

According to Cohendy *B. Caucasicum* grows between the limits 35° and 44° C. (95° and 110° F.) nearer the latter in preference.—W.H.M. N.B.—Acid-production ceases altogether at a slightly higher temperature.

The required quantity of milk (a pint or a quart being a customary day's supply), cooled to about 40° C. (104° F.) (this can be done expeditiously by standing the saucepan with lid on, in a basin of cold water), is placed in a suitable jar or basin so arranged with a small light beneath that a temperature of 40° to 45° C. (114° to 113° F.)—not higher—can be maintained for eight to ten hours,—a ventilated dry heat (hot air) will work satisfactorily. A water bath is not necessary. For a pint of milk two or more active Lactic Acid Bacilli Tablets—the quantity varies with the different

brands—are crushed, *e.g.*, with a spoon in a little of the previously heated and then cooled milk (reserved for the purpose), to make a paste and stirred into the remainder of the milk in the jar. For a quart six or more tablets should be employed. The milk will, at the end of this time (or a little longer *v., infra.*), have formed a junket ready for consumption. If the Curdled Milk be 'over-made' (*i.e.*, much whey formed on the top), the heat must be reduced till the correct adjustment is ascertained.

Curdled Milk may be eaten, according to taste, either with sugar, or with cream and sugar, or with sugar and a little powdered cinnamon, or ginger as flavoring. It is usually taken 12 to 24 hours after souring has been started—some consume it with relish even 10 days old, *vide infra.* Metchnikoff recommends curdled milk to be made from skimmed milk "as it is undesirable to absorb too much fatty matter." Providing one has a strain of organisms that does not decompose fat to too great an extent and produce a bitter-tasting product, this, perhaps, is open to discussion. The remarkable fact is that we find in our experiments that at any rate after 8 to 10 hours *B. Caucasicum* is in great preponderance in the cream when ordinary milk is used,—the bacilli appear to be carried up with the milk fat. Since making this observation we find that Anderson also noted organisms (of contamination) in a marked higher proportion in the cream in the case of milk spontaneously infected.

It is an interesting fact that on several occasions efforts to obtain a good curd with "dried milk" reconverted into milk were unavailing; one obtains a lumpy product, and a large amount of whey is thrown out.

N.B.—The milk must, of course, be free from preservatives and in all respects as fresh and pure as can be obtained. If the full cream milk be deemed too rich, skimmed milk may be used.

EXPERIMENTS TO INCREASE BACTERIAL GROWTH.

It occurred to us that an addition of a considerable quantity of milk sugar or cane sugar added to the milk before incubation, might possibly increase the growth of the bacillus. Our experiments resulted as follows:—

		Acidity average of three tests.	Bacteriological Results.
(1). 1 pint of milk with 20 Gm. Milk Sugar and 2 Trilactine Tablets.	Curd fair.	0.92%	Bacteria good num- ber, teeming in cream.
(2). Employing Cane Sugar, 20 Gm. instead of the milk sugar.	Curd fair.	0.99%	Same as above.
(3). Controls to above. (without either sugar).	Normal.	0.98%	Normal,—teeming in the cream.

These examinations were made after about ten hours. After thirty hours the acidity in all is practically doubled, and the bacilli grow evenly throughout the curd in addition to the cream.

We conducted experiments also with *Separated Milk* using both the above additions, but there was no marked difference either in acid production, curd formation, or bacterial growth.

Experiments were also conducted to determine whether a large proportion of added calcium carbonate (20 Gm. to the pint), would increase the growth

of the Bacilli, but this was equally disappointing. On the whole, therefore, it would seem desirable to give the preparation a little longer than ten hours to 'make,' yet on the other hand, provided full-cream milk be taken it is obvious *the bacilli at 10 hours' growth are in an active form capable of rapid multiplication*, and the curd is more sightly in appearance than if 'over-made' with excess of whey.

Pharm. Form. says acid-production in milk begins immediately the milk is drawn from the cow, and in 48 hours sufficient acid (1%) is produced to coagulate the milk at normal temperature.

For this reason dairy farmers add sodium bicarbonate by rule of thumb, to counteract acidity and act as preservative. Some medical men think sodium lactate to be provocative of diarrhoea, and object to the addition.

With the growing popularity of the Metchnikoff treatment a large number of preparations were placed on the market purporting to contain the *Bacillus Massol*. We regret to say that in some instances we found the organism wanting. One of us (W.H.M.) conducted an exhaustive bacteriological and chemical examination of the products obtainable, and published results in the C.D., December 1908. It is conceivable that these preparations have since been improved.

Methods of Examination.

1.—ORGANISMS PRODUCED AND CURD FORMATION.

If properly made there is no reason why lactic acid bacilli in tablet form should not keep good for months or even years.—W.H.M.

The property of producing lactic acid is common to a vast number of organisms (cf. L. ii./08, 957).

Loopfuls of the milk, treated with the crushed tablet, are to be examined after ten and twenty-four hours' cultivation.

The best staining method to employ is that of Gram *q.v.*, using 1% neutral red as counterstain. The Gram-staining organisms take on a deep violet, and the rest of the field is a reddish pink, less diffuse than that with eosin, which is often used as a counterstain. A copious growth of *B. Caucasicum* is essential, with exclusion of other bacteria. Curd formation should also be satisfactory.

2.—ESTIMATION OF LACTIC ACID.

The Pasteur Institute found in soured milk, made according to Metchnikoff, 1% of lactic acid when ready for consumption. More is formed if longer time allowed (*vide ante*).

(Heinemann and Hefferan state that the lactic acid produced by *B. Caucasicum* may reach more than 3%. N.B. strains differ.)

The amount obviously depends on the content of lactose, the average of this constituent being 4 per cent. The decomposition of lactose in milk into lactic acid is a complex matter. In any case nature will not allow an optimum yield, as the bacilli kill themselves by the acid they produce—the maximum acid formation being reached in about thirty-six hours. *B. Caucasicum* is the most resistant to its own lactic acid.

It is, however, not so much a question of the quantity of acid produced as the assurance that the culture used is active and capable of thoroughly establishing itself in the intestines to the exclusion of harmful bacteria, as evidenced by bacteriological examinations of the excreta.

Wynter Blyth says the maximum amount of lactic acid formed under ordinary conditions (from milk) seems to be 0.8 per cent., which is probably not far short of the mark, so far as our work shows.

Milk, it should be noted, is amphoteric in reaction on account of its content of alkali phosphate. Phenolphthalein can be used as an indicator in titrating, but the end reaction is a little difficult to determine—it requires to be carefully looked for; 10 c.c. of the milk is a convenient quantity to titrate, using $\frac{N}{10}$ Soda.

3.—CASEIN RENDERED SOLUBLE.

At the Pasteur Institute 38 per cent. of the casein in milk could be rendered soluble by treatment with lactic-acid organisms (Metchnikoff, p. 180). Herschell states that as much as 50 per cent. of it is converted into albumose and peptone by this means.

For further details *vide* the contribution 'Lactic Acid Organisms.'—W.H.M.

4.—PHOSPHATE RENDERED SOLUBLE.

Metchnikoff states that 68% of the calcium phosphate (which he terms the chief mineral substance of milk) was rendered soluble during fermentation by his process. Our investigations gave results closely approximating this statement.

5.—GENERAL CHARACTERS.

NOTE.—Herschell states Tablets for internal use or for curdling milk should be—

- (1). White or greyish white in colour.
- (2). Should be odorless both when dry and moistened.
- (3). Should disintegrate with gentle crushing in cold water, *without effervescence*.
- (4). The suspension should be neutral to litmus.
- (5). Should produce a good firm clot in milk in ten hours at 40-42°C.
- (6). No brown sediment should form during incubation.

It appears that in the district around Milan spontaneously curdled milks are not used to any extent nor milks prepared by special ferments. In Sardinia, however, the people prepare and make a continuous diet of (for lack of anything better) Gioddu, Mezzoraddu, or Micariatu, which are the products of fermentation due to *Saccharomyces Sardons* and to *Bacillus Sardons* and *Mazun*, and which resemble in composition the *Lebenraib* of Egypt, the *Prostokwacha* and *Varenetz* of the Russians, the *Kephir* of the Caucasians, the *Koumiss* of the Tartars, and the *Mazun* of the Armenians. At Milan the grape ferment is in demand, at Turin *Blastoinvertin* (*Saccharomyces invertens*), in Lombardy *Kephir*, and at Piedmont the true *Yoghourt*.

From Greece we learn that *Yoghourth* is much in use both as a food and for therapeutic treatment. It is prepared there by adding a little lemon-juice to fresh milk, which is then kept warm for eight hours, forming a curd which is the first stage in the manufacture. From the curd thus formed a tablespoonful is mixed with boiled milk, and this procedure is repeated several times, with fresh milk on each occasion, until a *Yoghourth* of suitable consistence is obtained. Small spoonfuls of this latter product are added to wooden or earthenware pans containing milk which has been boiled and is still slightly warm. This forms the commercial *Yoghourth*, which curdles in four hours at 35° C. It has at first a sweetish taste, becoming extremely acid after twelve hours. In order to keep it, which one may do for as long as from five to eight days, it is poured into little bags of cotton, from which the whey filters, the product thereby becoming thicker and of better-keeping qualities. *Yoghourth* prepared from sheep's milk is highly esteemed as a milk-food by the Greeks.

Uses and References to Lactic Acid Bacilli Tablets and (plain) Curdled Milk—Both the Tablets and the Curdled Milk are used for summer diarrhoea in children, diarrhoea and constipation in adults, skin affections, such as eczema and psoriasis, acne and furunculosis, infective disorders of the intestinal tract, such as typhoid, dysentery, for intestinal tuberculosis and tuberculous diarrhoea, and for cancer of the stomach or intestines, where it is of great service in keeping under and suppressing the secondary infections, and in enteritis and colitis generally. Also as a cholagogue in hepatic congestion and gallstone, and in threatened appendicitis. Beneficial in migraine, neurasthenia and allied troubles.

The faeces in course of the treatment (which is harmless) gradually assume a neutral or faintly acid reaction.

The treatment is useful for loss of appetite and for loss of energy.

The Milk acts as a lubricant to the digestive tract, forming a pleasant article of diet and may with advantage be taken in comparative health as a nutrient and antiputrefactive.

The presence of anaerobic bacteria is believed to account for abnormal putrefaction in the intestine—normally the bacteria are either aerobic or facultative anaerobes—mainly whilst the anaerobic are in the minority. Excess of the anaerobic bacteria may be caused by excess of animal food,—auto-intoxication can undoubtedly be traced to this. Again the food may be excessively contaminated with bacteria, *e.g.*, in pyorrhœa alveolaris, and post-nasal catarrh. Further it may pass from the stomach imperfectly digested. There is in addition purely intestinal putrefaction. One of the agencies of defence by nature against such injury is the combating of toxins by the intestinal flora—principally *B. Coli*—this organism is furthermore stated to produce thermolabile and thermostable substances which not only inhibit the growth of other organisms, but also their own if given long enough time to act.

Diagnosis of abnormal putrefaction may be assisted by estimating (*v. Herschell p. 14 et seq.*) (1) URINE, increase in ethereal sulphates in the urine: increase in total output of aromatic bodies; rise in capillary constant; examination for Indican and other constituents. (2). EXAMINATION OF THE FÆCES,—staining by Gram's method and counterstaining with neutral red—the red organisms should preponderate (*B. Coli* is non-Gram Staining.) In abnormal putrefaction in proportion as the aerobic bacilli are replaced by strict anaerobes (mostly + Gram) the blue stained will be in excess. A loopful of a 1 in 100 suspension of fæces in sterile milk should not produce a rapid gas formation (*e.g.* by *B. Aerogenes Capsulatus*.)

Contra-Indications.—In many cases the stomach will not tolerate the Curdled Milk. Notably in chronic acid gastritis. Many cases of enteritis are aggravated by milk in any form. Personal idiosyncrasy also enters into consideration.—G. Herschell.

Ribbert of Bonn confutes Metchnikoff's theory, and says senility is not accounted for by toxic absorption from the colon. Asks for evidence of long life of birds which have no colon.—*B.M.J.* ii/o8, 525.

Metchnikoff found *B. putrificus*, *B. Sporogenes*, and *B. Welchii* (*B. Aerogenes Capsulatus*) inhabitants of the large intestine.—*B.M.J.* i/o9, 1024.

Suggestions that various ferments produce the various forms of Acid (+, -, and o) and that *B. Coli* is adversely affected by one form and not by another.—Glover—*Li/o9*, 133.

Importance of thoroughly sterilising the milk before use.—Allen.—*B.M.J.* ii/o8, 1605; *P.J.* i/o9, 150.

Necessity of boiling milk on two successive days. Perhaps better to discard milk altogether and employ a liquid sugar medium. Peptone water seems to be an essential of any form of the latter. A culture administered in an acid broth desirable. Freshly made cultures should be employed when the Lactic therapy is indicated. Opinion is expressed that the gastric juice kills bacteria with ease. Lactic ferments are devitalised.—*B.M.J.* i/o9, 711.

For abnormal intestinal fermentation causing chronic ill health, either by local irritation or auto-intoxication, also to render the gastro-intestinal tract aseptic prior to operation, further for some forms of constipation.

It is interesting to consider the changes which may be expected during treat-

ment. In the first week slight diarrhœa may occur, with flatulence and colicky pains; headaches have also been observed at this stage. In the second week there is often constipation, and cases of chronic constipation become aggravated. Constipation disappears during the third week, the bowels become regular, and there is progress toward recovery. The ethereal sulphates in the urine are said to diminish, and in the fourth week the harmless colon bacilli begin again to predominate in the stools.

Periodic examinations of the stools should be made during treatment, in litmus milk containing 3.5 parts of lactic acid per litre, incubating at 37° C. In this medium hardly anything will grow except the bacillus of massol. The litmus remains coloured pink unless organisms are present which can neutralise acidity. About two and a half months is requisite to completely transform the intestinal flora.—L. ii./o8, 372.

Soured milk; its nature and uses.—Hewlett, Nat. April 7, 1910, 159.

Dysentery and ulcerative colitis treated with apparent increase of lactose-fermenting organisms in the stools.—B.M.J. ii./o8, 831.

Leader on the method.—B.M.J., ii./o8, 847.

To prevent, or at least diminish, intestinal intoxications and formation of such products of secondary fermentation as give rise to tyrosin, the conjugated ethereal sulphates, and xanthin compounds in excess.—L. ii./o8, 958.

Pernicious anæmia treated.—L. ii./o8, 1600.

Patient who had typhoid passed stools much infected with bacteria. There was discomfort in digesting. Curdled milk in a week rendered fæces free from bacteria except lactic organisms in small quantity.—B.M.J., ii./o8, 1605.

Local Use of Lactic-ferment Preparations.—A filtered milk culture of lactic-acid organisms for use to free the urethra from bacteria on the urethral mucosa. An ounce injected night and morning for a week resulted in lactic organisms only being found. Weak permanganate lotion completed the treatment.—B.M.J., ii./o8, 1605. A preparation of this nature is 'Trilactine, Special, for Injection.' It will keep good about a month.

The method was also referred to B.M.J. i./10, 192, for use in the treatment of gonorrhœal and mixed infections of the female genital tract. After disinfecting the parts, all excess of disinfectant is removed, and the lactic fluid introduced into the vagina. In the most favourable cases the secretions are normal in a few days. In other cases the treatment is repeated weekly until cure is complete, usually in two or three weeks.

Spraying and washing out cavities, especially when putrefactive processes caused irritation.—B.M.J.E. ii./o8, 20.

Trilactine Pigment of stiff consistency suitable for applying with a brush, *e.g.*, to nose or throat, is also made.

Arthritis deformans, also osteo-arthritis, may perhaps be well treated with fermented milk.—L. ii./o8, 1868.

"The Bulgarian lactic bacilli," to quote Mason (L. ii./o8, 958.), "prevent the breaking-up of the peptone into excremental products, which diminish the amount of nutritive material required for the rebuilding of the sero-albumins and sero-globulins which are elaborated by the epithelial cells of the villi during the passage of the peptones to the portal vein. The mere splitting-up of the sugar is no advantage, since lactic acid is eliminated as carbonic acid and water. The useful rôle of the lactic acid therefore appears to consist in preventing changes in the proteids beyond a certain point. Once established, the lactic bacilli counteract

the action of such bacteria as *B. Coli*, which splits up proteids beyond the desired limit, with production of toxins, etc., and diminishes the amount of nutrition supplied to the blood".—L. ii./08, 958.

Chronic arthritis.—Herschell has found considerable improvement results from combined treatment with Lactic Acid Bacillus Therapy and Ionisation. The latter consisted of 50 milliampères current for 40 minutes three times a week using Potassium Iodide 2% solution driven in at the negative electrode and at the + pole 2% Lithium Citrate. At each sitting the relative positions of the electrodes were reversed.

Chronic ill health without any obvious cause. Force regained under the Bulgarian Bacillus treatment.—Herschell.

Symbiosis in nature plays a large part in the destruction of infective organisms—by crowding out. The fact that the lower animals do not become infected through the digestive tract with typhoid and cholera is ascribed by Metchnikoff to this symbiosis.—Hewlett.—L. i./09, 743.

Lactic Acid Bacilli are aerobic hence better to sour the milk before taking it.—P.J. i./09, 361.

There is an association between disordered conditions of the alimentary tract and melancholic states. Arguing that the former was cause and the latter effect, Lactic Acid Bacilli were employed in hypochondriacal melancholia with good result.—B.M.J. i./09, 1234.

In the knowledge of the writers a patient found the milk treatment nergising—in fact he could not sleep, a bromide mixture was necessary.

In the knowledge of the writers again a patient took lactic acid organisms in the form of active curdled milk culture for a fortnight—this produced diarrhoea—hardened pieces in addition to the liquid fæces—on persevering with the treatment stools became quite normal and the patient stated he never felt better in health.

In the knowledge of the writers a patient suffering from nervous dyspepsia very susceptible to drugs, debarred wines, saccharin, stimulants, etc., under three weeks treatment with "Trilactine" found acidity and flatulence to disappear though taking the sugar required, but, whether due to the treatment or not, he noted decrease in colour of complexion. At first there was a slight tendency to constipation. He noted stoutness (excess of fat) to decrease, but weight to increase. No other form of acid had ever been tolerated. In general, the treatment was thought beneficial.

Again, a well-known medical man suffering from a violent attack of ptomaine poisoning resulting in acute distension, was in our knowledge completely cured by a two days' course of sour milk.

Similarly a case of cystitis with the urine teeming with *B. Coli* was freed from the infection by aid of the treatment.

Another patient suffering from rheumatism received much benefit—the rheumatism went almost completely and he was able to walk with ease.

Appendicitis may be warded off. The caecum becomes inflated with the gas produced by intestinal putrefaction, the valves at the apex of the vermiform appendix become separated and allow entrance of faecal matter to set up the septic irritation of appendicitis. Lactic Acid Bacilli may supersede the abnormal organisms and prevent necessity of an operation. The bacilli will go on producing the acid in the internal economy. Possibly gout, due to a specific organism, and rheumatism ascribed to uric acid, as

also stiff neck (fibrositis) and skin-diseases, both due to absorbed toxins, will disappear under the treatment. Lactic Acid Bacilli treatment may prevent erosion of the palate by *Leptothrix buccalis* and as lactate of lead (from milk and liquor plumbi) Lactic Acid cured a case of dermatitis repens when other remedies failed.—Campbell Williams.

In two cases of mild colitis with abdominal pain and regular passage of mucus half a pint of curdled milk given daily, results were most satisfactory, relief in fifteen days.—B.M.J. i./09,80.

The qualifications of Lactobacillin were examined (on a meat diet in order to raise the quantity of decomposition products). There was a distinct decrease in the decomposition products of intestinal digestion, especially when Lactobacillin and milk were taken together. The Bacillus appeared in the fæces after five days. Constipation not improved; other cases benefited.—B.M.J.E. ii./08,76.

Colitis treated with curdled milk much benefited.—B.M.J. i./09,763.

Three consecutive patients, with recovery.—L. i./09,395.

Indicators of putrefaction. The Sulphates in urine are diminished, and the intestinal contents lose characteristic odour in the change in the bacterial flora.—P.J. i./09,361.

Invariable appearance of moulds in milk.—Bastian. L. ii./08,1324.

Tablets must be active, Bulgarian Bacillus with perhaps one other bacillus to improve flavor when grown on Cohendy Serum of milk.—L. ii./08,1600.

Metchnikoff has contributed an account of his method of intestinal therapy to a volume forming part of the Bibliothèque Thérapentique.—Gilbert & Carnot.—B.M.J. i./09,407.

Sir Lauder Brunton thinks that the introduction of large quantities of Lactic Bacilli into the intestine act by destroying the bacilli which produce fatigue toxins.—B.M.J. i./09,1447.

Angina effectually treated by the method.—Clifford Allbutt.—B.M.J. ii./09,1127.

Bushnell says all the dry forms of ferments on the market contain spore-bearing organisms, and points out that the liquid preparations are better, but a little chalk should be added, and they only remain active a short time. B.M.J. i./09,63.

In sprue (an acid producing complaint) Cantlie found increased acidity of fæces at commencement and that the sprue conditions became worse, but on giving alkali there was marked improvement. This is probably explained by the fact that the Lactic Acid Bacilli stir up the existing passive intestinal fermentation to activity, which is then cut short by the alkali.—B.M.J. ii./09,776.

Catarrhal affections of the ear, throat and nasal passages. Treatment has been advocated by means of the Lactic Acid forming bacillus.—Pres. 1910, p. 9.

Abnormal putrefaction in the colon has been treated by 1 ounce injection of a culture of the *B. Caucasicum* in a medium composed of Lactose 2, Glucose 2, Witte's Peptone 3, Salt 1, Water 100;—through the appendix.

Bacillus Massol is extraordinarily effective in combatting proteolytic microbes. Ordinary *B. Lactis*, on the other hand, is easily destroyed and does not reach the intestine when given.—B.M.J.E. ii./09,48.

Buttermilk, Composition of.—Protein 3, Fat 0.5, Sugar 4.8, Water 91 per cent.

Differs from soured milk in containing much less fat. The ordinary Lactic Acid Bacilli found in this are not so active nor resistant as those contained in Bulgarian Sour Milk. Milk in any form, however, in sufficiently large quantity tends to lessen internal putrefaction.—B.M.J. ii. /09, 923.

Herschell sums up his knowledge of *B. Caucasicum* in the words—"It resists gastric digestion, reaches the intestines alive and establishes itself as a part of the intestinal flora with a limited life of a few weeks, becoming a facultative anaerobe living on the culture medium provided by the food of the individual."

Metchnikoff says "that if it be true that our precocious and unhappy old age is due to poisoning of the tissues (the greater part of the poison coming from the large intestine, inhabited by numberless microbes), it is clear that agents which arrest intestinal putrefaction must at the same time postpone and ameliorate old age."

Further references.—B.M.J. i./09, 676; L. i./09, 488.

Diminishes intestinal putrefaction.—B.M.J. i./09, 1305. Experiences with Trilactine.—J. R. Roberts. I.M.G. Nov., p. 415. Pres. 1910, p. 22.

Gastric digestion in the dyspepsia of old age is benefited by Lactic Bacillus Milk. A tumblerfull at each meal. Dyspepsia vanished in a fortnight, and flatulence relieved.—L. ii./09, 1348.

Examination of commercial products.—B.M.J. ii./08, 1216.

The use of previous day's curdled milk to use with a fresh brew is unsound theoretically, and likely to lead to untoward result. The Bulgarian Bacillus takes far longer than five hours to develop.—Herschell, B.M.J. i./10, 118, 235.

Considerable improvement has been known to be derived from the use of a lactic acid preparation expressly stated not to contain *B. Caucasicum*.—C.D. ii./09, 931.

Discussion at Royal Society of Medicine seemed adverse to the treatment. —L. ii./09, 1818. Thermos flask as incubator.—B.M.J. i./09, 764.

In acute nephritis milk is the ancient and traditional diet. It does not cause alimentary fermentation except perhaps Lactic Acid fermentation, which may be advantageous on these lines. Of advantage in counteracting alkaline putrefactive agents in the colon. Typhoid fever treated with very gratifying results.—L. i./10, 30.

Schottelius maintained that animal life is impossible without the assistance of intestinal bacteria. Chickens fed on strictly aseptic food soon died, but the researches (of Metchnikoff in particular) on a species of bat which has a particularly short colon, but in which digestion is very rapid, show that both the small and large intestine of this animal contain very few bacteria. Digestion cannot be attributed to these but to digestive juices.—B.M.J. i./10, 458.

Midway between incredulity and over-laudation there is good evidence of real dietetic and medicinal value in fermented milk.—"The Times," A Leader, April 29, 1910.

Sugar Whey and Lactic Bacilli Malt Bouillon.—These two preparations have been advocated as substitutes for the curdled milk by Cohendy and Herschell, where the patient does not favour the taste of the milk:

To prepare sugar whey, boil the milk gently for five minutes, add to same

while boiling 1.5 Cc. of hydrochloric acid to the litre. Separate the whey by a strainer; render just alkaline; add 300 Cc. of water, 3 Gm. gelatin, and 15 Gm. cane sugar; sterilise and filter. Add Lactic Acid Bacilli tablets or liquid preparation after cooling and incubate at 42° C. 8 to 10 hours. Flavour to taste.

For lactic bacilli in malt bouillon, dissolve a tablespoonful of malt extract in 20 oz. of water. Boil a few minutes, allow to stand, and decant from any sediment. Inoculate with lactic acid bacilli as with the previous preparation.—*L. ii./08,372.*

***Trilactine Tablets, Intestinal (Patented), i.e.,** so coated as to render them less likely to dissolve in the stomach juices than in the intestinal tract have been prepared. These should prove a considerable advance on the ordinary form of tablet when taken as such.

(These are of course not intended for the curdling of milk).

Lactic Acid Bacilli Dates, i.e., dates with the "stones" removed and filled with a paste of the bacilli have also been prepared—they are elegant and the sugar of the fruit forms a suitable culture medium.

Medicated Trilactine Milk (Martindale). Some experiments were conducted by us (*cf.* B.M.J.ii./09,1232) to determine the proportions of certain substances that can be incorporated with soured milk in the presence of the growing organism, *B. Caucasicum*, *e.g.*, Iodides, Salicylates,—which have to be given therapeutically over a prolonged period of time,—the medicaments being dissolved or suspended in the previously sterilised milks before insemination with Trilactine Tablets.

The following were approximately the *limits* of the medicaments permissible:—

	<i>Proportion to the Pint.</i>	<i>Acidity found.</i>	<i>Bacterial growth.</i>
② Arsenious Acid, $\frac{1}{4}$ grain	1.21%	Fair +
Bismuth Salicylate, 200 grains	0.75%	Not very marked.
Carbolic Acid, 12 grains	1.04%	+
Ferric Chloride, 30 grains	1.1%	+
Guaiacol, 24 minims	0.92%	Fair +
Iron Peptonate Solution, 1 to 2 ounces	1.12%	+
Naphthol B., 20 grains	1.08%	+
Potassium Citrate, 20-40 grains	0.9%	Not marked.
(Large amount of whey)			
Potassium Iodide, 20 grains	0.99%	+
Resorcin, 10 grains	0.93%	+
Sodium Salicylate, 20 grains (?)	Result very erratic,—difficult to explain.	Fair +

Smaller quantities of the medicaments, *taking doses into consideration*, could be tried therapeutically.

These limits were arrived at by a long series of experiments using gradually increased quantities of the medicaments.

Control for acidity with these experiments showed 0.93% taken as Lactic Acid in the same period of time.

After keeping two or three days the milk containing Bismuth Salicylate turned black owing to reduction.

It was interesting to note a rather marked gas production in the case of added Mercuric Chloride and Liquor Arsenicalis in all strengths up to their limits (not included in above list), and in some of the other medicaments when of increased strengths, also to note that the amounts of Arsenious Acid corresponding to the Liquor did not produce gasiness, and that the creams seemed to yield the most organisms (*vide antea*) also that the results were erratic in the case of Sodium Salicylate 20 grains, and that

in the case of Iron Peptonate Solution and Ferric Chloride 1 ounce and 20 grains respectively, *B. Caucasicum* seemed to be degenerated, *i.e.*, smaller in size than customarily.

The *raison d'être* of this medicated milk treatment is that the simultaneous administration of Lactic Acid Bacilli (in a medium native to their growth) and intestinal antiseptics *might* have as *modus operandi* that the antiseptics hasten the destruction of the proteolytic microbes, thereby giving the saccharolytic organisms a better chance of acclimatising themselves.

Biolactyl, *Fermenlactyl *Lactigen, *Lacteol, *Lactobacilline, Lactone, Lactiloids, and *Sauerin are preparations sold for the Lactic Acid Therapy. Special directions of the manufacturers in each case should be followed. Some makers are placing 'Cultures' liquid preparations on the market in addition to the Tablets. They only remain active a month or so.

*Lactoserve is a white powder prepared by pasteurising fresh milk, then soured by *B. Acidi Lactici*, evaporated *in vacuo* at 50°C. Sugar, flours and vegetable Albumin are added. It is said to contain living *B. Acidi Lactici* and is also used on the Metchnikoff principle of disinfection. For infants 200 Gm. to the litre of 'boiling' water—this is stated to resemble butter-milk. In cholera, dysentery and acute gastro-enteritis.

ACIDUM NITRICUM (*Off.*).

'Poisonous.' For Conditions of Sale *v.p.* 37.

$\text{HNO}_3 = 62.58$ (63.018 I. Wts.).

Dose.—1 to 4 minims (0.06 to 0.24 Cc.).

Sp. Gr. 1.42, contains 70% by weight hydrogen nitrate. U.S. 68%. PH. NED. 50%. Sp. Gr. 1.316. P. Helv. 25%. Sp. Gr. 1.151. FR. Cx. 63.64%, Sp. Gr. 1.394 at 15°C.

C.R. 1908.—Lead should not exceed 20 parts per million.

Preparation.—Distillation of sodium or potassium nitrate and sulphuric acid.

Use.—Strong oxidising agent. A caustic to warts and condylomata.

Acidum Nitricum Dilutum (*Off.*).

Dose.—5 to 20 minims (0.3 to 1.2 Cc.).

Contains 17.44% of Hydrogen Nitrate (in 6 fluid drachms one molecular weight in grains). U.S. and P. HELV. 10%. PH. NED. quadri-normal. FR. Cx. 10% approx. Tonic and biliary stimulant.

It has been suggested that the acids and alkalis of the Pharmacopœia should be made of a volumetric strength, so that they would all be simple multiples of each other, and that they should be prepared on volumetric test solution principles.—P.J. ii./03,619.

Incompatible with alkalis, sulphides, hyposulphites, ferrous sulphate, and alcohol.

Antidotes as for Hydrochloric Acid, *v.p.* 37.

Chloroform in 5 drop doses every ten minutes will prevent the convulsions following the inhalation of nitrous fumes, as in the accidental breaking of a bottle of nitric acid.—C.D. ii./05,130.

Chronic bronchitis has been relieved by inhaling for five or ten minutes the vapour from a few drops in a small quantity of water, heated to boiling.—Sem. Médicale /08, per M./08,116.

Poisoning by small quantity taken in mistake.—B.M.J., ii./08,1679.

Acidum Nitricum Fumans. 'Poisonous.' Sp. Gr. 1·5. (P. Jap. 1·486 to 1·5; P.G. and P. Helv. 1·45 to 1·5).

A reddish-brown liquid, giving off yellowish-red fumes on exposure. Contains about 91% by weight of hydrogen nitrate. Used as a caustic.

Acne pustulata should be stabbed with a pointed stick dipped in Nitric Acid.—B.M.J. i./01,513.

For lupus,—pain does not last long, must be 'Fumans.'—L. ii./08,471.

Diphenylamine (C_6H_5)₂NH = 167·86 (169·098 I. Wts.) in 1% solution in sulphuric acid is a very delicate test for nitric acid, giving a blue ring on properly layering, *vide* also Water Analysis Notes.

In the basic condition it is practically insoluble in water and soluble about 1 in 8 of alcohol, 90%.

***Arhovin.**—Diphenylamin Ethylthymyl-benzoate, $C_6H_4.C_{10}H_{13}.COO.C_2H_5.(C_6H_5)_2NH$ = 447·91 (451·274 I. Wts.). *Dose.*—4 minims in capsule. In gonorrhœa also used as bougies, 0·01 to 0·05 Gm. in each.—F.N. 1906,27. Of doubtful value.—M. '06. Said to have selective effect on the gonococcus, and has been used in cystitis and pyelitis.—L. i./09,552.

Acidum Nitro-hydrochloricum, U.S. (Strong).

Nitric Acid 9, Hydrochloric Acid 41, to produce 50. *Poisonous.*

Aqua Regia is Nitric Acid 3, Hydrochloric Acid 4. *Poisonous.*

Acidum Nitro-hydrochloricum Dilutum (Off.).

Dose.—5 to 20 minims (0·3 to 1·2 Cc.).

Nitric Acid 3, Hydrochloric Acid 4, Distilled Water 25. Mix, and keep 14 days (this is not necessary as far as strength goes). U.S. has Nitric Acid 20, Hydrochloric Acid 91, Water to 500.

Uses.—Biliary and liver stimulant. Is a good addition to preparations of cinchona.

Incompatible with alkalis, sulphides, carbonates and silver salts.

Ⓟ ACIDUM OXALICUM.

$(COOH)_2 \cdot 2H_2O = 125·10$ (126·048 I. Wts.).

White crystals soluble in water about 1 in 9; a powerful poison. Manufactured by acting upon wood, sugar, starch, etc., with Nitric Acid. The cerium and iron salts are used in medicine, *q.v.*

Antidotes.—Apomorphine Injection, Calcium Saccharate Solution, Chalk, Castor Oil, Stimulants.

Sal Limonis—SALT OF SORREL OR SAL ACETOSELLA, SALACETOS, consists of a mixture of Acid Potassium Oxalate $COOH.COOK + H_2O = 145·05$ (146·124 I. Wts.) and Potassium Tetroxalate $COOH.COOK + COOH.COOH + 2H_2O = 252·27$ (254·156 I. Wts.) (Bernthsen). It is largely used for removing ink stains, iron mould, cleaning leather, &c., and removing the colour from calico printing. Has been given for scurvy. *Dose.*— $\frac{1}{4}$ to $\frac{1}{2}$ grain. Is very poisonous, with which word it must be labelled.

"*Poisonous.*"—*All Soluble Salts of Oxalic Acid.*—For Conditions of Sale see p. 37. In Ireland Oxalates may only be sold by registered persons under Poisons Act conditions. Oxalates, i.e., both soluble and insoluble, were in the Irish Schedule before the 1908 Act, therefore could only be sold by pharmaceutical chemists, chemists and druggists

and registered druggists. In future this also applies, but Section 5 effects that soluble oxalates must be labelled 'poisonous,' in addition to the word 'poison' which was previously required.

ACIDUM PHOSPHORICUM CONCENTRATUM. (*Off.*)

$\text{H}_3\text{PO}_4 = 97.32$ (98.024 I. Wts.).

Dose.—1 to 4 minims (0.06 to 0.24 Cc.).

Antidotes as for Hydrochloric Acid, *q.v.*

This acid is produced by the oxidation of Phosphorus either by the aid of the atmospheric Oxygen or by heating with Nitric Acid.

Hydrated Phosphoric Acid, containing 66.3% of hydrogen orthophosphate, corresponding to 47.4% of phosphoric anhydride; Sp. Gr. 1.5. Commercially, it is also prepared, having Sp. Gr. 1.75, and containing 64.3% of the anhydride = 88.8% H_3PO_4 (U.S. is 85% H_3PO_4). If of this strength it may be reduced to B.P. strength by adding to each 3 parts by weight 1 part of distilled water. C.R. 1908 recommends it.

FR. Cx. 50 % by weight of H_3PO_4 . Sp. Gr. 1.349.

'Acidum Phosphoricum,' PH. NED., is 25 % H_3PO_4 . Sp. Gr. 1.15.

Volumetric titration with Normal Potash Solution using Phenolphthalein as indicator is well known to give very variable results especially when considerably diluted or in presence of ionisable salts. An iodometric estimation based on reaction which takes place between Phosphoric Acid, Potassium Iodide and Potassium Bromate, especially if allowed to proceed at 20° C. for 2½ to 3 hours, is more reliable.

5 Cc of the Acid in 5 % dilution in a 150 Cc stoppered bottle with 2 Gm. (approx.) of Potassium Iodide, 5 Cc of Saturated Potassium Bromate Solution, and 80 Cc of water, left securely stoppered for 2½-3 hours and Iodine liberated titrated with Sodium Thio sulphate Solution.— $6\text{H}_3\text{PO}_4 + 6\text{KI} + \text{KBrO}_3 = 6\text{KH}_2\text{PO}_4 + 3\text{I}_2 + \text{KBr} + 3\text{H}_2\text{O}$. 98.024 of Acid = 126.92 parts I. = 248.22 $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$, or 1 Cc N/10. $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ (0.024822 Gm.) = 0.0098024 Gm. H_3PO_4 .—Am. Jl. Ph. Apl., '08, p. 151. (Figures revised by us to 1910 International Wts.).

Metaphosphoric Acid $\text{HPO}_3 = 79.44$ (80.008 I. Wts.) (*vide p.* 861) is obtained by further concentration and is equivalent to 'Glacial Phosphoric Acid.'

Acidum Phosphoricum Dilutum (*Off.*).

Dose.—5 to 20 minims (0.3 to 1.2 Cc.).

Contains 13.8% H_3PO_4 or 10% of phosphoric anhydride. Sp. Gr. 1.08. (U.S. and P. Helv. 10% H_3PO_4 . P. AUSTR. 'Acidum Phosphoricum,' Sp. Gr. 1.12, 20% H_3PO_4 .)

Concentrated Phosphoric Acid 3 ounces (fluid), Distilled Water *q.s.* to 20 ounces at about 60° F.

By weight, to 4½ ounces of the acid add 17½ ounces of distilled water; or the same result may be obtained by diluting 4 parts, by weight, of acid Sp. Gr. 1.75 with 21 of distilled water. *Incompatible* with alkalis, ferric chloride, lime salts.

Uses.—Said to increase the proportion of phosphates in the red blood corpuscles. Well diluted, is a pleasant cooling drink in fevers, and relieves thirst in diabetes.

It renders iron preparations compatible with astringent vegetable infusions. A nerve tonic and hæmatinic.

Increases the coagulability of the blood.—L. i./08, 97.

Lichen plano-pilaris treated satisfactorily by Phosphoric Acid with Strychnine internally and Salicylic Acid Ointment externally.—L. ii/08, 1594.

★**Alexine.** A proprietary of phosphoric acid in pink granules.

Acidum Glycerophosphoricum (Medicinal).

$C_3H_5(OH)_2O.PO.(OH)_2=170.81$ (172.072 I. Wts.).

Dose.—5 to 10 minims (0.3 to 0.6 Cc.).

This dibasic acid forms a colourless, sour liquid, miscible with water and alcohol. It may be prepared by heating Glycerin with two-thirds of its weight of Phosphoric Acid 60%, at not exceeding 105° C. Fumes are given off. The resulting liquid is neutralized with calcium carbonate. The solution of Calcium Glycerophosphate is concentrated *in vacuo* (Caspary, 536) or precipitated by alcohol, collected and dried. This may be converted into the (purified) acid or other salts.

It is usually made 25% strength and has Sp. Gr. 1.125.

Some doubt exists as to the exact constitution of this acid. We understand some elucidations may shortly be published.

Calcii Glycerophosphas, $C_3H_7O_3.PO_3Ca=208.52$ (210.146 I. Wts.)
or + $H_2O=226.40$ (228.162 I. Wts.), FR. Cx. P. BELG.

Dose.—3 to 10 grains (0.2 to 0.65 Gm.) in water.

The calcium salt of glycerophosphoric acid. It is formed, together with choline, on the breaking up of lecithin in the process of digestion.

Manufacture.—By reaction of Glycerophosphoric Acid with Milk of Lime, removing Lime in solution with Carbon Dioxide and concentrating. A white crystalline powder, soluble in cold (1 in 23 by experiment), only slightly so in hot water, soluble also in glycerin, insoluble in alcohol. It is the most suitable salt for administration.

Uses.—Stated to improve nutrition of the nervous system, in all cases where nerve activity is enfeebled; may be given hypodermically, 2 to 4 grains daily in water. Hypodermic Sterules contain 1 grain. It is useful *per os* for incontinence of urine. In cardiac disease 1 grain (Brunton).—B.M.J. i./07,617.

Incompatible with Carbonates and Phosphates.

In doses usually prescribed can be of little avail, if assimilated at all. 135 grains taken in a few days without much effect. Phosphoric Acid and the soluble Phosphates have power in increasing coagulability of the blood.—L. i./08,97.

For the blood when defective in free Calcium Ions, small doses, combined with large doses of Phosphoric Acid.—B.M.J. ii./09,64.

Pulvis Calcii Glycerophosphatis cum Lacte Exsiccato.

Dose.—One heaped tablespoonful ($\frac{1}{2}$ ounce), mixed with 4 to 5 ounces of hot (nearly boiling), water, two or three times daily.

This preparation is intended as a restorative and nutritive. It contains 5 grains of Calcium Glycerophosphate in the above dose, also prepared *double* this strength if so ordered. It is prepared with Full Cream Milk.

Our experiments show that a preparation on these lines keeps well and retains a good flavor. It is obvious that Dried Casein could be used instead of Dried Milk, but in so doing one eliminates Milk Fat, Salts and Sugar, and Dried Caseins of commerce are not always readily soluble even with added alkali.

Phosphorus and Nitrogen retention are likely to improve under a food of this kind.

Ferri Glycerophosphas, $C_3H_7O_3 \cdot PO_3Fe + 2H_2O = 260 \cdot 17$ (261·938 I. Wts.).

Dose.—1 to 5 grains (0·065 to 0·32 Gm.). In whitish powder, or in scales, slightly soluble in water.

Flavoring.—Syl Lavandulæ, Syl Vanillæ, Syl Limonis; Elixir Aurantii. Sterules, Hypodermic, contain $\frac{1}{2}$ grain.

Pilula Ferri Glycerophosphatis (*Robin*).

Iron Glycerophosphate 0·05 to 0·1 Gm., Rhubarb 0·05 Gm., Extract of Cinchona 0·15 Gm. One pill with meals.—P.J. 1895, 1191. A Vinum Ferri Glycerophosphatis contains 1%, with Glycerin 5% in Sherry.

Lithii Glycerophosphas. $C_3H_7O_3 \cdot PO_3Li_2 = 182 \cdot 75$ (184·086 I. Wts.),
Dose.—3 to 10 Grains (0·2 to 0·65 Gm.) and

Magnesii Glycerophosphas. $C_3H_7O_3 \cdot PO_3Mg = 192 \cdot 99$ (194·376 I. Wts.). *Dose*.—3 to 10 grains (0·2 to 0·65 Gm.) also

Manganesii Glycerophosphas. $C_3H_7O_3 \cdot PO_3Mn = 223 \cdot 33$ (224·986 I. Wts.). *Dose*.—1 to 5 grains (0·065 to 0·32 Gm.).

Are white amorphous powders soluble in water.

Potassii Glycerophosphas. $C_3H_7O_3 \cdot PO_3K_2 + H_2O = 264 \cdot 35$ (264·272 I. Wts.). *Dose*.—3 to 8 grains (0·2 to 0·52 Gm.).

A yellowish liquid in 50 and 75% solutions and 100% (yellowish mass).

Quininae Glycerophosphas. *Syn.* KINEURINE.

Dose.—3 to 8 grains (0·2 to 0·52 Gm.).

$C_3H_7O_3 \cdot H_2PO_3 \cdot (C_{20}H_{24}N_2O_2)_2 \cdot 4H_2O = 886 \cdot 01$ (892·56 I. Wts.). FR. Cx. has $5H_2O$. This salt is termed 'basic' quinine glycerophosphate in France. A white powder, soluble in alcohol, but only very slightly in water.

Sterules, Hypodermic, contain $\frac{1}{2}$ grain.

Sodii Glycerophosphas. $C_3H_7O_3 \cdot PO_3Na_2 \cdot 7H_2O = 339 \cdot 73$ (342·168 I. Wts.).

Dose.—5 to 10 grains (0·32 to 0·65 Gm.) *per os*; also given hypodermically in 3 to 5 grain doses.

In the pure condition (100%) this compound is in crystalline lumps. The 75% product is a translucent straw-coloured mass which cannot be poured without warming. A 50% dilution is therefore supplied for the sake of convenience. This strength is official in the Fr. Cx. Useful in nervous affections, anæmia and general debility.

*Sanatogen is a food specialty said to be a 'combination of casein with glycerophosphate of sodium.'—Manufacturers' printed matter. For further details consult Schmidt, vol. ii. p. 1790. Given in mental and nervous disorders as a restorative, in stomach complaints, anæmia and for rickets.

Strontii Glycerophosphas. $C_3H_7O_3 \cdot PO_3Sr = 257 \cdot 676$ I. Wts.

Dose.—3 to 8 grains (0·2 to 0·52 Gm.).

① **Strychninae Glycerophosphas**.

Dose.— $\frac{1}{6}$ to $\frac{1}{30}$ gr. (0·001 to 0·0032 Gm.).

White crystalline powder, soluble in water. A 'tonic.'

Elixir Glycerophosphatum.

Calcium and Sodium Glycerophosphates of each 2, Iron Glycerophosphate 1, Aromatic Syrup, 250. *Dose*.—1 to 4 drachms (3·5 to 15 Cc.).

Ⓟ Glycerinum Glycerophosphatum Compositum.—Syn.

GLYCEROL OF GLYCEROPHOSPHATES. *Dose*.—1 to 2 fluid drachms.

Cudbear* $\frac{1}{4}$ ounce, Water 10 ounces. Boil 10 minutes, strain, and dissolve in the warm liquor—Calcium Glycerophosphate 160 grains, Potassium, Sodium, and Magnesium Glycerophosphates of each 80 grains, Iron Glycerophosphate 40 grains, Citric Acid 30 grains; add Tincture of Kola 10 drachms, Tincture of Ignatia Amara 1 ounce, and Glycerin *q.s.* to 1 pint. This is more palatable than if made with Strychnine and Caffeine. It keeps well, is suitable for export, and for patients who may not take sugar.

Glycerinum Glycerophosphatum cum Medulla Rubra.

GLYCEROL OF GLYCEROPHOSPHATES WITH RED BONE MARROW.

Dose.—1 to 2 drachms (3·5 to 7·0 Cc.).

Dissolve Calcium Glycerophosphate 80 grains, Iron Glycerophosphate 20 grains, Magnesium Glycerophosphate 40 grains, Manganese Glycerophosphate 20 grains, Potassium Glycerophosphate 40 grains, Sodium Glycerophosphate 40 grains, and Citric Acid 15 grains in Distilled Water 10 ounces; then filter and add Chloroform 5 minims, Alcohol (90%) 40 minims, Orange-flower Water 1 drachm, Cherry-laurel Water $1\frac{1}{2}$ drachms, Glycerin Extract of Red Bone Marrow 10 ounces.—P.J.i./o6,385. Given in rickets and debility.

The writer prepares this Glycerol with four times the amount of Chloroform, *i.e.* 1 in 480.

Granular Effervescent Glycerophosphates.

Dose.—60 grains (4·0 Gm.).

Contains in 1 drachm, Glycerophosphate of Calcium 3 grains, of Iron 1 grain, of Magnesium 3 grains, of Potassium 3 grains; with Caffeine Citrate 1 grain. A palatable mode of administration.

Compound Glycerophosphate Tablets are prepared containing in each the same quantities as the Syrup per drachm. To be crushed and taken in a little warm water.

Ⓟ **Tablets** of Glycerophosphates of Calcium, Potassium, Sodium, Iron and Magnesium with Caffeine, Strychnine and Hæmoglobin, are prepared.—B.M.J. i./o9,542.

Malted Glycerophosphates.

Dose.—1 to 4 drachms (3·5 to 15 Cc.).

Sodium Glycerophosphate 1, Potassium Glycerophosphate 1, dissolved in Water 30, with Liquid Extract of Malt to 120.

A very slight deposit forms. Experiments with a view to including other glycerophosphates, *e.g.*, those of magnesium and calcium did not give preparations which will remain clear.

* A purplish red powder obtained by the ammoniacal fermentation of *Lecanora tartarea* and other lichens, designated in Germany *Persio*, in France *Orseille de terre*, *Tinctura Persionis*.—P.J. i./o7,352. Percolate Cudbear $2\frac{1}{2}$ ounces with 1 pint of a mixture of 90% alcohol 1, and water 2. Used as a coloring agent, acids increase the red and alkalis change to purple.

Ⓟ **Syrupus Glycerophosphatum Compositus**, B.P.C., 1907.

Dose.—1 to 2 fluid drachms (3·5 to 7 Cc.).

Cudbear (*q.v.*) 1·25, Distilled Water 50. Boil ten minute filter and dissolve in the warm filtrate—Strychnine Hydrochloride 0·024, Glycerophosphates of Calcium 2, Potassium 1, Sodium 1, Magnesium 1 and Iron in fine powder 0·5, Caffeine 0·5 with Glacial Acetic Acid 1. Then add Refined Sugar 70. Heat until dissolved, and strain. When cold, add (mixed) Chloroform 0·25, Alcohol (90%) 0·5 and Distilled Water *q.s.* to 100.

Caffeine base with Acetic Acid is found more satisfactory than Caffeine Citrate and Citric Acid. Lunan suggested Glycerophosphoric Acid *vice* Acetic Acid in the formula, but our experiments did not show it to work so well. *N.B.* The final Syrup must be slightly acid.

The Chloroform is unnecessary. Might with advantage be replaced by Vanilla flavouring.—*P.J.* ii./08,361.

Experimental quantities (1909) of this Syrup (i) made with Caffeine and Acetic Acid, and (ii) Caffeine with Glycerophosphoric Acid showed the Acetic Acid to work well—better in fact than the (ii) method.

Ⓟ Capsules are prepared equivalent to $\frac{1}{2}$ and 1 drachm.

Ⓟ **Pulvis Glycerophosphatum Compositus**.

Dose.—1 to 2 drachms (4 to 8 Gm.).

The following is representative of the Syrup as near as can be made:—Glycerophosphates of Calcium 2·0, Potassium (100%) 1·0, Sodium 1·0, Magnesium 1·0, Iron 0·5, Caffeine 0·5, Strychnine Hydrochloride 0·024 (use Trituration 0·24), Powdered Sugar to 100. This keeps satisfactorily in corked bottles.

SACCHARUM GRANULÉ DE GLYCÉROPHOSPHATE DE CALCIUM. *Fr.* Cx.

Dose.—1 to 3 drachms in a little water. 20 Gm. contain approximately 1 Gm. of the Salt.

Ⓟ **Syrupus Glycerophosphatum cum Formatibus**. *Syn.*

Elixir Glycerophosphatum cum Formatibus. Contains Sodium and Potassium Formates of each 5 grains added to each drachm of above Syrup (made with Acetic Acid).

Ⓟ **Syrupus Glycerophosphatum** (*Robin*) is a special preparation.

Dose.—1 to 4 drachms (3·5 to 15 Cc.).

The original formula by Dr. Robin was given in the *Bulletin General de Therapeutique*, May 30, 1895, as follows:—Glycérophosphate de Chaux 6 Gm., de Soude, de Potasse, de Magnésie aa. 2 Gm., de Fer 1 Gm., Teinture de sève de St. Ignace 30 gouttes, Pepsin 3 Gm., Maltine (diastase) 1 Gm., Teinture de Kola 10 Gm., Sirop de Cerises (pour compléter) 200 Gm. The fact remains that the formula is impracticable.

Emulsio Olei Morrhuæ et Glycerophosphatum. *Dose*.—

2 to 8 drachms (7 to 30 Cc.).

Contains the Glycerophosphates of Calcium, Iron, Magnesium, Potassium, Sodium, combined with Cod Liver Oil Emulsion, containing 50% Cod Liver Oil. Is a useful nutrient combination.

Vinum Glycerophosphatum (*Labesse*).

Contains about 1% each of Calcium and Sodium Glycerophosphates in a bark and kola wine. *Dose*.— $\frac{1}{2}$ to 2 ounces (15 to 60 Cc.).

ACIDUM PICRICUM.

P. JAP. FR. CX.

Syn. CARBAZOTIC ACID; TRINITROPHENIC ACID. $C_6H_2.OH.NO_2$. $NO_2.NO_2$ 1; 2: 4: 6 = 237.44 (229.054 I. Wts.). *Dose.*— $\frac{1}{4}$ to 2 grains (0.016 to 0.13 Gm.).

Is formed by cautiously adding phenol to fuming nitric acid, heating the mixture, and purifying by re-crystallizing. It is in yellow, shining, bitter tasting crystals, which melt at $125.5^{\circ}C$.—the yellow liquid may be distilled without decomposition. Heated rapidly to $300^{\circ}C$. in the open it burns, if confined it explodes.

Solubility.—1 in 95 of water with yellow colour, and 1 in 10 of alcohol 90%, and in ether about 1 in 20.

Use.—Solutions or ointment are applied in the treatment of burns, erysipelas, pruritus, eczema, chilblains, and gonorrhœa. The ammonium and potassium salts have been thought to act like quinine; also for hardening tissue in microscopy, and as a urine test for albumin, *q.v.* It precipitates most alkaloids.

Chronic excoriated surfaces as in pruritus ani with fissures are well treated by $\frac{1}{2}$ to 1 % Solutions.—B.M.J. i./09,1342.

In phthisis, *inhalation* of Vapour from 60 Gm. dissolved in 1000 Cc. Water heated to boiling,—daily for 2 to 3 hours gives good results, even cures.

In stomatitis mercurialis a watery paste of the acid applied to the parts every 2 days relieves pain and removes the ulceration.—M. '08,119.

For burns of the eye, Ointment 2% better than saturated solution Instillation of a little cocaine solution beforehand.—B.M.J.E.ii./08,36.

Gauze, Picric Acid. For burns (6 yard pieces).

Lotio Acidi Picrici, 1% aqueous (St. Th. H.).

Cotton wool impregnated with this lotion is used for burns. For toxic action *vide* Refs. in Edn. XII., p. 51. Recommended by H.M. Inspectors of Explosives to keep handy as First Aid for burns.

Ointment, 1 to 3%, for pruritus of scrotum and gonorrhœa.

For burns: Relieves pain and may be left 48 hours without changing.

'Collapsubes' of Picric Acid Ointment, $\frac{1}{2}$ % in soft paraffin basis, are supplied with catheter attachment for urethral medication.

Wool, Picric Acid. For burns in 1 lb. rolls.

Papillary erosions of the cervix uteri are well treated with saturated alcoholic solution of picric acid, only to be swabbed for three minutes twice or thrice weekly.—B.M.J. ii./05,1205.

Sterile gauze soaked in solution of 60 grains in 16 ounces of water useful for burns. After 48 hours remove and wash with Potassium Permanganate 5 grains in water 16 ounces. Washing with weak ammonia and then with hydrogen peroxide removes the stains.—L. ii /08,1025.

Picric acid dressing suggested to dry up the skin after operation for pruritus ani.—B.M.J. i /10,440.

ACIDUM PYROGALLICUM.

$C_6H_3(OH)_3$ 1:2:3 = 125.1 (126.048 I. Wts.).

Syn. PYROGALLOL, I.C. Add., P.G.

Dose.— $\frac{1}{2}$ to $1\frac{1}{2}$ grains (0.032 to 0.1 Gm.) in aqueous solution, or in pills with syrup—these must be freshly prepared, and kept from the light.

Manufacture.—By heating gallic acid.

A specially pure acid designated "Resublimed Medicinal," is prepared for internal administration.

In light small white odourless crystals, producing a sensation of coolness on the tongue.

Solubility.—Soluble in 2 parts of water, about 1 in 1 of alcohol 90%, and in 10 parts of melted lard.

It has great affinity for oxygen.

Uses.—Antiseptic in skin affections and in ringworm. Ointment 2 to 10% sometimes combined with Salicylic Acid 2 to 5%, and Ichthyol about 5%. It darkens the skin, used with Silver Nitrate blackens the hair. Large doses poisonous. Seldom used internally.

Pyrogallol-Sulphonic Acid is employed as a hair dye, being much less poisonous.—P.J. i./07, 538. (Patent.)

It is astringent for hæmoptysis in doses of a grain every half hour. It has been prescribed with ergot for this and stated not to cause vomiting nor to derange the stomach.

Diluted nitro-hydrochloric acid may obviate the toxic effects. Tests for.—P.J. i./07, 429.

Pyrogallol stains removed by rubbing with ammonium persulphate, *q.v.*; and rinsing with water.—P.J. i./98, 54a.

Lupus vulgaris, if the area is not too large, 40% plaster as caustic, afterwards 10% Ointment, best treatment.—B.M. J. ii./08, 1259.

For lupus, 10% Ointment with Vaseline applied a long time (until blister rises), then proceed with 2% Ointment, finally with a weak (0.1%) ointment.—M. '08, 121.

Acidum Pyrogallicum Oxidatum (*Syn.* PYRALOXIN). A brownish powder prepared by the action of air and ammonia on Pyrogallie Acid. Soluble in water; insoluble in ether, benzol, and in acetone; is used in 10% ointment for skin affections.

Eczematous surfaces may be treated with a coating of Iassar's Paste (*q.v.*) containing 3% pyraloxin.

Ringworm Ointment.—Pyrogallie Acid Oxidised 10 grains, Precipitated Sulphur 30 grains, Ammoniated Mercury 15 grains, Vaseline 1 ounce.

In chronic conjunctivitis, Unna has recommended Eye Drops 0.1% in 'Aqua Boracis' and Fennel Water equal parts. Taking the 'Aqua Boracis' as 1 in 30—Pyraloxin will dissolve.

Eugallol, $C_6H_3(OH)_2(CH_3COO) = 166.8$ (168.064 I. Wts.), Pyrogallol-Monacetate, a yellowish syrupy liquid, has similar properties, and is applied mixed with an equal quantity of acetone with a brush. Lenigallol, Pyrogallol-Triacetate, $C_6H_3(CH_3COO)_3 = 250.2$ (252.096 I. Wts.) in white powder, is much weaker, may be used with zinc paste in acute and chronic eczema.

In chronic eczema of service in many cases.—L.i./09, 967.

Gallacetophenone.

$C_6H_3(OH)_2.CO.CH_3 = 166.8$ (168.064 I. Wts.).

In yellowish-brown powder or needles (freely soluble in alcohol, ether, glycerin, slightly in water), and in 20% solution. Parasiticide. 10% ointment useful.

ACIDUM SALICYLICUM (*Off.*). U.S.

$C_6H_4.OH.CO_2H$ 1:2=137.01 (138.048 I. Wts.).

Syn. ORTHO-OXY-BENZOIC ACID.

Dose.—5 to 20 grains (0.32 to 1.3 Gm.) in cachets.

FR. CX. Max. single dose 15 grains: max. during 24 hours 60 grains.

In colourless prismatic crystals, odourless, but its dust irritates the nostrils, taste sweetish. Melting point 156° to $157^{\circ}C$.

Soluble 1 in 500 of cold water, 1 in 3 of 90% alcohol, 1 in 40 of 45%. 1 in 2 of ether, about 1 in 80 of olive or almond oil, 1 in 100 of castor oil, 1 in 200 of glycerin, and 1 in 55 chloroform; soluble also in melted fats and soft paraffin; 20 grains of salicylic acid are rendered soluble in an ounce of water by the addition of 25 grains of borax. Ammonium citrate and sodium phosphate also increase its solubility.

Incompatibility.—Spirit of nitrous ether, quinine salts, sal volatile. An aqueous solution of the acid gives a deep violet colour with a trace of a persalt of iron.

Salicylic acid may be prepared from Salicin and from Oil of Wintergreen (*Gaultheria procumbens*,—*Ericaceæ*) and sweet birch (*Betula lenta*,—*Betulaceæ*), (natural acid) or by the action of carbonic anhydride on phenol (artificial acid).

For internal use this natural acid and its salts are preferred. An artificial "Salicylic Acid, Physiologically Pure," is also free from impurities. Commercially "Powdered Acid" forms the third variety.

Detection of, when used as Preservative.—Concentrate liquid (distil off any alcohol) in presence of Alkali and Sodium Chloride, acidify and shake out with Chloroform, evaporate and add Ferric Chloride Solution, red colour.—P.J. ii./05,279. Its use to preserve foods, where otherwise rapid decomposition would occur in hot weather, is upheld.—L. ii./04,638,916,963; B.M.J. ii./04,854; i./05,455.

A Departmental Committee inquired into use of preservatives and colouring matters added to foods. Not more than 1 grain per pint of liquid and 1 grain per pound of solid food is permissible. Presence may impair digestion, but said not to be injurious.—L. i./03,717; ii./04,1544. Though harmful, is less virulent than supposed. As preservative unnecessary.—L. ii./06,1613.

Methods of detecting Artificial from Natural Salicylic preparations.—Am.Jl. Ph. Sept. 1908. P.J.ii./08,585.

Uses.—Salicylic acid prevents fermentative and putrefactive processes. It has recently been found that Benzoic Acid is even more useful. It is given for various febrile conditions, but particularly for acute rheumatism. It is more generally employed as sodium, lithium or bismuth compounds.

Large doses alone act as a direct poison on the heart and respiration. For sweating feet Pulvis Salicylicus cum Talco is used.—v. *infra*. It is applied locally to corns, warts, and lupus.—v. *infra*.

In chorea give sufficient to produce singing in the ears.—M.A. 1906,154.

Rectal Injection.

A saturated aqueous solution has been used for dysentery of children.

To eradicate stumps left after removal of papillomatous growths 1 to 6% solutions in spirit. It may also be used dissolved with sodium sulphocinate.—q.v.

In treatment of rheumatic fever the acid or the salt employed either kills the organism or neutralises the toxin. The patient should have a large dose at once so

as to kill off the microbes while they are still in the blood stream or joints before they have had time to become firmly established in the fibrous tissue or in the valves of the heart.—B.M.J. ii./06, 1439.

Compresses of 2% Alcoholic Solution found of value in scarlatinal sore throats, tonsillitis, and in gonorrhœa, may prove irritant, necessitating periodical dropping and renewal.—M. 1906.

The following sterile solutions and suspension of Salicylic Acid have been proposed for **Hypodermic use** at the seat of rheumatic pain:—

(a) Salicylic Acid—1 in 100 of olive oil.

(b) 1 of acid, borax 1·5 in water 500 or less *c.f.*, p. 66.

(c) 1 of acid suspended in 6 of vaseline oil, *q.v.*

Elixir Acidi Salicylici Compositum.

Dose.—1 drachm (3·5 Cc.) in water.

Each ounce represents Salicylic Acid 40 grains, Gelsemium 15 grains, Cinicifuga 15 grains, Potassium Iodide 4 grains.

A proprietary preparation for use in chronic gout and rheumatism, lumbago, and sciatica. It is antirheumatic, analgesic and the eliminative action of small doses of Potassium Iodide is useful.

Amyl Salicylate. $C_6H_4.OH.CO.O.C_5H_{11}=206·56$ (208·128 I. Wts.).

Substitute for Methyl Salicylate, with much less odour. For painting on to rheumatic joints.

Capsules of Amyl Salicylate contain 3 grains (0·2 Gm.) for internal medication.

Unguentum Amyl Salicylatis Compositum. *Syn.* 'Amysal.'

Similar to Methylsal Balm *q.v.* but made with Amyl Salicylate. Odour more pleasant.

* **Salit.** *Syn.* BORNEOL SALICYLATE.

Uses.—Muscular rheumatism and acute neuralgia, by inunction or by painting over affected part. Apply $\frac{1}{2}$ to 1 drachm, with equal quantity of olive oil.

Oleum Gaultheriæ. *Syn.* WINTERGREEN OIL. **I.C. Add.,** *q.v.* pp. 555, 736.

Maceration for 12 to 24 hours of the leaves prior to distillation necessary for best yield, the oil being a "ferment" oil not pre-existing in the plant, but occurs as a non-odorous glucoside, which must be hydrolysed by the ferment before distilling.—P.J. ii./05, 224.

Capsules of Oil of Gaultheria.—10 minims in each. *Dose.*—One three times a day or oftener.

The oil has similar properties to salicylic acid. 10 to 20 minims are given every 3 or 4 hours in rheumatism and sciatica. With olive oil externally for rheumatism.

Methyl Salicylas. $C_6H_4.OH.CO.O.CH_3=150·92$ (152·064 I. Wts.).

Artificial (or Synthetic) Oil of Wintergreen, U.S. **FR. OX**

A colourless liquid, with odour like above oil. **Soluble** in 90% alcohol, ether, chloroform or glacial acetic acid. Applied covered by impermeable tissue is quickly absorbed. Is useful for rheumatism, furunculous ulcers, orchitis, and mumps.

Spiritus Gaultheriæ, U.S. 1 in 20 alcohol (U.S.).

Average dose.—30 minims (2 Cc.).

Unguentum Methyl Salicylatis Compositum. * 'Methysal'
Balm.—Martindale.

Methyl Salicylate 7, Menthol 15, Lanolin, hydrous and anhydrous, 39 each. For analgesic effect in rheumatism. Supplied in Collapsubes.

It relieves pruritus and is suitable as a general antiseptic Ointment. For muscular rheumatism of the limbs, which it cures (W.W.W.) it is best applied after fomenting the part with hot water.

May be prepared much stronger to obtain prompt relief if desired 50% would not be too strong, *c.f.* p. 89 for specially hard basis, but *N.B.*, must be moderately soft if for use in a collapsible tube.

Chloral Hydrate 1 to 5% has been suggested as an addition to creams of this kind.

Oil of Cajuput is sometimes used.—P.J.ii./o8,739.

Linimentum Methyl Salicylatis, Martindale.—Methyl Salicylate 20, Menthol 10, Chloroform 10, Camphor 10, Eucalyptus Oil 10, Turpentine Oil 10, Lavender Oil 5, Liquid Paraffin to 100. For use similar to the above.

Opium Tincture or Belladonna Liniment 10 to 20% may be added if required, but they do not mix with the Salicylate Liniment.

Linimentum Methylatis Compositum (Glasgow Association).—Menthol 1, Chloral Hydrate 1, Alcohol 2, Indian Hemp Tincture 2, Essential Oil of Camphor 4, Methyl Salicylate *q.s.* to 20.

Preparations designated **Linimentum Menthomethyl Salicylatis Compositum**; "Betulol," "Linimentum Betulæ Compositum," and Baume Analgésique, are supplied commercially.

Unguentum Acidi Salicylici Terebinthinatum. — Salicylic Acid 1, Oil of Turpentine 1, Lanolin 1.

All the above are of value in painful rheumatic affections applied to the joints on lint covered with gutta percha tissue and flannel bandage.

Another form: Salicylic Acid 15, Turpentine 15, Wool Fat 15, White Wax 7·5, Lard 77·5, Curcuma *q.s.*

In phthisis, daily rubbing with this ointment beneficial.—B.M.J.E. i./o9,56.

Methyl Salicylate Plasters are prepared of size 5 inches by 7 inches, and are useful in lumbago, sciatica, and rheumatism.

Ethyl Salicylate. $C_6H_4.OH.COOC_2H_5 = 161.83$ (166.08 I. Wts.).

A colourless liquid with aromatic odour. Soluble in alcohol. Injected subcutaneously or intravenously. Not nearly so toxic as methyl salicylate. Stated not to be absorbed into the system either by inhalation or when applied to the skin.—Am. Jl. Phys., 1905,331.

* **Mesotan.** (Patented). SALICYLIC-METHOXY-METHYLESTER.

Odourless Liquid. Soluble in 90% Alcohol, Ether or Chloroform. About 1 to 2 in Olive Oil (Mesotan and oil in equal parts) forunction in rheumatism. It is not used pure.

Caused a rash.—B.M.J. i./o5,881.

Water decomposes Mesotan, dispense in dry bottles, and first treat the skin with a little Spirit.

* **Ulmarene.** Similar in use to Mesotan. May be applied with Menthol and Wool Fat.

Gelatin Capsules of Ulmarene for internal administration contain 8 minims (0.5 Cc.)

* **Spirosal.** MONO-GLYCOL-ESTER OF SALICYLIC ACID.

Dose.—For external use 30 minims three or four times daily.

Almost odourless and tasteless, readily soluble in alcohol and chloroform and

about 1 in 110 of water. Is readily absorbed by the skin and intended as local application as such or diluted with alcohol in rheumatism.—*Am. Jl. Ph.*, Mar. 08, 143.

★ **Diplosal.** $\text{OH.C}_6\text{H}_4.\text{COO.C}_6\text{H}_4.\text{COOH.} = 256.14$ (258.03 I Wts.).

Dose.—15 grains (1 Gm.) in cachet or tablets.

Salicylic Ester of Salicylic Acid. Salol in which the phenyl group is replaced by Salicylic Acid. White, odourless needles melting at 147°C . Insoluble in water and dilute acids, soluble in alcohol. Used for rheumatism, neuralgia, and cystitis.

Methyl - Acetyl - Salicylas. *Syn.* METHYL-RHODIN. $\text{C}_6\text{H}_4.\text{OCH}_3.\text{CO. COO.CH}_3 = 194.82$ (194.05 I. Wts.)

Dose.—1 to 2 drachms (4 to 8 Gm.) spread over the day.

Crystalline substance melting at 49°C . Soluble in alcohol and glycerin. Decomposed by alkalis into salicylate and acetate. Has been tried in rheumatism but its odour is against its use externally, but internally has proved equal to, if not better than, Methyl Salicylate. Well tolerated,—said to be not decomposed until leaving the stomach.—*F.N.*, 1909.

Granular Effervescent Salicylic Acid contains 5 grains in 60 grains. *Dose.*—1 drachm (4 Gm.).

Colleplastrum Salicylicum, P. Austr., contains 4% Salicylic Acid, with 20% Petroleum Ether evaporated in **Colleplastrum Adhæsivum**, P. Austr. Soak Oleum Resinæ Empyreumaticum 6, Resina Elastica 10, Ether Petrolei 45, several days to dissolve with shaking, and add previously prepared Copaiba Balsam 4, Resina Colophonii 4, Adeps Lanae 2, Cera Flava 2, Resina Sandarachi 2, Radix Iridis 9, Ether 10. Heat to a suitable mass and spread on lint (allowing the Petroleum Ether to evaporate in the air). That of P. Dan. is very similar.

Oleum Resinæ Empyreumaticum, P. Austr (crude) is from Colophony; Sp. Gr. 0.88—0.99.

Liquor Acidi Salicylici.

Boiling Distilled Water 1,000 parts, Salicylic Acid $1\frac{1}{2}$ parts. Useful in preparing solutions of alkaloidal salts, and may be employed as an antiseptic solvent for other salts: it is irritating to the eyes.

The late Prof. A. Gamgee strongly recommended this solution as an Antiseptic Gargle.

Pasta Acidi Salicylici. Salicylic Acid 1, Glycerin 9.

Guttæ Acidi Salicylici Compositæ, St. M.'s H. Salicylic Acid 10 grains, Boric Acid 20 grains, Glycerin 2 drachms, Methylated Spirit to 1 ounce.

Pulvis Salicylicus cum Talco, P.G.

Salicylic Acid 3, Wheaten Starch 10, Talc 87.

Mix to a fine powder. For perspiration of the feet.

Ⓢ **Salicylic Cream.**

Salicylic Acid, in powder, 2, Carbolic Acid 1, Glycerin 10; mix. G.H. has Salicylic Acid 1, Glycerin 9.

Used as pigment when the skin is irritated by the discharge from wounds, &c., under antiseptic dressings.

Oleum Acidi Salicylici.

Scabs in eczema well treated by Salicylic Acid dissolved in Castor Oil.—*B.M.J.E.* i./10, 36. We suggest 1 in 50. This dissolves on warming.

Unguentum Acidi Salicylici (O.F.).

Salicylic Acid, in powder, 1, Paraffin Ointment, white, 49. Useful in eczema, acne, ringworm and cancer.

In seborrhœa, the following is useful: Salicylic Acid 1, Precipitated Sulphur 2.5, Cold Cream 25.

Gauze, Lint and Salicylic Wool, each 4%.

Dissolve the Salicylic Acid in alcohol *q.s.* (about 1=1 of dressing), and impregnate under pressure: dry.

Baculum Acidi Salicylici, St. M.'s H.

Salicylic Acid 1, Wax 2, Lanolin 6.

Ammonii Salicylas, U.S. $C_6H_4.OH.COONH_4 = 153.95$ (155.082 I. Wts.).

Dose.—5 to 30 grains (0.32 to 2 Gm.).

In crystalline powder, very soluble in water.

U.S.—*Average dose*, 4 grains.

Effervescent Ammonium Salicylate.

Dose.—1 drachm (containing 10 grains) or more.

Magnesii Salicylas. $(C_6H_4.OH.COONa)_2Mg, 4H_2O = 367.72$ (370.464 I. Wts.).

Dose.—10 to 30 grains (0.65 to 2.0 Gm.).

Colourless crystals. **Soluble** 1 in 6 of water. It has been given in typhoid fever.

Potassii Salicylas. $C_6H_4.OH.COOK = 174.84$ (176.14 I. Wts.).

Dose.—5 to 30 grains (0.32 to 2 Gm.). A white crystalline powder, very soluble in water.

Sodii Salicylas (*Off.*). $C_6H_4.OH.COONa = 158.89$ (160.04 I. Wts.)

Off.— $(C_6H_4.OH.COONa)_2H_2O = 335.36$ (338.096 I. Wts.).

Dose.—10 to 30 grains (0.65 to 2 Gm.) in a 'mixture' or in cachets. 5 of salt=4 of acid.

FR. Cx.—*Max. single dose*, 30 grains. *Max.* during 24 hours 180 grains, approximately.

A dose of 40 grains.—B.M.J.i./07,1121.

In white scales or shining tabular crystals (of sweetish taste), **soluble** in its own weight of water, 1 in 0.83 (P.J. i./02,552), also in alcohol. For varieties in commerce, compare Salicylic Acid.

Solubility in water of caffeine, theobromine, exalgin, phenol, menthol, creosote, guaiacol, and thymol is considerably increased by sodium salicylate.

Incompatible with free ammonia, ammonium carbonate, and aromatic spirit of ammonia (turns brown) Mineral and many organic acids cause separation of salicylic acid.

Flavoring.—Syl Lavandulæ, Glyl Pini; Syrupus Aromaticus (not so good as the former). Extractum Glycyrrhizæ Liquidum, Syrupus Zingiberis.

Uses.—Rheumatism, neuralgia, possibly diarrhœa, vertigo, chorea, Menière's disease, malarial fevers and diabetes may be all well treated by salicylates.

In influenza and acute tonsillitis, 10 grains every three hours relieve the distressing symptoms.

Its solution forms an antiseptic wash for the bladder..

Sore throat is sometimes caused by.—B.M.J.ii./09,542.

In rheumatic fever, solutions may be given per rectum.—B.M.J.E. i./06,71.

Rheumatism, according to a theory, is thought to be caused by a protozoon, not a bacterium. Salicylates are practically specifics in acute rheumatism, and as there is nothing in the pharmacological action of these to account for the beneficial effect, it has been suggested that the disease is due to a protozoon.

Hæmaturia said to have been produced by 15 grain doses.—L. i./07,288.

In sciatica the electro-negative salicyl ions may be driven into the tissues.—L. ii./08,1299. See also *ibid.* 1314, and Iontophoresis, p. 422.

Acute rheumatism should be treated with large doses, *e.g.*, 150 grains daily, with twice the amount of Sodium Bicarbonate. The latter should always accompany it to render urine alkaline and to prevent constipation.—B.M.J. ii./08,1812; L. ii./08,1816.

Sodium Bicarbonate prevents vomiting. Use Glycerin and Peppermint Water to cover taste.—B.M.J. i./09,147.

Even children may receive as much as 400 grains *pro die*.—Pr. Nov. '09,642.

Stockman has shown that the fall of temperature in rheumatism under treatment with Salicylate, and return of joints to the normal, vary within limits, with the dose administered. Acute rheumatism may be the result of protozoa.—Pr. Feb. '09,249.

Rheumatic appendicitis is generally well treated by. If no improvement 36 hours after taking substantial dose the inflammation is not of rheumatic origin.—B.M.J. ii./08,1601.

Hæmorrhage and mucus from the bowel (apparently connected with a past rheumatic fever and long illness) was instantly relieved by large doses.—B.M.J. ii./08,1778.

In gonorrhœa, especially acute posterior urethritis, should always be used.—Pr. Apl. '09,544.

General peritonitis, as patient was of rheumatic tendency, 20 grains given on chance. Cure.—B.M.J. ii./08,1602.

One of the best intestinal antiseptics.—L. i./09,446.

Tablets, 3 and 5 grains (0.2 and 0.32 Gm.).

Effervescent Sodium Salicylate. This is prepared in two strengths—5 and 10 grains in a drachm. *Dose*.—1 drachm (4 Gm.) or more.

* '**Vescettes**' of Sodium Salicylate. 5 grains. To be crushed and taken in a draught of warm water.

Injectio Sodii Salicylatis. *Dose*.—15 to 30 minims (0.9 to 1.8 Cc.).

1 in 20 of sterile water or weaker. Is injected at the seat of the pain in rheumatism.—*c.f.* p. 67. Intravenously 4 grains have given relief.

Acidum Acetyl-Salicylicum. Fr. Cx., P. Helv., P. Dan., Ph. Ital.

*Aspirin, Saletin, Salacetin, Acetysal, *Xaxa.

$\text{CH}_3\text{CO.O.C}_6\text{H}_4\text{COOH} = 178.71$ (180.064 I. Wts.).

NOTE.—Salicyl-Acetic Acid would be an entirely different substance with composition $\text{C}_6\text{H}_4(\text{OH})\text{CO.CH}_2\text{COOH}$, and the chemical in question must not be misnamed.—P. J. ii./07,478.

Dose.—10 to 15 grains (0.65 to 1 Gm.) in cachets or suspended in water thrice daily. Children $\frac{1}{2}$ to 5 grains (0.032 to 0.32 Gm.).

A white powder prepared by action of acetic anhydride on Salicylic Acid. Melting Point 135°C. **Soluble** about 1 in 400 of water, 1 in 5 alcohol 90%. Passes unchanged through the stomach, decomposing only on

reaching the alkaline intestinal juices. *Incompatible* with free acids, iron salts and alkalis. It forms a clear mixture with Sodium Bicarbonate, owing to formation of Acetate and Salicylate of Sodium, and is not intended to be thus prescribed.

Heating Acetyl-Salicylic Acid in presence of moisture also causes disassociation.—P.J. ii./05 723.

Ferric Chloride added to Solution produces no violet colour; distinction from and absence of Salicylic Acid.

Flavoring.—Glyl Aurantii Amari, Glyl Vanillæ, Glyl Menthæ Piperitæ; Syrupus Pruni Virginianæ, Syrupus Tolutanus.

Uses.—Has anti-rheumatic properties, and is used as a substitute for Salicylic Acid and its salts. Does not irritate the mucous membrane of the stomach, and is to be preferred in heart and ear complaints. Is useful in influenza (especially with Quinine), acute and chronic affections of the joints, and in gout, neuralgia, chorea, and pleurisy. Has been used in hay-fever, diabetes and dysmenorrhœa. The gradual hydrolysis of the substance in the body is said to prevent the cumulative toxic action of the Salicylic Acid. It relieves the pain of cancer and of cystitis.

In some cases of influenza, it is useful with Caffeine, *e.g.*, Aspirin, $7\frac{1}{2}$ grains with Caffeine 3 grains.

References to Aspirin.

Chorea well treated.—L. ii./03,526.

Dose of 15 grains causes poisonous symptoms, but $7\frac{1}{2}$ grains safe.—B.M.J. ii./05,21.

May cause gastric pain, vomiting, and giddiness; œdema of face and skin rash may occur.—L. ii./05,1518.

In acute rheumatism no advantage over Salicylic Acid and Salicylates, but useful in cases of severe headache due to overwork, in which 10 grains at bedtime causes perspiration and relief of pain and refreshing sleep afterwards.—L. i./05,84.

For prevention of coryza combined use of Aspirin and Quinine.—B.M.J. ii./08,1052.

Arthritis deformans treated by Aspirin.—L. ii./08,1814.

In diabetes in the tropics, Aspirin and Antipyrine, in 5 grain doses of each, materially reduces the number of night calls for micturition and relieves thirst and burning.—B.M.J. ii./07,1054.

Chorea in a girl of 16 treated with 5 grains increased to 10 grains with recovery.—B.M.J. ii./09,794.

In erythema nodosum and rheumatism 15 grains thrice daily. Good result.—L. i./07,207.

Sciatica may be treated with advantage by 15 grain doses *ter in die*.—L. ii./08,1299.

Poisoning by one dose of Aspirin 10 grains and Exalgin 2 grains combined in slight rheumatism caused most alarming symptoms. Patient thought his last hour had come.—B.M.J. ii./08,1052.

—Patented process of making.—P.J. ii./07,424.

Di-halogenides of Methylene Citric Acid even more powerful in therapeutic effect than Acetyl-Salicylic Acid. Patent.—P.J. i./07,439.

In dengue Aceto-Salicylic Acid $7\frac{1}{2}$ grains thrice daily has been used.—Brooke, 170.

Tablets are prepared weighing 5 grains (0.32 Gm.), and 8 grains (0.52 Gm.). These should not be swallowed whole.

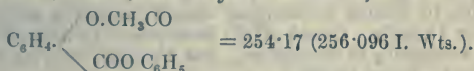
Also Tablets of Acetyl-Salicylic Acid with Phenacetin $2\frac{1}{2}$ grains each and with Dover Powder $2\frac{1}{2}$ grains.

Elixir Sodii Brom-acetosalicylatis.

Dose.— $\frac{1}{2}$ ounce repeated each hour if necessary until 4 doses have been taken. Contains the equivalent of 10 grains of Acetyl-Salicylic Acid and 10 grains of Sodium Bromide in 1 ounce.

Antipyretic. Relieves chronic articular rheumatism, also muscular rheumatic pains, and may be tried for vague neuralgic pain.—W. W. W.

Phenyl-Acetyl Salicylate. *Syn.* VESIPYRINE, ACETYL-SALOL.



Dose.—15 grains (1 Gm.) thrice daily. Much larger doses have been given. Crystals insoluble in water. Soluble in alcohol uses as for salol and salicylates. Breaks up in the intestine into salol and acetic acid.—F.N. 1909.

***Novaspirin.**—"Methylene-Citryl-Salicylic Acid," said to have the composition $\text{C}_{21}\text{O}_{11}\text{H}_{16}=440.79$ (444.128 I. Wts.).

Dose.—10 to 15 grains (0.65 to 1 Gm.) thrice daily.

White powder containing about 60% Salicylic Acid almost insoluble in Water, readily in Alcohol. *Incompatible* with alkalis and their carbonates. Larger doses may be given and over longer periods.—Am. J. Ph. Mar. 07, 133; Pharm. Zeit. 07, p. 9. In influenza.—F.N. '08, 196.

Also neuralgia and headache.—B.M.J.E. ii./07, 28.

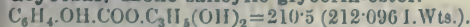
One says perfect substitute for Aspirin, another less powerful Antipyretic.—M.A. 1908, 25.

Arthritis deformans treated.—L. ii./08, 1814.

***Novaspirinoids** (Compressed Tablets of) contain 5 grains.

***Dymal** consists mainly of Didymium Salicylate. 10% Wool Fat Ointment for skin affections, (dry and weeping eczema) and for profuse sweating of feet.

Glycosal. Mono-salicylic glycerin-ester.



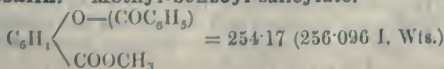
Dose.—5 to 30 grains (0.32 to 2.0 Gm.).

A white crystalline powder only slightly soluble in water, but soluble 1 in 3 of 90% alcohol and in glycerin.

Is said to act as an antiseptic, preventing fermentation in the bladder. In cystitis. Is claimed not to disturb the digestive functions. Also useful in muscular rheumatism.

In the form of ointment is employed in chronic and squamous eczema. 20% Collodion for sciatica, and Alcoholic Solution for rheumatic joints. Glycosal Tablets 15 grains (1 Gm.).

***Benzosalin.** Methyl-benzoyl-salicylate.—



Single Dose.—8 to 15 grains (0.5 to 1.0 Gm.) *per diem* 3 to 4 Gm. White crystalline powder melting at 85° C. **Soluble** in Alcohol 35, **insoluble** in Water. It is said to be decomposed only on reaching the intestine, and to have good effect in rheumatism. The Alcoholic Solution diluted with water *q.s.*, to slight turbidity should produce no violet colour with Ferric Chloride.

Tablets contain 0.5 Gm. *Dose.*—6 Tablets *pro die.*—P.J.i./07,9; Am.Jl.Ph.Mar.07,132; B.M.J.E. i./07,7, ii./07,52; M.A. 1908,10; B.M.J.E. ii./08,8.

Salacetyl. $C_6H_4(OH).COO.CH_2CO.CH_3 = 192.62$ (194.08 I. Wts.)

ACETYL-METHYL-SALICYLATE.

Dose.—10 to 30 grains (0.65 to 2 Gm.), in cachets or suspended.

An artificial glucoside made by heating Monochlor-Acetone with Sodium Salicylate, in shining crystals, very slightly soluble in water, in alcohol 90% 1 in 14 easily. Caustic alkalis decompose it forming salicylates.

Used successfully in rheumatism. For diarrhoea best given in Castor Oil (if required)—before breakfast.

Acidum Succinyl-Salicylicum. *Syn.* ★ DIASPIRIN.

$(CH_2 - COO)_2.(C_6H_4.COOH)_2 = 355.42$ (358.112 I Wts.).

Dose.—15 grains (1 Gm.) May be given several times daily.

A white crystalline powder with difficulty soluble in water, but easier in alcohol. Is well tolerated. Intended as substitute for salicylic acid in rheumatism, neuralgia, influenza, etc.—M./08, 121, 191.

★ **Saloquinine.** $C_6H_4.OH.CO.O.C_{20}H_{23}N_2O = 440.97$ (444.244 I.Wts.).

Dose.—2 to 30 grains (0.13 to 2 Gm.).

Quinine Salicylic Acid-ester: is a tasteless quinine substitute, insoluble in water, but soluble about 1 in 120 of alcohol 90%. Said to be prompt in action in malaria, and as a prophylactic to tropical fevers, and to be useful in neuralgia and sciatica.

★ **Saloquinine Salicylate.** *Syn.* RHEUMATIN.

$C_6H_4.OH.CO.O.C_{20}H_{23}N_2O, C_6H_4.OH.COOH = 577.98$ (582.292 I. Wts.).

Dose.—15 grains (1 Gm.) repeated.

A white powder only slightly soluble in water, in alcohol 90% 1 in 35. In acute rheumatism and neuralgia.

Salicinum (*Off.*), U.S. $C_6H_{11}O_5.O.C_6H_4.CH_2OH = 283.99$ (286.144 I. Wts.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.) in aqueous solution, taste may be covered with liquid extract of liquorice, or small dose in pill with glycerin of tragacanth.

A glucoside in colourless shining trimetric tabular crystals, without odour, taste moderately bitter. **Soluble** 1 in 28 parts of cold water, 1 in 50 of alcohol, but not soluble in ether. Obtained commercially from *Salix fragilis* or *S. purpurea* and other species of willow.

Flavoring.—Syl Rosæ, Glyl Cinnamomi; Syrupus Aurantii, Elixir Saccharini.

Uses.—In psoriasis, internally of value.—L. i./09, 967.

In small doses, often combined with valerianates and compound rhubarb pill, as a mild tonic. It is stated to cure influenza more rapidly than any other treatment, and to act as a prophylactic. In acute rheumatism, large

doses are specific. It is essentially a tonic. Salicylates are depressants, hence Salicin is more suitable for treatment. Is used for ague and all malarial fevers. In syphilis useful where Mercury cannot be tolerated. It is not adapted for use as an external antiseptic.

Effervescent Salicin.

Dose.—1 drachm. Contains 5 grains in 1 drachm.

Tablets, 5 grains of Salicin (0.32 Gm.). *Dose.*—1 to 4.

Ten grains of salicin in draught with carbonate of ammonium checks pyrexia of phthisis.—B.M.J. i./91, 684.

In lupus erythematosus with good results, 15 grains 3 times a day with a saline aperient.—Brit. Jl. Dermatology, July, 1903.

Dott confirms correctness of B. P. solubility,—the U.S. is wrong,—actually 1 in 24 at 25°C.—P.J.i./07, 79.

Salol. Phenyl Salicylate (Off.). U.S.

P.G. P. Austr. Fr. Cx.

$C_6H_4.OH.CO.O.C_6H_5 = 212.47$ (214.08 I. Wts.).

Dose.—5 to 15 grains (0.32 to 1 Gm.) in cachets or suspended in milk. Fr. Cx.: *Max. single dose*, 15 grains. *Max. during 24 hours*, 90 grains.

Small crystals, with a slight wintergreen odour.

Tablets, 5 grains (0.32 Gm.). *Dose.*—1 to 3.

Capsules contain 5 and 10 grains (0.3 and 0.6 Gm.).

Soluble 1 in 10 of alcohol, 2 in 1 of ether, 1 in 12 of liquid paraffin, in fixed oils, and a trace in glycerin. Almost tasteless and insoluble in water.

Flavoring.—Glyl Lavandulæ, Glyl Pini; Elixir Aromaticus, Syrupus Aurantii Floris.

Uses.—Antiseptic and antipyretic. In the system it splits up into its component parts, both being found in the urine, which is rendered aseptic and becomes very dark.

Salol has been given with success for rheumatism, acute and chronic, for sciatica, dysentery, and typhoid fever, gonorrhœa and vesical catarrh and diabetes. Valuable in all forms of sore throat, relieves earache and ocular neuralgia, and of value for summer diarrhœa, especially of children.

On account of slow excretion, should not be given in too large doses because of large content of phenol.

Attempts to render typhoid carriers free by this and other intestinal antiseptics not successful. B.M.J. ii/08, 1174.

Must not be given in renal disease.

Cachets of Salol, Bismuth Carbonate and Sodium Bicarbonate, 5 grains each are useful as intestinal antiseptic.

Salol with castor oil and tragacanth powder in a mixture should be dispensed by melting the salol and the oil in a warmed mortar (salol melts about 108° F.); emulsify with the tragacanth, using hot water to complete.—P.J. ii./05, 386.

Salol Mouth Wash.

A preparation similar to Odol; is produced by dissolving Salol 2.5, Saccharin 0.004, Peppermint Oil 0.5, in Alcohol 80%, 97 by weight, and adding Clove and Caraway Oil.—Y.B.P. 1902, 284. **Anise Mouth Wash.** *Vide* Edn. XII., p. 64.—Pierre's Eau Dentifrice is similar. Eau de Botot is prepared with Cinchona, Rhatany, Cloves, &c.

Owing to ready decomposition, in contact with moisture, into Salicylic Acid and Phenol, Salol in mouth washes is unsuitable.—L. ii/oS, 1387.

Emulsio Salol. *Dose.*— $\frac{1}{2}$ to 1 ounce.

Salol 20 grains, Compound Tragacanth Powder 20 grains, Distilled Water *q.s.* to 1 ounce.

Another formula: Mix Tincture of Tolu 50, and Water 500, and strain to free from separated resin. Triturate Salol 20, with Gum Arabic 20, and Tragacanth 1, add Syrup 150, and finally the Water and Tincture of Tolu in portions with stirring. $\frac{1}{2}$ ounce contains 8 grains Salol.

Ulcerative colitis treated by 10 grain doses as antiseptic.—L. ii./o4, 1209.

Spring Catarrh in Bombay treated with Sterile Saturated Solution in Almond Oil—instilled into the eye—Adrenalin into the fellow eye.—B.M.J. ii./o7, 1232.

In the treatment of cholera during the algide stage the following mixtures have been used:—Salol 10 grains, Mucilage 1 drachm, Spirit of Chloroform 15 minims, Water 1 ounce—every two hours until reaction sets in—then Bicarbonate of Soda 10 grains, Spirit of Chloroform 20 minims, Sweet Spirits of Nitre 20 minims, Water to 2 drachms, every four hours till urinary secretion is established and normal.

Cox combines with this 2 or 3 quart intravenous injections of warm Sodium Chloride Solution (100 grains to the quart). This injection is made by gravity, (2 or 3 feet head of water) and may be repeated.—Brooke, 165.

(*Vide* Edu. XII. for a number of older references.)

Salol Varnish for Pills.

Salol 2, Shellac 3, Absolute Alcohol and Ether, of each 3; forms a pill coating insoluble in the acid gastric juice, but soluble in the alkaline fluid of the intestine; suitable for purgatives to act on the bowels, and for administering antiseptic remedies in cases of eczema and urticaria, when these are caused by intoxication from ptomaines in the intestinal canal. Our experiments (*v.p.* 539 *et seq.*) do not confirm its utility.

Collodium Salol. Salol 4, Ether 4, Collodion 30. Gives rapid relief in pain of acute rheumatism.

Salol Catheter Oil. Salol 1, Castor Oil and Almond Oil, of each 15. Does not dissolve the varnish of catheters (G. Buckston Browne).

Salol cum Camphora, Salol Camphor.

Salol 3, Camphor 2, heated together combine to form a viscid liquid, which has been used as an antiseptic in place of iodoform. Prepared with 10% only of camphor, quickly crystallizes, and when powdered is suitable for application, where liquid not available.

Useful in suppuration of the middle ear; is neither painful nor irritating.

Ⓢ Unguentum Salol cum Cocaina.

Salol 2, Cocaine Hydrochloride 1, Ceratum Petrolei 16. Useful for burns.

***Salophen.** ACETYL-PARA-AMIDO-SALOL. P. Belg, Helv., Svec.

FR. CX. $C_6H_4 OH.COO.C_6H_4 NH.COCH_3 = 269.11$ (271.114 I. Wts.).

Dose.—10 to 15 grains (0.65 to 1 Gm.) three or four times a day in cachets.

White crystalline scales, tasteless ; soluble in alcohol, ether, and alkalis, almost insoluble in water. It contains about 50% salicylic acid. **Incompatible** with Alkalis and their carbonates. It is unaffected by gastric juice, but decomposed by pancreatic ferment. Anti-febrile and anti-rheumatic. Also in chorea, neuralgia, sciatica and headache. Ointment 10% in Lanolin for psoriasis and other skin affections.

Employed in throat affections and rheumatism with good effects.—Pr., March, '07.

Tablets, 5 grains, are prepared.

Acidum Cresotinicum C_6H_5OH . CH_3 . $COOH = 150.92$ (152.064 I. Wts.) has pharmacological action (in rheumatism) closely resembling Salicylic Acid.

It was stated by Demme in 1888 that *Para*-Cresotinic Acid can be given in 90-120 grain doses without being poisonous, that the *Meta*-Acid is without action, and that the *Ortho*- is an active heart poison even in small doses, but these last two statements require revision as the *Ortho*-Acid is really not more toxic than pure Salicylic Acid.

The Sodium Salts of all three acids can be administered in same dose as Sodium Salicylate.

Examined as to bactericidal power Salicylic Acid 1 in 1000 stopped a *Streptococcus* and *B. Coli* entirely. With 1 to 1500 Solution, *Ortho* and the *Meta* Cresotinic Acids prevented growth, while with Salicylic and *Para* Cresotinic Acid a few colonies developed, but growth was not nearly so abundant as in the control (sterile water). With 1 in 2000 growth was obtained in all. In the case of *B. Coli* the Cresotinic Acid was more active than Salicylic Acid.

Fever of pulmonary phthisis was reduced by 30 grains of Sodium *Ortho*-Cresotinate 2° F. in $1\frac{1}{2}$ hours.

Does not cause ringing in the ears, which prolonged treatment with Salicylate often does.

Acute rheumatism is well treated by Sodium *Ortho*-Cresotinate to the extent of complete disappearance of the symptoms in a short time, acting within 24 hours.—B.M.J. ii/09, 330,791.

Acidum Toluicum. $C_6H_4CH_3$. $COOH = 135.04$ (136.064 I. Wts.).

Though allied chemically to the above has different properties, and no therapeutic value is attributable to it.—B.M.J. ii/9,791.

ACIDUM STEARICUM. U.S. P.Jap.

Stearinum, P. Austr. Commercial Syn. "STEARINE" wrongly so called. $C_{17}H_{35}COOH = 282.14$ (Off. and U.S.Wts.); (284.288 I. Wts.).

This monobasic acid occurs as a hard white solid substance and is not entirely pure. It is prepared by decomposition with superheated steam of Stearin (the triglyceride of stearic acid contained with those of palmitic and oleic acids in tallow). **Soluble** about 1 in 18 of alcohol 90%. Readily soluble in ether. Melts about 56° C. (132.8° F.) This melting point corresponds to a mixture of 40% stearic acid and 60% palmitic. A melting point of 58° C. (136.4° F.) would be better for some suppositories. (P. Jap has M.Pt. $60-65^{\circ}$ C.) P. Austr. and

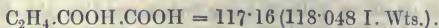
U.S.—Vide Glycerin. It is obtainable commercially with melting points 50° C. (122° F.), 52·5° C. (126° F.), and 55° C. (131° F.).

Commercially it contains 29 to 30% oleic acid. Iodine No. is indication of purity.—P.J. ii./07,86. Hill informs us he would regard 24% (Iodine No. 21·7) as indicating a good commercial quality. Pure stearic acid would of course have Iodine No. *nil*. By recrystallizing it is possible to bring the No. down to 6.

Cocoa Nut Stearine.—A white firm fat melting at 84° F. (29° C.), suggested for use as suppository basis as having a melting point somewhat lower than cacao butter, which (*Off.*) softens at 80° F. and (26·6° C.), and melts between 88° F. and 93° F. (31·1° and 33·9° C.).

ACIDUM SUCCINICUM. P. SVEC.

GERMAN.—BERNSTEINSAEURE.



Dose.—5 to 10 grains (0·32 to 0·64 Gm.).

Occurs on destructive distillation of Amber, as the oxidation product of a number of substances rich in carbon, *e.g.*, fats and fatty acids,—if treated with Nitric Acid. Also by fermentation of Malic Acid (Calcium Salt)—Liebig, or of Tartaric Acid, which is Di-hydroxy-Succinic Acid.

Colourless crystals *Soluble* in water 1 in 20, in Alcohol 1 in 9. Used chiefly as—

Ammonii Succinas.— $\text{C}_2\text{H}_4(\text{COO NH}_4)_2 = 151\cdot04 \text{ (152}\cdot116 \text{ I. Wts.)}.$

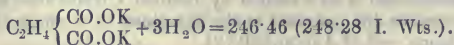
Dose.—2 to 5 grains (0·13 to 0·32 Gm.).

Crystalline salt soluble in water and alcohol.

In spasmodic pains, particularly spastic contractions of uterus.

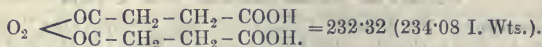
Sodii Succinas.— $\text{C}_2\text{H}_4(\text{COONa})_2 + 6\text{H}_2\text{O} = 268\cdot2 \text{ (270}\cdot128 \text{ I. Wts.)}$ in dose as above in catarrhal jaundice. Soluble 1 in less than 1·5 water. Has also been given in delirium tremens.—M.Am.

Potassii Succinas.



A deliquescent powder; has been used in doses of 5 to 10 grains to control hæmorrhage. **Ferri Succinas**, Ferric Succinate, a reddish-brown insoluble powder removes biliary calculi and relieves hepatic colic.

***Alphogen. Syn. *Alphozone.** DISUCCINYLDIOXIDE or SUCCINIC PEROXIDE.



Dose.—2 grains (0·13 Gm.) added to $\frac{1}{2}$ tumbler of water. Tablets 1 grain. For local use 1 in 3,000 to 1%.

An amorphous odourless white substance with acid bitter and metallic taste. Acid to Phenolphthalein and Litmus.

Soluble 1 in 100 water (1 in 10 at 37° C.).

Uses.—As germicide and deodorant (not germicidal when neutralised with alkali). Rapidly loses germicidal power by hydrolysis on standing in solution,—must be freshly employed. 1 in 1,000 solution destroys *B. anthracis*, *B. coli communis*, *B. diphtheriæ*, *B. typhosus*, *Streptococcus pyogenes aureus*,

etc., in 15 minutes. Carbolic Coefficient for *B. coli communis*, *B. enteritidis* (Gärtner), *B. typhosus*, and for *B. diphtheriæ* is 25. 1 in 1,000 to 1 in 100 Solutions rapidly destroy *Streptococci* in pus, *B. diphtheriæ* in membrane, *B. coli* in faeces, etc.

Dusting Powder 5%, Unguentum 2% (Paraffin basis). —See also B.M.J.i./05, 1150; L.i./05, 367.

ACIDUM SULPHURICUM.

$H_2SO_4 = 97.34$ (98.086 I. Wts.).

'Poisonous.'—For retail in Great Britain and Ireland, must be labelled as such (with name of the substance), and the vessel must bear name and address of seller.

Sulphuric Acid (Off.).—Syn. OIL OF VITRIOL.

Dose.—1 to 2 minims (0.06 to 0.12 Cc.).

Has Sp. Gr. 1.843, and contains 98% by weight of hydrogen-sulphate (U.S. contains 92.5%); is colourless and almost odourless.—Ph. Ned., 94 to 96%. P. Helv., 93 to 99%. Fr. Cx. allows 2% Water.

Preparation.—By passing SO_2 (made by burning sulphur) with a little nitric acid into leaden chambers into which jets of steam are also sent.

This Acid is used commercially for the production of glucose which enters into the manufacture of beer at the present day. Owing to it being made from Pyrites, it contaminated the glucose, and thence the beer with Arsenic in 1900.

Report of Royal Commission on arsenical poisoning see B.M.J. ii./03, 1557, 1610; L. ii./03, 1674, and p. 142.

Use.—Very occasionally as caustic.

Pruritus is well treated by internal use of, even when alkaluria is absent.

Dose 1 tablespoonful every 2 hours of 1½ to 2½ solution. Results good after other methods had failed. The itching is said to rapidly disappear.—Aust. Jl. Phcy. June 1908 per several German papers.

C.R. 1908 advises limit of Lead as impurity 20 parts per million.

Antidotes.—Magnesia and *c.f.* Acidum Hydrochloricum.

Sulphuric Acid "Arsenic-free" is specially prepared to stand the Marsh-Berzelius Test 1 hour.

Acidum Sulphuricum Aromaticum (Off.). Syn. ELIXIR OF VITRIOL. *Dose.*—5 to 20 minims (0.3 to 1.2 Cc.).

Add Sulphuric Acid 3, to Alcohol (90%) 29½ with stirring, then add Spirit of Cinnamon ½, Tincture of Ginger 10.

This contains a small amount of (aromatic) ethylsulphuric acid. The preparation would be improved by carefully heating the mixture of acid and alcohol to encourage the formation of the vinous acid. Contains 13.8% of hydrogen sulphate, and has Sp. Gr. 0.922 to 0.926.

U.S. has sulphuric acid (92.5%) 111, Tincture of Ginger (1 in 5 alcohol 94% by volume) 50, Oil of Cinnamon 1, Alcohol (94.9%) to 1,000 (=20% by weight H_2SO_4 , was 18.5% 1890).

Elixir Acidum. F. Ital. *Dose.*—2 to 8 minims (0.12 to 0.48 Cc.).

Strong Sulphuric Acid and Alcohol, of each equal weights. Mix carefully and gradually.

P. Austr. has Liquor Acidus Halleri, P.G. Mixtura Sulphurica Acida, F.E. Aqua Rabeliana, and P. Helv. Mixtura Sulphurica acida (Eau de Rabel) 1 to 3 of alcohol (weight); Fr. Cx. Acide Sulfurique Alcoolisé 100 to 300 (weight), and Red Poppy Petals 4; Ph. Ned. Sulfas Aethylicus Acidus cum Spiritu (equal weights); similar in composition to our Elixir of Vitriol; useful in checking excessive perspiration.

Acidum Sulphuricum Dilutum. (*Off.*). Sp. Gr. 1.094. *Dose.*—5 to 20 minims (0.3 to 1.2 Cc.).

Contains 13.65%. (U.S. Fr. Cx. and P. HELV. 10%.) P. AUSTR. has Sp. Gr. 1.12=16.66%. PH. NED. is quadrinormal.

Add gradually sulphuric acid 4 to distilled water 40 (not *vice versa*), and when cool add more water to 48½ approx.

In making a small quantity, the acid and water can be poured one from one jug and the other from another, through a funnel into the bottle.

A useful digestive, intestinal astringent and addition to cough linctus or syrup.

In carbuncle, large doses, 20 to 30 minims well diluted with water every 4 hours create even during the first 12 hours visible changes in the affected area. Local use of Carbolic Vaseline afterwards. B.M.J. ii./08, 407.

Incompatible with alkalis and carbonates. It precipitates calcium from solutions of calcium salts, also soluble lead and silver salts.

Acidum Sulphuricum Fumans. *Syn.* NORDHAUSEN SULPHURIC ACID.

Sp. Gr. about 1.9. Contains some sulphuric anhydride dissolved in sulphuric acid—another method of making.

Fröhde's Reagent for alkaloids consists of a fresh solution of Sodium Molybdate 1, in pure strong Sulphuric Acid, 1,000. This gives various colour reactions, or absence of colour with different alkaloids.

ACIDUM SULPHUROSUM (*Off.*).

$\text{H}_2\text{SO}_3 = 81.46$ (82.086 I. Wts.); $\text{SO}_2 = 63.58$ (64.07 I. Wts.).

Dose.—½ to 1 drachm (1.8 to 3.5 Cc.).

A colourless liquid, with strong sulphurous odour, and containing 5% of SO_2 (U.S. has 6%). Sp. Gr. 1.025.

Preparation.—By roasting sulphur or by heating copper and sulphuric acid, or carbon and sulphuric acid.

Sulphurous acid is a strong reducing agent. For example, many colours are bleached by the sulphurous acid combining with the oxygen of any water present, hydrogen being liberated, which latter forms colourless compounds with the colours. These compounds may then be removed by washing.

C.R. 1908.—Lead should not exceed 10 parts per million.

Uses.—Sulphurous acid, the solution is applied externally as a lotion—one part to two or more of water and sometimes a little glycerin added—for parasitic affections such as chloasma, ringworm, pruritus, thrush, and chapped hands, with very good results. It is sprayed into the throat for tonsillitis, diphtheria (better diluted) and asthma, or used as an inhalation, a teaspoonful to a pint of cold water. It is strongly antiseptic, and has been used in whooping cough by fumigating the room. Also diluted for fœtor of the teeth, *e.g.* in syphilis.

Internally it has been used in cholera (and is prophylactic). As a rectal injection, a 1 or 2% solution of the gas. Also for gastric fermentation accompanied by sarcinæ, as in typhoid (20 to 30 minim doses) every two or three hours.

The gas compressed in small cylinders was used for Room Disinfection, but Formalin (*q.v.*) is more used now.

"Clayton Gas," consisting principally of the residual nitrogen of the air, sulphurous acid up to 15%, and a considerable amount of sulphuric acid (which

is useful, as it renders the gas visibly opaque) has been employed for freeing ships' holds from vermin. A special apparatus is used.

Calcii Bisulphis. Is an antiseptic supplied in solution. Checks fermentation and putrefaction. Has been employed for preserving foods. ("Madame Rachel"). **Calcium Sulphite**, $\text{CaSO}_3 = 119.17$ (120.16 I. Wts.). A white powder, soluble in dilute Sulphurous Acid, has similar properties in less degree.

Magnesii Sulphis.

$\text{MgSO}_3 + 6\text{H}_2\text{O} = 210.92$ (212.486 I. Wts.).

Dose.—10 to 30 grains (0.65 to 2 Gm.).

White crystalline powder. Soluble 1 in 90 in water. Valuable in diphtheria and other infectious diseases. Large doses may be given with impunity. Tablets 5 grains.

Sodii Hyposulphis.—*Syn.* SODIUM THIOSULPHATE (*Off.*). U.S.

$\text{Na}_2\text{S}_2\text{O}_3 + 5\text{H}_2\text{O} = 246.44$ (248.22 I. Wts.). *Dose.*—10 to 60 grains (0.65 to 4 Gm.).

Crystals soluble in water 1 in 1. Insoluble in alcohol.

Uses.—As a lotion, 1 in 10 for chloasma, ring-worm, &c. It may be made to evolve sulphurous acid as, *e.g.*, in the following: Sodium Hyposulphite 6, Diluted Sulphuric Acid 1, Water 32.

To preserve the volumetric solution of Sodium Thio-sulphate a few drops of carbon disulphide added are useful.

Useful in clearing out the intestinal tract and in lowering blood pressure (in arterio-sclerosis).—B. M. J. 1/06, 126.

In Italy medical men and the general public frequently demand sodium hyposulphite (specially recrystallised). For internal use the dose is from 1 to 6 grammes as a purgative; its antiputrescent action is said to be superior to that of the sulphite. While passing through the blood circulation it is transformed firstly into sulphite and then into sulphate.—Ph. Notes.

ACIDUM TANNICUM (*Off.*).

Syn. TANNIN. $\text{C}_{14}\text{H}_{10}\text{O}_9 \cdot 2\text{H}_2\text{O} = 355.42$ (358.112 I. Wts.). (U.S. *sine* Aqua 319.66 U.S. Wts.).

The water of crystallisation should be omitted in formula.—C. R. 1908. *Dose.*—2 to 5 grains (0.13 to 0.32 Gm.).

It is extracted from galls with ether containing a little alcohol and water.

Soluble in water 1 in 1 slowly, and in glycerin, less so in alcohol 90%, insoluble in ether and chloroform.

Incompatible with ferric salts, acids, alkalis, silver and other metals and with gelatin, *c.f.* Tannalbin p. 82. Furthermore, Tannin Solution precipitates the majority of alkaloids from solution, hence is occasionally employed as an antidote to these.

Uses.—Throat and mouth wash 1 to 2%. Astringent and styptic in powder form for epistaxis (by coagulating the albumin). Sometimes given in dysentery.

Rectal injection of tannin 30 grains in a quart of hot water, with or without opium, has been given in cholera.

A 2 to 3% solution in ether has been used to brush over burns 2 or 3 times daily.—E. M.

Estimation of Tannin Matters. To an aqueous solution of Tannic Acid Standard Iodine is added in excess, then a few drops of Starch Solution and afterwards aqueous NaOH , until the Starch-Iodine colour disappears, avoiding excess. Then add sufficient Dilute HCl to separate the unabsorbed iodine the amount of which is estimated by Standard Sodium Thio-sulphate. The process is

also applicable to estimation of many Phenols, *e.g.*, Phenol, Salicylic Acid, &c. With these the amount of Iodine absorbed is in direct ratio to the number of Hydroxyl groups present 10H requiring 1 Mol. Iodine. The method gives very good results with ordinary tanning materials, *e.g.*, gall-nuts, sumach, valonia, divi-divi and quebracho.—Gardner and Hodgson, Int. Cong.

Glycerinum Acidi Tannici, *v.p.* 340.

Glycerinum Aluminis et Acidi Tannici, *v.p.* 340.

In erysipelas, Taunin 1, Camphor 1, Ether 8, painted on the part, useful.—B.M.J.E. ii./92,31.

Gargarisma Acidi Tannici, C.X., L.H., St. G. H. 12½% Glycerin of Tannin, U.C.H. 10°/o.

Ovules with glycerin basis for use in vaginal discharges.—*v.p.* 508.

Pessus Acidi Tannici 10 grains each in theo-broma oil basis, 120 grains weight.

Syrupus Iodo-Tannicus, *v.p.* 408.

Suppositoria Acidi Tannici (*Off.*).

3 grains with theobroma oil *q.s.* to 15 grains.

Ⓟ Suppositories of Tannic Acid with Opium, 1 grain in addition, or Ⓜ Morphine ½ gr.—W.H.

Ⓟ **Unguentum Acidi Tannici cum Opio**, B.S.H. Tannic Acid 30 grains, Opium 30 grains, Lard 1 ounce.

★ **Tannalbin**. *Dose*.—8 to 15 grains (0.52 to 1 Gm.), P. AUSTR., PH. NED. (Albuminum Tannicum. P. JAP.).

A compound of tannin with albumen, in pale brown insoluble, tasteless powder, containing about 50% of tannin. A disinfectant soluble in the intestines, but unaffected by the stomach, given for diarrhoea.

P. Jap. gives method of making from white of egg and a Pepsin test.

★ **Tannigen**. DI-ACETYL-TANNIN. $C_{14}H_8(COCH_3)_2O_9 = 403.06$ (408.112 I Wts.). *Dose*.—5 to 15 grains (0.3 to 1 Gm.) in cachet.

A tasteless, insoluble powder, but rendered soluble by alkali. In diarrhoea. Dissolves in the intestine appearing in the urine as gallic acid. Should not be prescribed with alkali.

★ **Tanocol**. *Dose*.—15 grains (1 Gm.).

A compound tannin and gelatin; intestinal astringent.

★ **Tannoform**. SYN. METHYL-DITANNIN. $C_{29}H_{20}O_{18} = 651.23$ (656.16 I. Wts.).

A compound of tannin with formaldehyde in reddish-white powder insoluble in water, soluble in alcohol and alkalis. Used as an antiseptic in ointment (1 in 10) or dusting powder alone or with 1 to 4 parts of starch, for bedsores, hyperidrosis, pruritus, eczema (particularly in interdigital eczema), and piles. In diarrhoea (*Dose*—from 1 to 20 grains according to age) and enteritis and for tender feet.

ACIDUM TARTARICUM.

CH.OH. COOH = 148.92 (150.048 I. Wts.).

CH.OH. COOH

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

Manufactured from acid potassium tartrate by heating with water and sufficient calcium carbonate to almost neutralise, converting thus into insoluble calcium tartrate and soluble neutral potassium tartrate. The latter is also converted by aid of calcium chloride into calcium tartrate. The two portions of calcium tartrate are washed and then decomposed with the necessary quantity of sulphuric acid.

Soluble 10 in 8 water, 1 in 2½ alcohol 90%, 1 in 4½ glycerin, 1 in 120 ether 0.720, 1 in 5 absolute alcohol. Nearly insoluble in benzol and chloroform.

Incompatible with alkaline carbonates, potassium, calcium, and mercury salts.

Uses.—For making Granular Effervescent Preparations, Effervescing Tablets, (see Neutralisation Table for equivalents) and cooling drinks.

Estimation of Lead in Tartaric Acid.

Best English tartaric acid as a rule does not contain more than 5 parts per million of lead and rarely exceeds 10. Foreign acids contain more. (c.f. Govt. Report *infra*.)

Prepare a standard lead nitrate solution in water 0.4 Gm. in 250 Cc. This should be kept distinctly acid, and is diluted 100 times for use. 1 Cc. of this diluted solution contains 0.00001 Gm. Pb. 7 Gm. of tartaric acid are dissolved in 50 Cc. of water in a Nessler glass with internal diameter 2.5 Cm., and in another 2 Gm. of the same acid are dissolved in the same amount of water. To the first, ammonia is added in excess, and a few drops of a 10 per cent. potassium cyanide solution are added to prevent the iron and copper from interfering with the sodium sulphide solution, which is then added to the first Nessler glass.

The amount of lead solution added to the 'dummy' to match the colour of the solution of the sample on adding sulphide is the amount present in 5 Gm. of the sample. One arrives, therefore, at the amount of lead present in parts per million; e.g., 5 grammes of acid requiring 5 Cc. of diluted standard lead solution to balance coloration represent a content of 10 parts per million. Do not add lead solution after the sodium sulphide, this is a grave source of error.

To eliminate the inherent colour of the solution of the substance before adding the sulphide it may be necessary to add a minute quantity of burnt sugar to the 'dummy.'

If the sample be rich in lead, use correspondingly less of it, e.g. 2 Gm.

Method of Producing Lead-free Tartaric Acid.—Where the proportion of lead is excessive (e.g. 40 parts per million), pure lead-free acid for use as 'dummy' will be necessary. To prepare this 250 Gm. of the best acid obtainable are placed in a strong bottle fitted with rubber cork, and 1000 Cc. cold saturated hydrogen sulphide solution are added to nearly fill the bottle, which is (cautiously) then well shaken to dissolve the acid. Great internal pressure is produced owing to comparatively slight solubility of hydrogen sulphide in solutions of citric or tartaric acid. Allow to stand one day, filter, evaporate and crystallise. The solution on concentrating may become straw coloured, which can be removed by stirring into the hot solution a crystal of sodium chlorate. The first crop of crystals equal to half the acid taken will be absolutely lead-free.—C.D. March 15, 1905.

The Government Laboratories (MacFadden's Report to Local Government Board) found no Arsenic in the English Tartaric Acid and in no case more than 0.002% of lead—approximately $\frac{1}{2}$ grain per lb. With nearly half the foreign acids this figure was exceeded—the worst being a German acid containing 0.0062% of Metallic Lead. A Spanish Acid contained 0.0008% of Arsenic.

Minute amounts of Lead and Arsenious Oxide below 0.002 ($=\frac{1}{2}$ grain, per lb.), and 0.00014% ($\frac{1}{100}$ grain per lb.) respectively, would not justify condemnation.—B.M.J. ii./c7, 1140, c.f. also p. 142.

C.R. 1908 gives test to limit sulphates and advises lead should not exceed 10 parts per million.

Criticism of the Reference Committee's pronouncement on the color estimation of lead. 20 per million might well be adopted as a counsel of perfection.—C.D. ii./c9. 93.

Acidum Glutaricum. *Syn.* PYROTARTARIC ACID. $\text{COOH}(\text{CH}_2)_3\text{COOH}$. = 131.07 (132.064 I. Wts.).

Dose.—? but assumed as of Tartaric Acid.

Isomeric with Pyrotartaric (Methyl Succinic), Ethyl-Malonic and Dimethyl-Malonic Acids—four isomers being possible. Colorless crystals,—soluble in water and alcohol. M.Pt. 97° C.

Experimentation by injection of dogs rendered diabetic by mean of phloridzin,—showed its value in diabetics. The excretion of Nitrogen diminished. Seems to act by preventing the spitting up of the tissues, or food into sugar and urea.—B.M.J. ii./c7, 542.

Further researches have confirmed this and even more marked effect with rabbits. —M/1908, 114.

ACOCANTHERA.—*Syn.*—*Toxicophloeæ*.

HOTTENTOT'S POISON BUSH.

Kaffir, Intlungunyembe or Ubuhlungu Benyoka.

Not strictly included in the Schedule of Poisons (1908) but obviously care should be taken.—This refers to the drug and all its preparations.

Of this plant there are several varieties, *e.g.*, *A. Venenata* (here referred to—the one employed in South Africa), *A. Thunbergii* and *A. spectabilis*. They probably all contain Ouabain or a glucoside closely allied. Leaves, young twigs and roots are used for snake-bite by producing vomiting. The genus is intensely poisonous, and an overdose will produce violent vomiting. Fraser found Acocantherin, a glucoside in it (probably Ouabain, W.H.M.)—but there appears to be evidence of an alkaloid also.—C.D. i./08, 20. Originally the plants were employed as arrow poisons. The drug produces a strong contraction of the heart.

Extractum Acocantheræ Venenatæ Liquidum (1=1) has been prepared from the leaves. Some Physiological experiments kindly conducted for us by A. D. Waller, F.R.S., showed that the leaves of *Acocanthera* are more powerful than the stem and that the *dose* of the Liquid Extract of the leaf may be taken as about $2\frac{1}{2}$ to $7\frac{1}{2}$ minims (0.15 to 0.45 Cc.), *i.e.*, $\frac{1}{2}$ a dose of Tincture of *Digitalis*, P.B. This is only tentative and more exact comparison, *e.g.* with aconitine is desirable *c.f.* also Proc. Phys. Soc. Dec. 19/08, Jl. Phys., vol. xxxviii.

The drug may possibly contain of Ouabain about 1 in 1000 of the drug (and the dose of Ouabain being up to $\frac{1}{250}$ grain,—the maximum dose of this Liquid Extract would be 4 minims (0.24 Cc.) It may, however, contain more (*c.f.* *A. Schimperi* below)—it has not been estimated. For use as a substitute for *digitalis* in heart disease. Andrew Smith, of St. Cyrus, mentions 15 grains of the powdered leaf as a *dose*—but this apparently causes vomiting.

Infusum Acocantheræ Venenatæ is suggested for trial like that of *A. Schimperi* below,—

Acocanthera Schimperi and *A. Deflersii*—two further distinct species contain amorphous Ouabain together with crystalline Ouabain,—the former according to M. 1906, *q.v.*, is the Acocantherin of Fraser.

Infusum Acocantheræ Schimperi Ligni 0.5% flavoured with Syrup has been given in $\frac{1}{2}$ ounce doses—six to eight of such per diem (!) Merck tells us that *A. Schimperi* and *A. Deflersii* contain about 0.3% Amorphous Ouabain,—this dose, therefore, would be equivalent to about $\frac{1}{300}$ grain Ouabain assuming of course it is all extracted, which it probably is not.—W.H.M. May sometimes cause vomiting. Action on the pulse and diuretic effect is like that of *digitalis*. In some cases it proved even better than *Digitalis*.

Ouabain Amorphous has been injected in 0.0003 to 0.0004 Gm. ($\frac{1}{250}$ to $\frac{1}{180}$ grain) doses. Not painful. Excellent in heart disease.

These plants should be of value in heart affections.—Berl. Klin. Woch. 1906, No. 50, 1586., *v.* also Ouabain p. 652.

A. venenata contains a glucoside differing from those of other *Acocanthera* var.—*Vide* Ber. D. Pharm. Ges. 1894.

A glucoside from *A. Schimperi*,—Faust, Arch. f. Exp. Pharmacologie u. Therap. Vols. 48 and 49.

Ⓐ ACONITI RADIX (Off.).

Ⓐ *Aconite, Aconitine and their preparations.*

Root collected in the autumn from *Aconitum Napellus* (*Ranunculaceæ*), cultivated in Britain and dried. B.P. gives no dose or standard. P.G. and Fr. Cx. give *Dose* (max. single), 0.1 Gm.; Fr. Cx max. during 24 hours 0.3 Gm. That of P. BELG. in powder dried at 100°C. contains 0.8% alkaloids. If more, dilute with milk sugar.

Fr. Cx.—Selected heavy roots from the wild plant collected before end of the flowering season. U.S. contains 0.5% Aconitine.

C.R.—Not to be kept more than 1 year. Should strictly be called *Aconiti Tuber*. Powdered drug to be used entire.

C.R. 1908.—The drug not to be restricted to English root. Standard 0.4% alkaloid.

Use.—Anodyne, diaphoretic, diuretic.

Externally the liniment as such or mixed with chloroform or belladonna liniment in neuralgia and rheumatism (causes tingling and numbness).

Internally the tincture diminishes the force and rate of the pulse, especially in the early stages of fevers and mild local inflammations such as feverish cold, laryngitis, and first stages of pneumonia, erysipelas and gonorrhœa. It also relieves the pain of neuralgia, pleurisy and aneurism. Large doses cause tingling of mouth and skin generally.

In cardiac failure or to prevent, *e.g.* in acute pneumonia the old depressant treatment by full doses of aconite, abandoned.—West, Pr., Apl., 08, 435.

Average dose.—0.065 Gm. (1 grain).

U.S. Assay method.—10 Gm. of the root in No. 40 powder are shaken with a mixture of alcohol 7 and water 3 and percolated. The percolate is evaporated to dryness at a temperature not exceeding 60° C., the residue is treated with a sufficiency of N/10 H₂SO₄ and water. The alkaloidal solution is treated with ammonia and ether in repeated quantities. The ether washings are evaporated and dissolved in a measured volume of N/10 H₂SO₄ which is then back-titrated with N/50 KOH, using Cochineal as indicator. The factor 0.064 is given for determining the amount of aconitine present.

The filtering of the first acid liquors in the process is quite impracticable.—Am. J. Ph., Oct. 06, 454.

Assay of aconite herb, root and extract by various methods using Iodeosin* as indicator; also method of examining this compound for analytical purposes.—P. J. i., 03, 267.

Ⓐ *Aconiti Folia* may contain as much as 0.8% total alkaloid.

Fr. Cx. employs fresh leaves for making *Alcoolature d'Aconit*, 1=1 using 95% alcohol by macerating 8 days. Max. single dose 1 Gm., max. daily dose 5 Gm.

*NOTE.—Iodeosin Test Solution, U.S. Tetra-iodo fluorescein C₂₀H₈I₄O₅, 0.1% in alcohol. Becomes colourless in acid solutions, pink in alkaline. Dilute the solution to be titrated with 100 Cc. or so of water, add 20 Cc. ether and 5 drops of the indicator and shake. Titration complete when pink persistent. For alkaloidal residues dissolve in known volume standard acid, to dilute 100 Cc., and proceed as above.

It is very suitable for alkaloidal residues with Centinormal or weaker acid.—P. J. ii., 08, 194.

Aconitum Anthora (=Anti-Thora) was formerly used as an antidote to *Ranunculus Thora* (Holmes).—P. J. i./07,383,427,447.

Antidotes.—Apomorphine hypodermically as emetic; stimulants; Amyl Nitrite. Digitalis tincture 25 minims hypodermically in course of 4 hours was successful.

④ Other Preparations of Aconite.

① **Chloroformum Aconiti**, B.P.C. Prepared as Chloroformum Belladonnæ, *q.v.*

② **Extractum Aconiti Radicis Alcoholicum**. FR. CX. (EXTRAIT D'ACONIT) prepares from the root with 70% alcohol and standardises to 1% alkaloids. *Max. single dose*, $\frac{1}{2}$ grain. *Max. during 24 hours* $1\frac{1}{2}$ grains approx.

③ **Fluidextractum Aconiti**, U.S.

Average Dose.—0.05 Cc. (1 minim) equal to $\frac{1}{300}$ grain which would appear to be too high. Standardised to 0.4 Gm. Aconitine in 100 Cc. Assay on lines of Aconite Root, *q.v.*

④ **Linimentum Aconiti** (*Off.*).

$1\frac{1}{2}$ = 1 of English root; useful in neuralgia.

May be produced 1 = 1 to contain all the alkaloids.—P. J. i./03,458.

9 minims of this liniment = about $\frac{1}{30}$ grain aconitine, has proved fatal.

⑤ **Linimentum Aconiti Compositum**. G.H.

A. B. C. Liniment.

Aconite Liniment, Belladonna Liniment, Chloroform Liniment, equal parts. To be well shaken before use, as the olive oil in the chloroform liniment is not soluble in the other ingredients. B.P.C. uses Liniment of Aconite 2, of Belladonna 2, Chloroform 1. Miscible.—Also ⑥ **Linimentum Aconiti et Chloroformi**, B.P.C. Chloroform 1, Aconite Liniment 7.

Poisoning by A. B. C. Liniment.—B. M. J. i./96,399.

Poisoning by $\frac{1}{2}$ ounce of A. B. C. liniment. Liquor Strychninæ and saline enema 2 pints, containing 2 ounces brandy, saved life. Afterwards $\frac{1}{2}$ grain morphine. The lethal effect of the aconite was abolished by stimulating action of the atropine.—B. M. J. ii./08,372.

⑦ **Pastill Aconiti**, *c.f. p.* 342. Contain 1 minim Tincture. (*Off.*)

⑧ **Pilula Aconiti**. Root, in powder, $\frac{1}{2}$ grain in each.

Dose.—1 hourly = about 2 minims of tincture.

⑨ **Tinctura Aconiti** (*Off.*).

1 of dried English root in 20 of 70% alcohol.

Dose.—5 to 15 minims (0.3 to 0.9 Cc.). As a febrifuge 2 minims every 10 minutes or quarter of an hour, for an hour, then repeat dose every hour till skin acts well and temperature is reduced.

C. R. states: No difficulty in making a tincture 0.05% which F. I. requires.

FR. CX. has this strength made with 70% alcohol. It is termed *Teinture d'Aconit au dixième* and has max. single dose 9 minims approx.

P. G. (1 in 10). Maximum single dose, 0.5 Gm. Daily dose, 1.5 Gm. U.S. has 1 in 10, assayed to 0.045% aconitine. The 'average dose' being 10 minims equal to $\frac{1}{250}$ grain of Aconitine, is nearly double the average dose of Aconitine U.S. P. Belg. contains 0.05% alkaloids.

⑩ **Syrup**, P. Belg., 1 of Tincture to Syrup 19.

① **Tablets** are prepared each equivalent to 5 minims. To be directed to be dissolved in a little water.

② **Trochisci Aconiti** contain each $\frac{1}{2}$ minim of tincture. Given in fevers and mild inflammatory conditions.

③ **Fleming's and Turnbull's Tinctures of Aconite** are about twelve times the strength of the official. They are used externally, and were given internally in doses of 1 to 5 minims.

Pharm. Form. says it should be particularly noted that Tincture of Aconite *Fleming* of all prescriptions, except British and American is not this preparation but a 1 in 10 tincture.

Tincture of Aconite (*Fleming*) combined with equal volume of Tincture of Iodine (*Off.*) is frequently ordered to be painted on the gums for pain.

① ACONITINA (*Off.*).

Syn. ACETYLBENZOYLACONINE. $C_{33}H_{45}NO_{12} = 642.53$ (647.37 I. Wts.) (U.S. $C_{34}H_{47}NO_{11} = 640.55$ U.S. Wts.).

The official formula is Dunstan's original one. Freund's formula is $C_{34}H_{47}NO_{11}$. (Schmidt at Marburg now also gives Freund's formula as the most likely.) Dunstan also uses it for Aconitine prepared on the Continent, and suggests that the substance from English roots is a different body. Schulze says they are identical. Although Freund's formula is more acceptable for the salts (*vide later*) we continue to calculate on the official formula.

FR. CX. has also U.S. (Freund's) formula. Also PH. ITAL. Latter gives tests for pseudaconitine and aconine as adulterants.

① Crystallised Aconitine.

Dose.— $\frac{1}{800}$ grain to $\frac{1}{300}$ grain (0.00011 to 0.0003 Gm.), and may be increased if desired with extreme caution, the maximum single dose being 0.001 Gm., the maximum dose during 24 hours 0.003 Gm.—M. Am. 1907.

FR. CX. gives 0.0005 Gm. as maximum in 24 hours.

The B.P. gives no dose, presumably on account of its extreme toxicity. U.S. *average dose.*— $\frac{1}{400}$ grain.

An alkaloid obtained from *Aconitum napellus* root and dried leaves, content about 0.03%. In colourless crystals. **Soluble** in dilute acids, alcohol (90% 1 in 40), and chloroform (1 in less than 1), less readily soluble in ether, and almost insoluble in water and petroleum ether; melts at 189° to 190° C. (U.S.—heated rapidly melts at 195°, heated slowly at 182° C.); in weak acetic solution yields a red crystalline precipitate with potassium permanganate.

U.S. tests for pseudaconitine and atropine by Vitali's test.—*q.v.*

A drop of dilute solution placed on the tongue produces a characteristic tingling sensation.

Antidotes *vide Aconite*.—Calcium permanganate 5% solution antagonistic.—J.C.S.A. i./05, 107.

Uses.—More particularly employed externally (*vide Unguentum Aconitinæ* and *Oleatum Aconitinæ*) in neuralgia, avoiding mucous membranes, and raw skin.

Internally aconitine in the form of a pill is a depressant, calmative, and diaphoretic.

One part of aconitine corresponds in action to 0.5 parts of Pseudoaconitine (*vide infra*) and 0.8 parts of Japaconitine. (Acetylbenzoylbenzaconine) v. p. 688.

Fr. Cx. gives tests for distinguishing pure aconitine from decomposition products and substances which occur with it in the root.

⑧ **Pseudoaconitine** $C_{21}H_{27}NO_2 \cdot OCH_3CO(OCH_3)_4 \cdot O[C_6H_3(OCH_3)_2CO]$, or $C_{36}H_{51}NO_{12} = 684.26$ (689.418 I. Wts.), a crystalline alkaloid obtained from Indian (or Nepaul) aconite, *A. ferox*, melts at $201^{\circ}C.$, and has the constitution of acetyl-veratryl-pseudoaconine.

⑨ **Indaconitine**, or Acetyl-benzyl-pseudoaconine—

$C_{21}H_{27}NO_2 \cdot OCH_3CO(OCH_3)_4 \cdot OC_6H_5CO = 624.68$ (629.386 I. Wts.) is from *Aconitum Chasmanthum*.

⑩ **Bikhaconitine** (crystalline) $C_{21}H_{27}NO \cdot OCH_3CO(OCH_3)_4 \cdot O[C_6H_3(OCH_3)_2CO] = 668.38$ (673.418 I. Wts.) from *A. spicatum*.—L. ii. 05,1347. May be used as substitutes for aconitine and pseudoaconitine for internal use, the dose in the case of the latter being $\frac{3}{4}$ of that of aconitine.

⑪ Aconitine Preparations.

⑪ **Aconitinæ Nitras.** $C_{33}H_{45}NO_{12}HNO_3 = 705.11$ (710.388 I. Wts.).

A crystalline stable salt, soluble in water and alcohol. Fr. Cx. with Freund's formula *vide antea*.

Dose.— $\frac{1}{640}$ grain (0.0001 Gm.), hypodermically.

⑫ **Hypodermic Tablets** are made this strength, to be dissolved in warm water.

⑬ **Granules of Aconitine** Fr. Cx. and of **Aconitine Nitrate** Fr. Cx. contain $\frac{1}{10}$ mgr. in each, and are coloured pink.

⑭ **Aconitinæ Hydrobromidum.** $C_{33}H_{45}NO_{12} \cdot HBr \cdot 2\frac{1}{2}H_2O = 767.58$. (773.338 I. Wts.).

and ⑮ **Aconitinæ Hydrochloridum.** $C_{33}H_{45}NO_{12} \cdot HCl \cdot 3H_2O = 732.36$ (737.886 I. Wts.) are crystalline Salts with dose as for the Nitrate.

⑯ **Oleatum Aconitinæ.**

Aconitine 2, Oleic Acid by weight 98. Dissolve; may be perfumed—is painted on the skin (avoid broken) for neuralgia.

⑰ **Unguentum Aconitinæ** (*Off.*).

Aconitine 1, Oleic Acid (by weight) 8, (1 grain=2 drops); heat gently to dissolve, and add Lard 41. Mix thoroughly. Freshly prepared. A piece the size of a bean is gently rubbed in for facial neuralgia, avoiding broken skin and mucous membranes.

ADEPS LANÆ.

Wool Fat (*Off.*). P.G. iv. U.S. P. Austr. Ph. Ned. ANHYDROUS LANOLIN.

The purified cholesterin fat of sheep's wool. A yellowish, tenacious, unctuous substance, almost inodorous, melting from $104^{\circ}F.$ to $112^{\circ}F.$ Sheep's wool yields from 10 to 30%. It is removed by treatment with water.

Soluble 1 in 25 ether, 1 in 18 oil of turpentine (both with some residual matter), almost insoluble in alcohol 90%.

Adeps Lanæ can only be saponified by alcoholic solutions of Potash under pressure—paraffin by this means can be easily detected.

C.R., 1908, gives several revised tests.

Adeps Lanæ Hydrosus. Hydrous Wool Fat (*Off.*). Commonly known as 'Lanolin.' Wool Fat 7, Distilled Water 3. Melt and mix.

P.G. P. Austr. "Lanolinum" Ph. Ned. (with 75% of fat). U.S. not more than 30% water. FR. CX. has 25%.

Yellowish white, free from rancid odour. More water, up to about equal weights of fat and water, may be incorporated with it without affecting its consistence. Soluble partly in alcohol, while ether and chloroform dissolve only the fats it contains.

Wool Fat is readily absorbed by the skin (especially if washed with ether). It helps absorption of narcotic extracts, quinine, iodine, potassium iodide, and chaulmoogra oil. *c.f.* also Disp. p. 207.

When an ointment containing Mercuric Chloride or Carbolic Acid is ordered, it is usually intended for antiseptic purposes, therefore the *anhydrous* should be used, otherwise caustic action may result.—L.i./09,54.

Lanolinum Hydrargyri.

Mercury 100, Lanolin 200, Mercurial Ointment 5, Mutton Suet 50. For inunction in syphilis (effect is rapid); used daily 4 to 8 times after a hot bath. *See also* Mercurial Injections.

Sapolanoline. Lanolin 5, Soft Soap 4.

Recommended for acne and eczema.

Unguentum Adipis Lanæ, P.G. iv.—Wool Fat 20, Water 5, Olive Oil 5 (by weight).

Unguentum Lanolini.

Lanolin (hydrated) 2, Soft Paraffin or Vaseline 1. Mix. May be performed to form **Lanolin Cream**. Less sticky than Lanolin.

Lanolin, lard and soft paraffin, *p æq.* melted, give a useful basis, as also Wool Fat 9, with Almond Oil 1.

Unguentum Lanæ Anhydrosus.—Anhydrous Wool Fat and Yellow Soft Paraffin equal parts, and

Unguentum Lanæ Hydrosus.—Hydrous Wool Fat and White Soft Paraffin, equal parts. Mixes well with powders, with watery solutions and with spirituous preparations.

Unguentum Durum Flavum.—Yellow Wax and Anhydrous Wool Fat, equal parts, and

Unguentum Durum Album.—Hydrous Wool Fat and White Wax, equal parts, are almost solid bases suitable for such ointments as that of Methyl Salicylate 50%, or one containing a large proportion of oil or other liquid.—R. Fisher.—C.D.I./08,123.

For other Ointment bases c.f. pp. 674, 927.

Unguentum Leniens, Ph. Ned.

Wool Fat 10, Yellow Wax 5, Spermaceti 10, Sesame Oil 50, Rose Water 25. Creamy consistence.

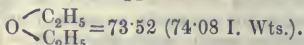
Cholesterin $C_{27}H_{45}OH + H_2O$ (Schmidt) = 401.331 (404.384 I. Wts.) prepared from wool fat by saponifying the same with potash, and extracting the cholesterin with ether.

Tuberculosis is well influenced by giving cholesterin. This substance thought to have antidotal power. It has it to strychnine and curare. Lecithin and cholesterin are antagonistic. Lecithin was found to increase the poisoning power of curare and cholesterin to reduce it. Cholesterin is capable of arresting ferment production by lecithin. In carcinomatous tissue active intracellular ferments are thought to be present which are first set in action by lecithin. This substance is always found in marked amount in rapidly growing tissues. The administration of cholesterin will eliminate lecithin. Fifteen cases so treated showed diminution—and indeed disappearance—of the tumours.—M. '08,184

For pernicious anæmia, cholesterin in form of cream and butter *ad lib.* has been given with success. (Cholesterin is antagonistic to hæmolysis.)—L.i./09,69.

ETHER (*Off.*).

(P) *Applicable to Ireland.*



Syn. ÆTHER SULPHURICUS; ETHYL OXIDE.

Dose.—40 to 60 minims (2.4 to 3.5 Cc.), or 10 to 30 minims (0.6 to 1.8 Cc.) repeated.

Manufactured by the distillation of Sulphuric Acid and Alcohol—Ethyl Hydrogen Sulphate being first formed which reacts with a further quantity of Alcohol liberating Ether and Sulphuric Acid again; in this manner the Acid will react with a very considerable quantity of Alcohol. Sp. Gr. 0.735.

Soluble 1 in 10 of water, and the ether similarly dissolves about the same amount of water. Is miscible in all proportions with alcohol. Ether is a solvent for a number of alkaloids, fats, resins, and of mercuric perchloride and biniodide, also of bromine and iodine.

For next B.P. should distil at not under 34° C.

Uses.—Internally; a rapid stimulant in syncope. Is carminative. May relieve dyspepsia and asthma. Hypodermically it saves many lives threatened by syncope, collapse, and shock from hæmorrhage and injury. See Sterules, p. 91, but Dixon says, not a direct cardiac stimulant. It depresses nerve tissue, in very large doses it tends to depress muscle tissue, including cardiac muscle, but it never excites.—B.M.J.ii./09, 329,540.

For general anæsthesia ether produces less depression on the heart than chloroform, but its use is unpleasant both to the patient and to the operators. Its suffocating action on the patient, if suffering from any lung or bronchial affection, is very irritating, and has proved fatal. Care must be taken not to employ it near a light; its vapour is 2½ times heavier than air and very inflammable, and as an anæsthetic it has to be used freely.

If dangerous symptoms arise during administration of ether proceed as for ethyl chloride, *v. p.* 95.

W. T. G. Morton, first administrator of Ether to produce anæsthesia. Oct. 16th, 1846, at the Massachusetts General Hospital. For further in-

formation r. "Pharmacy Notes," 1907, B.M.J.ii./o8,1635, C.D.ii./o7,337, 405,507, L.ii./o7,794, also B.M.J. Oct. 17th, 1896, latter in particular.

Oxygenated and warmed Ether as a general anæsthetic.—B.M.J. i./10, 320.

Crile's Nasal Tube method of giving Ether.—Less Ether is required than by employing the ordinary way using the open drop method. An injection of Morphine $\frac{1}{2}$ grain with Atropine $\frac{1}{15}$ grain is given an hour before the operation. Oxygen in addition not found necessary.—L.ii.o9,364.

Ether Inhalation, excessive, to relieve pains in the chest the result of alcoholic excess, 6 drachms of Ether inhaled at a time—1 lb. a day, patient had ultimately to be fed by rectum.—B.M.J.ii./o9,1282.

Report on Ether drinking.—B.M.J.ii./90,885.

Death during ether anæsthesia.—L. i./oo,45; Pr. liii. 367; B.M.J. i./o1,574.

Ether is used as a menstruum and vehicle for skin medication, on account of solvent action on sebaceous secretion. See Ethereal Tinctures of Belladonna, Capsicum, Iodine, and Menthol.

Sterules of Ether contain half a drachm in each for hypodermic injection as a dose in heart failure. 20 to 60 minims have proved a successful restorative in typhoid fever and for dyspnoea, but *c.f.* Dixon *antea*. These are made with 0.735 ether.

Sciatica treated by injection of ether with either cocaine or morphine subcutaneously into the sciatic nerve. 5 minim doses of ether with 2 minims of 1 in 12 cocaine or morphine injection 3 minims with 2 $\frac{1}{2}$ inch needle. Unless patient involuntarily shoots out his leg the sciatic nerve has not been touched.—B.M.J. ii./o8,1080.

Tests.

Cowie's Examinations of Commercial Ethers. Water solubility tests give good results. Boiling point is the most reliable test, showing presence or absence of Methyl Ether, Alcohol, Water and Acids in one step. Potash test for Aldehyde discussed. 0.735 Ether officially should be done away with as also the 0.735 Methylated.—P.J. ii./o3,366, 407.

Commercial Varieties in General Use.

(1) From pure Alcohol.

Æther (Off.) Sp. Gr. 0.735.

This, the ordinary medicinal ether, contains not less than 92%, by volume, of ethyl oxide; the remainder is alcohol and water. Boiling point not higher than 105°F. (40.5°C.).

C.R. 1908 says *Off.* monograph should be altered to permit use of ether made in this country from industrial alcohol. Also recommends introduction of a purer **Æther Anæstheticus**.

Æther Purificatus (Off.). For inhalation as anæsthetic. 'Aether,' PH. NED., P. Helv. and P. Jap. Sp. Gr. not exceeding 0.722 and not below 0.720.

Should assume no blue colour on standing, when mixed with half its volume of solution of potassium bichromate acidulated with sulphuric acid, showing absence of hydrogen peroxide; nor should it be coloured by potassium hydroxide, showing absence of aldehyde. On evaporation leaves no residue or abnormal odour.

Æther Purissimus. *Syn.* Ether officinale. FR. Cx. Sp. Gr. 0·720 at 15° C.

Æther pro Narcosi.

In several Continental Pharmacopœias (Sp. Gr. 0·720) is carefully tested and preserved.

(2) *From Methylated Alcohol.*

Absolute Ether, Methylated, Sp. Gr. 0·717 to 0·719.

Contains a little methylic ether, and is specially adapted for spraying to produce local anæsthesia, as it boils below 27° C. (80° F.), and is free from water. It is not adapted for producing general anæsthesia.

Rectified Ether, from Methylated Alcohol, Sp. Gr. 0·720. FOR GENERAL ANÆSTHESIA.

Ether, well washed to free it from methylic ether, purified and re-distilled. It is well adapted for producing general anæsthesia, if standing the tests given for purified ether.

Methylated Ether, Sp. Gr. 0·730.

Is adapted for common purposes, ice machines, &c. Not fit for medical use. For photography a purer preparation, Sp. Gr. 0·725, is used.

Preparations.

Perles of Ether, 3 minims in each. *Dose.*—1 to 4.

Perles of Ether and Turpentine. *Dose.*—1 to 4.

Useful to relieve pain of gallstones, gravel and colic.

Spiritus Ætheris (*Off.*).

Ether, Sp. Gr. 0·735, 1, Alcohol (90%) 2.

U.S. has Ether 325, Alcohol (94·9% by vol.) 675.

Dose.—60 to 90 minims (3·5 to 5·3 Cc.), or 20 to 40 minims (1·2 to 2·4 Cc.) repeated.

The older formula is often ordered, viz.:—

Spiritus Ætheris Compositus (*Off.*).

Syn.—HOFFMANN'S ANODYNE, Liquor Hoffmanni, but the simple Spirit of Ether is now called Hoffmann's Anodyne in Continental Pharmacopœias. (In many parts *e.g.* P. DAN. it is Ether 1, Alcohol 90% 3.)

Dose.—60 to 90 minims (3·5 to 5·3 Cc.), or 20 to 40 minims (1·2 to 2·4 Cc.) repeated.

Ph. Ned. uses Ether and Alcohol 90% equal parts (by weight). U.S., has Ether 325, Alcohol (94·9% vol.) 650, Ethereal Oil 25.

Mistura Ætheris cum Ammonia (Martindale).

Spirit of Ether 3 Aromatic Spirit of Ammonia 3, Water to 48. A rapid stimulant. *Gt. Orm. H.* has Spirit of Ether 3½, Aromatic Spirit of Ammonia 3½, Tincture of Orange 2, Camphor Water to 160, for a child one year old.

Mistura Ammoniaæ cum Æthere. U.C.H., has Aromatic Spirit of Ammonia 15, Spirit of Ether 15, Camphor Water to 480. The dose of either of these preparations is one ounce, *St. M.'s H.* has Sal Volatile ½ drachm, Spirit of Ether ½ drachm, Chloroform Water to 1 ounce.

Lotio Ætheris Composita.

Liquor Hoffmanni 250, Ammonia Solution 4, Distilled Water 25, Pilocarpine Hydrochloride ½; Spirit of Lavender 25. For hair falling off, applied with friction, after washing with soap.—B.M.J.E., ii./09,24.

Spiritus Ætheris Nitrosi (*Off.*).

Dose.—60 to 90 minims (3·5 to 5·3 Cc.), or 20 to 40 minims (1·2 to 2·4 Cc.) repeated.

An alcoholic solution of ethereal compounds containing ethylnitrite (not less than 1·75%), aldehyde, and other substances, probably including paraldehyde.

Uses.—Antipyretic, diaphoretic, diuretic, and stimulant. Relieves the spasm and pain of asthma, dysmenorrhœa, angina pectoris; also the pain of the passage of renal calculi and gall stones.

U. S. requires 4% ethyl nitrite.

Incompatibility and Test.—5 Cc. of this solution treated with 5 Cc. of Potassium Iodide Solution (*Off.*), and 5 Cc. of dilute Sulphuric Acid yield at least $31\frac{1}{4}$, but not more than 35 Cc. of Nitric Oxide, corresponding to at least $2\frac{1}{2}\%$ by weight of Ethyl Nitrite, Iodine being liberated. Potassium Iodide should, therefore, obviously not be prescribed with Spiritus Ætheris Nitrosi. Furthermore, green Isonitrosoantipyrine is formed with Antipyrine (neutralise first with alkaline carbonate or bicarbonate in dispensing); Spiritus Ætheris Nitrosi is also incompatible with Salicylates and Ferrous Sulphate.

Ammonium Acetate or Citrate hinders the deterioration of Spirit of Nitrous Ether.—D. J. Leech.

Liquor Ethyl Nitritis, Solution of Ethyl Nitrite (*Off.*).

Dose.—20 to 60 minims (1·2 to 3·5 Cc.). Should be directed to be added to a small quantity of water at the time of taking.

A mixture of Absolute Alcohol 95 and Glycerin 5, containing in 100 parts by volume, 3 parts, or not less than $2\frac{1}{2}$ parts by weight of Ethyl Nitrite (obtained by the interaction of alcohol, sodium nitrite, and diluted sulphuric acid, at a low temperature). Should be stored in small bottles. Sp. Gr. 0·823 to 0·826. It keeps better than the Spirit.

The circulation is distinctly affected by a fraction of a minim, yet large quantities do not cause death, *vide* also Nitroglycerin, and Sodium Nitrite—Leech.

Æther Aceticus. Acetic Ether. (*Off.*).—Consists principally of

ETHYL ACETATE. $\text{CH}_3\text{COO C}_2\text{H}_5 = 87\cdot4$ (88·064 I. Wts.) U. S.

Fr. Cx. Ph. Ned., P. Helv. and Jap.

Dose.—60 to 90 minims (3·5 to 5·3 Cc.) or 20 to 40 minims (1·2 to 2·4 Cc.) repeated. Sp. Gr. 0·900 to 0·905. Boils between 165° and 172°F ($73\cdot9^\circ$ and $77\cdot8^\circ\text{C}$). U. S. $161\cdot6^\circ$ to $170\cdot6^\circ\text{F}$. Fr. Cx. Sp. Gr. 0·92 @ 15°C . Is used in preparing Liquor Epispasticus, and inhaled for laryngeal catarrh, $\frac{1}{2}$ drachm to the pint.

Soluble in all strengths in alcohol and ether, and about 1 in 90 of water.

C. R. 1908 advises should not contain less than 90% Ethyl Acetate.

Ethyl Butyrate.— $\text{C}_3\text{H}_7\text{COO C}_2\text{H}_5 = 115\cdot22$ (116·096 I. Wts.). The chief constituent of Pine Apple Essence. A colourless liquid with Pine Apple odour Sp. Gr. 0·886 @ 15°C . Miscible with Alcohol, Boiling about 120°C .

iso-Amyl Butyrate.

$\text{CH}_3\text{CH}_2\text{CH}_2\text{COO CH}_2\text{CH}_2\text{CH} < \begin{smallmatrix} \text{CH}_3 \\ \text{CH}_3 \end{smallmatrix} = 156\cdot95$ (158·144 I. Wts.).

Colourless liquid with Sp. Gr. 0·882 @ 0°C . Used as a flavouring agent.

ÆTHYL BROMIDUM. FR. CX. P. JAP. P. HELV. $C_2H_5Br = 108.17$ (108.96 I. Wts.).**Ethyl Bromide.**—*Syn.* HYDROBROMIC ETHER.

Is prepared by distilling a mixture of alcohol, bromine, and phosphorus. It is a colourless, very volatile liquid with a strong peculiar odour and a sweetish warm taste. It has Sp. Gr. 1.4735, boils at $38.8^{\circ}C$. (Schmidt).

Soluble 1 in 85 of water and miscible with alcohol 90%, and ether.

If pure, is a safe and convenient anæsthetic for short (minor nose and throat) operations. *Dose.*— $1\frac{1}{2}$ to $3\frac{1}{2}$ drachms, by inhalation. Suitable where the action of Nitrous Oxide is not prolonged sufficiently. Does not require any special apparatus. —B.M.J. ii./02,589; L. ii./03,746; M. 1906.

For *local* anæsthesia it may be used as spray, or simply short covered contact for neuralgia. It may be added to Menthol Liniment, all feeling is checked.

Somnoform (v.p. 95) contains 5% of Ethyl Bromide.

Ethyl Bromide Capsules.

Encased in cotton wool and silk, contain 5 minims in each; are convenient for use when fractured. Useful in asthma and epileptic convulsions.

Ethylene Bromide. $C_2H_4Br_2 = 186.52$ (187.872 I. Wts.).

This is poisonous—distinguish from the above.

Dose.—1 to 2 minims (0.06 to 0.12 Cc.) in alcoholic solution or oily solution hypodermically or in Gelatin Capsules.

A colourless liquid, of Sp. Gr. 2.163, Soluble 1 in 4 of 90% alcohol, insoluble in water. Reduces frequency and intensity of attacks in epilepsy.

ÆTHYL CHLORIDUM.**Æthylis Chloridum, U.S.; FR. CX. P. Austr.; Ph. Ned. P. Helv.** $C_2H_5Cl = 64.01$ (64.5 I. Wts.) (64.00 U.S. Wts.).*Syn.* CHLORYL ANÆSTHETIC, ★KELENE.

Dose.—A good average for an adult by inhaler is 5 Cc.—L. ii./04,1704.

Manufactured by the action of hydrochloric acid on absolute ethyl alcohol.

At ordinary temperatures this is gaseous, but condenses into a colourless mobile liquid with a sweetish burning taste. Slightly soluble in water, readily in alcohol. Sp. Gr. U.S. 0.911 to 0.916 at $8^{\circ}C$. On account of its low boiling point (about $50^{\circ}F$.) and the intense cold produced by evaporation, it is useful for producing local anæsthesia in minor surgical operations, also for allaying the pain of neuralgia. All fat must be removed from the part by washing with soap and then with alcohol or ether before applying. In dental cases the patient is instructed to breathe through the nose during operation, the part is well dried, and other parts protected. Its vapour is inflammable.

For inducing **general anæsthesia**, it is described as pleasant, is taken readily by children and adults, with few or no after effects. Probably within

the limits for which it is intended it is safer than any other anæsthetic excepting nitrous oxide. It has the advantage of requiring no complicated apparatus. It is quicker in action than ether.

If it be necessary to prolong the general anæsthesia induced by ethyl chloride this should be done, not by giving more ethyl chloride but by using ether or chloroform.—Herrenkuecht, Münch. Med. Woch. 1907, No. 49,2421.

Ethyl Chloride (and Ethyl Bromide) are said to be heart stimulants not depressants, as Chloroform is.

Glass Tubes contain 30 grammes, with spring-capped point, to be held 6 to 10 inches from the part to be anæsthetised.

These are also supplied graduated, with coarser spray for *general* anæsthesia.

Metal Cylinders are also supplied with screw cap containing 50, 100, and 150 Gm. These may be recharged. **Glass Capsules** contain 3 and 5 Cc.

Instructions for treatment if dangerous symptoms arise in the administration of—

Ethyl Chloride, or Somnoform or Ether.—See that the airway is clear and the clothing loose, and begin artificial respiration at once. Weak ammonia vapour may be held to the nostrils. Hot flannels should be placed over the heart, and chest smacked with a towel wetted in cold water. Artificial respiration must be kept up for at least an hour, and meanwhile Faradism may be tried. The patient must be kept warm.—R.D.H.

The combined use of Ethyl Chloride and Nitrous Oxide has been advocated for dental extractions.—Brit. Dent. Jl. 1903, 615.

Ethyl chloride should not be used in dentistry where nitrous oxide would do.—L. ii./05,1359; B.M.J. i./06,83. It should not be administered nor given to alcoholics.—B.M.J.E. ii./04,64.

Fatalities under ethyl chloride.—B.M.J. ii./05,73; B.M.J. i./06,616; L. i./06,1233, 197.

For a number of earlier References vide Edn. XIII., p. 97.

Relative safety of; best mixed with air at the end of the inhaler, otherwise danger of giving insufficiently diluted.—L. i./07,1098.

As much as 1 ounce (30 Gm.) has been given.—M. 1906.

Not so safe as it promised to be.—L. ii./07,1843.

Combined use of ethyl chloride and ether, 2½ Cc. of ethyl chloride used, then ½ ounce ether in a modified Clover inhaler.—B.M.J. ii./06,1257.

It is suggested that status lymphaticus in large measure accounts for the fatal dispute into which Ethyl Chloride has temporarily fallen.—L. ii./09,1703.

Anestile.

A mixture of ethyl chloride and methyl chloride, evaporates at a lower temperature than the ethyl chloride alone, is quicker and more extended in action.

Somnoform is said to be a mixture of Ethyl Chloride 60%, Methyl Chloride 3%, and Ethyl Bromide 5%. 60 Gm. glass tubes with "valve stopper" for inhalation as an anæsthetic in dentistry. **Glass Capsules** contain 3 and 5 Cc.

If dangerous symptoms arise in administering proceed as directed under ethyl chloride.

In using, respiration must be watched carefully.

ÆTHYL IODIDUM.

Ethyl Iodide.—*Syn.* HYDRIODIC ETHER.
 $C_2H_5I = 154.72$ (155.96 I. Wts.).

May be obtained by distilling a mixture of alcohol, iodine, and phosphorus. A colourless liquid (but liable to become coloured by setting free iodine). Of a penetrating odour; boils at 148° F., has Sp. Gr. 1.94; is not inflammable. When dropped on red-hot charcoal, it gives off an iodine vapour. *Soluble* 1 in 400 of water, and miscible with alcohol and ether in all proportions.

It is useful inhaled as an anæsthetic to relieve the dyspnœa of bronchitic asthma and œdematous laryngitis. As it contains four-fifths of its weight of iodine, it forms a rapid means of saturating the system with this element; it neither impairs appetite nor weakens digestion. General iodization may be produced by painting the iodide on the calf of the leg or between the shoulders, and covering by impermeable dressing.

It is useful for inhalation in œdema of the glottis from catarrhal laryngitis. It acts as an antispasmodic in spasmodic asthma and certain forms of nervous dyspnœa: iodine can be detected in the urine 10 minutes after inhalation, and as long as 30 hours after.

Useful in bronchial catarrh; induces sleep and promotes expectoration when inhaled.—B.M.J.ii./89,1216.

In all spasmodic affections such as angina pectoris and spasmodic asthma one of the best remedies.—L.ii./08,1132. B.M.J./09,994.

Ethyl Iodide Capsules.

Encased in cotton wool and silk, containing 5 minims in each. The glass capsule is snapped, the fluid absorbed by the wool, &c., and inhaled for four or five minutes. This may be repeated 3 or 4 times a day. The patient requires no assistance, and can take one of the capsules from the bedside in the dark if necessary.

In whooping cough exceedingly useful—the coughing fits are rapidly reduced.—Pr. Sept. 1907, p. 439.

Ⓟ **Ethyl Iodide and Chloroform Capsules** contain 5 minims of Ethyl Iodide and 10 minims of Chloroform, and are of the greatest service in the relief of asthma and whooping-cough.

Internally Ethyl Iodide is found useful in bronchitis, asthma, rheumatism, and for secondary syphilis.

Externally 10 to 20% ointment with paraffin basis may be used (stronger may blister).

Methyl Iodide. $CH_3I = 139.81$ (141.944 I. Wts.).

A colourless liquid (when first made) boiling at 44° C. Sp. Gr. 2.285. As a vesicant is even more powerful than Cantharides.

Blisters appear in a few hours after rubbing in 15 to 20 drops, according to area to be blistered.—L.i./06,923.

ALCOHOL.

$C_2H_5OH = 45.7$ (46.048 I. Wts.).

Alcohol Absolutum (*Off.*). U.S. Ph. Ned. Fr. Cx.

Syn. ETHYLIC ALCOHOL, B.P. 1885.

Ethyl hydroxide, with not more than 1% by weight of water. Sp. Gr. 0.794 to 0.7969 representing 99.95 to 99.4% by volume.

In B.P. 1885 this had Sp. Gr. 0.797 to 0.800, and therefore contained 1 to 2% of water; the purest Alcohol obtained by Squibb had Sp. Gr. 0.7935 at 60° F.

Alcohol Absolutus, P.G. iv., Sp. Gr. 0.796 to 0.800. Fr. Cx.—Sp. Gr. must not exceed 0.79683 at 15°C.

Alcohol (90% by vol.), (*Off.*). *Syn.* Spiritus Rectificatus.

SPIRITUS VINI. P. Austr. 'SPIRITUS,' Ph. Ned.

Contains 90% by volume, or 85.65% by weight, of Ethyl Hydroxide. Sp. Gr. 0.8340 (Squibb). Strength 57.80° O.P. (*i.e.*, 100 volumes contain the same quantity approximately of Ethyl Hydroxide as 157.8 volumes of proof spirit). It is generally manufactured commercially of higher alcoholic strength, *i.e.*, about 70° O.P., Sp. Gr. 0.809, containing nearly 95% by weight of Ethyl Hydroxide, and is diluted as required.

'Alcohol,' U.S. has Sp. Gr. 0.816 at 15.6° C. (0.809 at 25°C.), and contains 94.9% by volume (92.3% by weight) of Ethyl Hydroxide. Alcohol Ordinaire (officinal) Fr. Cx. has Sp. Gr. 0.81602 at 15°C., and contains approx. 95% by volume (92.43 by weight).

Diluted Alcohol (*Off.*). *Syn.* Alcohol Dilutum.

Including Alcohol (90%)—see above—there are official five strengths, or "several degrees of dilution," of Ethylic Alcohol, four of which are directed to be prepared from the Alcohol (90%), and contain respectively 70, 60, 45, and 20% by volume of Ethyl Hydroxide. On the next page a Table is given, founded on B.P. and Gilpin's Tables, showing:—

(i.) The volume of Distilled Water necessary to be added to 100 volumes of Alcohol (90%) for the production of each strength of Diluted Alcohol.

(ii.) The volumes of Alcohol (90%) and of Distilled Water respectively which, when mixed and reduced to 60° F. (15.5° C.), will produce, allowing for contraction in volume, 1,000 Cc., 1 pint, or 1 gallon of each strength of Diluted Alcohol.

The Specific Gravity and the exact Excise (Sikes') strength at 60° F. 15.5° C.), in degrees over proof (O.P.) and under proof (U.P.), of each dilution, are given in the first column.

"Proof Spirit" has Sp. Gr. 0.920. This, in the olden time, was found to be the weakest spirit that could be put to the proof of igniting a little gunpowder moistened with it. If the spirit caught fire and inflamed the gunpowder was designated "over proof," and if not, "under proof." By the Hydrometer Act, 58 Geo. III., Cap 28, Proof Spirit is defined as spirit of strength, which at a temperature of 51° F. weighs exactly twelve-thirteenths of an equal quantity of distilled water.

Alcohol Dilutum, U.S. 41·5% Absolute Alcohol by weight (48·9% by volume). **Spiritus Vini Dilutus, P. Austr** is 68—69% vol.

TABLE FOR THE DILUTION OF ALCOHOL (90%) TO WEAKER OFFICIAL STRENGTHS.

Volume Percentage, Specific Gravity, and Excise Strength.	Alcohol. (90 per cent.)	Distilled Water.	Volume Produced.
70 per cent. Sp. Gr. 0·8900 22·7° O.P.†	100 vols. + 31·05 vols. 777·8 Cc. + 241·6 Cc. *648·5 Gm. + 241·6 Gm. 15 oz. 266 m. + 4 oz. 398 m. 124 oz. 215 m. + 38 oz. 307 m. *6 lbs. 7 $\frac{3}{4}$ oz. + 2 lbs. 6 $\frac{1}{2}$ oz. = 8 lbs. 14 $\frac{1}{2}$ oz.	= 128·57 = 1000Cc. = 1000Cc. = 1 pint = 1 gal.	
60 per cent. Sp. Gr. 0·9135 5·20° O.P.†	100 vols. + 53·65 vols. 666·6 Cc. + 357·8 Cc. *555·9 Gm. + 357·8 Gm. 13 oz. 160 m. + 7 oz. 74 m. 106 oz. 320 m. + 57 oz. 112 m. *5 lbs. 9 oz. + 3 lbs. 9 $\frac{1}{2}$ oz. = 9 lbs. 2 $\frac{1}{2}$ oz.	= 150 = 1000Cc. = 1000Cc. = 1 pint = 1 gal.	
45 per cent. Sp. Gr. 0·9436 21·2° U.P.†	100 vols. + 105·34 vols. 500 Cc. + 526·6 Cc. *417·2 Gm. + 526·6 Gm. 10 oz. + 10 oz. 256 m. 80 oz. + 84 oz. 130 m. *4 lbs. 2 $\frac{3}{4}$ oz. + 5 lbs. 4 $\frac{1}{2}$ oz. = 9 lbs. 7 oz.	= 200 = 1000Cc. = 1000Cc. = 1 pint = 1 gal.	
20 per cent. Sp. Gr. 0·9760 64·9° U.P.†	100 vols. + 355·8 vols. 222·2 Cc. + 790·7 Cc. *185·2 Gm. + 791 Gm. 4 oz. 213 m. + 15 oz. 390 m. 35 oz. 267 m. + 126 oz. 243 m. *1 lb. 13 $\frac{3}{4}$ oz. + 7 lbs. 14 $\frac{1}{2}$ oz. = 9 lbs. 12 $\frac{1}{2}$ oz.	= 450 = 1000Cc. = 1000Cc. = 1 pint = 1 gal.	

NOTE.—*These figures are the weights necessary to produce a gallon and a litre respectively, at 15·5° C.—P.J. i./98,501. †Stevenson.

Spiritus Tenuior, Proof Spirit. B.P. 1885, contained 57% Ethyl Hydroxide by volume=49% by weight. Sp. Gr. 0·920. Prepared by mixing 5 volumes rectified spirit, *s.g.* 0·838, with 3 volumes of distilled water, the contraction in volume being about 2·5%.

The greatest contraction occurs when quantities are in the proportion of 5 molecules of water and 1 of alcohol.—Tests, &c., P.J. i./07,404.

Rule for Calculation for Dilution of Alcohol.

If **V** be volume percentage of the stronger alcohol and **v** of the alcohol required—

I. *By volume.* Mix **v** volumes of the stronger alcohol with distilled water, *q.s.* after cooling to make **V** volumes, *e.g.* to make an alcohol 43% from alcohol 95% take 43 volumes of the 95% and make up to 95 volumes.

II. *By weight.* Proceed on same lines by weight throughout.

To Transpose Volume per cent. of Alcohol into Weight per cent. The volume per cent. is multiplied by 0·7938, and the product

GENERAL REFERENCES TO TREATMENT, ETC., WITH ALCOHOL

Alcohol strengthens no one, it only deadens the sense of weariness.—L. i./06,97. As therapeutic agent.—B.M.J. ii./05,4; i./09,265.

1½ ounces of pure alcohol is all that can be utilised as a food in the human body per diem = 3 ounces of brandy and whisky = 7 ounces sherry = 15 ounces champagne, claret and white wines.—L. ii./04,1132,1437.

Even in small quantities is injurious to the proper working of the brain (Victor Horsley).—B.M.J. ii./05,1656.

Its chief physiological effects narcotic and antipyretic, not stimulant.—Pharmacol, p. 16.

Absolute alcohol applied to herpes zoster relieves the pain.—B.M.J.E., i./01,12.

Alcohol Injection in Neuralgia,—

Facial neuralgia cured by injections of alcohol down to the effected nerve sometimes with cocaine ½ grain).—L. i./06,1605, and more recently with novocain.

For broncho-pneumonia in infants whisky in dose of 15, 20 or 40 minims every 2 to 4 hours until convalescence is established.—B.M.J., i./08,372.

True trigeminal neuralgia, as also severe recurrent post-influenzal supra-orbital neuralgia treated with Alcohol (80%). Injection around the supra-orbital notch. Schloesser's method of Alcohol Injection described.—L. i./09,1311,

In tic douloureux Purves Stewart employs solution of Beta-Eucaine 2 grains, Absolute Alcohol 6 drachms, Water to 1 ounce. Technique of the injection. A needle 10 Cm. long and 1.5 m.m. in diameter is used with blunt stilette enclosed—the latter is used as soon as the needle is through the skin.

Facial neuralgia treated by alcohol injections containing 2% of menthol and % novocain into the nerve trunk, in the facial portion or into the medial or deep portions of the nerve. The cure lasts 1 to 2 years.—B.M.J. ii./09,1166.

Affords relief for prolonged periods, is free from pain and risks.—B.M.J. ii./09,848.

Acute forms of inflammation of the womb and ovaries and general inflammatory conditions of the female genital organs have been well treated by abdominal compresses, first of alcohol 60 % strength, and afterwards with 90% together with vaginal tampon 30% strength.—M.A.04,5.

Royal Commission on Whisky and other Potable Spirits, Definitions of brandies, Rum, Gin, etc.—B.M.J. ii./09,399.

All about Bonded Warehouses and Spirits in Bond.—C.D ii./06,510.

Lancet report on Cognac brandy.—L. ii./03,1503.

For dietetic use the alcohol from grapes is purest; from corn is next best; from beetroot may be impure; and from potato the most dangerous.—W.W.

24 Tinctures (official) could be prepared with Alcohol of lower strength than ordered. L. ii./09,308. We have indicated them in the text.

Useful suggestion to sterilize substances insoluble or only slightly soluble, alcohol with that agent.—(Charles Wray). B.M.J. ii./08,862.

Alcoholic fermentation. Presence of Phosphorus (Phosphate) essential. (International Chemical Congress Paper) B.M.J. i./09, 1375.

Beer and the materials and substitutes used in its production. B.M.J. i./09, 673.

The Excise-duty (1909) on spirit has been advanced by 3/9 per proof gallon; it was previously 11/- per proof gallon. (Proof spirit is approximately alcohol 50%—*c.f. antea*).

REFERENCES TO TREATMENT OF INEBRIETY.

***Normyl Treatment.**—One ingredient stated (by the makers) to defy Analytical Chemistry. If of value the preparation is miraculous—the whole thing a delusion.—M.P. Correspondent, July 28, 09, p. 99. See also P.J. ii./05, 243, 260.

Temperance promises a higher moral yield than total abstinence. Harrington Sainsbury.—B.M.J. i./09, 1418.

Man is lost without self-control. Marked improvement noticeable in this country of recent years. International Congress on Alcoholism. L. ii./09, 236.

Hypnotic suggestion as treatment for intemperance.—M.P.C. Sep. 15/09, 292.

Effects of Alcohol in the Army and Navy. The consumption of it is gradually diminishing to the benefit of the individual soldier and general increased efficiency.—B.M.J. ii./08, 307. See also B.M.J. ii./08, 317.

Multiple neuritis is commonly caused (directly or indirectly) by Alcohol whether in the form of beer or spirits. It will be recollected that in 1900 peripheral neuritis was attributed to the Arsenic in beer. The percentage of cases in the Manchester district (where the trouble started) has since the epidemic been almost identical with that before the epidemic, whilst during the epidemic the percentage was about four times as great.—B.M.J. ii./09, 1025.

Pure alcoholic neuritis may exist, but as a rule not severe in degree.—B.M.J. ii./09, 1257.

See also McBride's treatment, p. 167.

Guttæ Spiritus cum Formalin (Aural), G.N.C.

Alcohol 90% $\frac{1}{2}$ ounce, Glycerin $\frac{1}{2}$ ounce, Formalin 12 minims.

Guttæ Spiritus Compositæ. Gt. Orm. H.

Alcohol and Glycerin of Borax, *partes æquales*.

Spiritus Vini Gallici.

Brandy. Contains 40 to 50% (or 60% in case of good Cognac) by volume absolute alcohol. Yields 0.6 to 1.2% Extractive, 0.01 to 0.02% ash, 0.3 to 0.8% sugar, 80 in 100,000 parts compound ethers. Suggested as a standard of purity (Analyst, Feb., 1905). See also Jl. Socy. Chem. Ind., Feb., 1905.

Spiritus Vini Cognac, P. Austr., 44–48% by volume.

Brandy Sterules, Hypodermic. Convenient for the emergency bag. Contain 1 drachm.—L. i./05, 1583.

Estimation of Ethers in Brandy. P.J. ii./09, 598.

Spiritus Frumenti, U.S. Whisky prepared by distillation of fermented grain—Indian corn, rye, wheat, barley. Sp. Gr. 0·924, at 15°C, contains 37 to 47% by weight (44 to 45% by volume) C_2H_5OH .

Special Analytical Commission on Whisky and details of Manufacture.—The Hospital, 'Apl. 7, 06, p. 8.

Vinum Album, U.S. By fermenting grape juice (*Vitis Vinifera*)—Sp. Gr. at 15·6°C., not less than 0·990 nor more than 1·010—containing not less than 8·5 nor more than 15% by volume absolute alcohol.

Vinum Rubrum is from the red grape and identical with above in alcohol content.

P. Helv. gives useful summary of analysis of wines.

Spiritus Methylatus, Mineralised or Denaturalised.

A mixture of rectified spirit with wood naphtha, containing 10% by volume of the latter, with in addition $\frac{3}{10}\%$ ($=0\cdot375\%$) by volume of Mineral Naphtha (Petroleum Oil) of Sp. Gr. not less than 0·8; has Sp. Gr. 0·827 to 0·828, and forms an opaque mixture with water.

Duty free (plain) Spirit can only be obtained by Universities and similar Training Institutes and by Manufacturers of certain chemicals and substances for which Methylated Spirits are proved to be detrimental. The question of increased cost in manipulation has no weight in the eyes of the Commissioners of the Board of Inland Revenue.

Recently by the provision of the Revenue Act, 1906, Industrial Methylated Spirit was introduced. This is simply a mixture of 'plain Spirits' with one-nineteenth of its bulk (5% of its volume) of Wood Naphtha, and is obviously considerably purer and of greater utility for manufacturing purposes. The Mineralised Methylated Spirit is retained, but the old name 'ordinary' Methylated Spirit should be dropped as the Industrial Methylated Spirit has taken its place. Industrial Methylated Spirit can only be used by a Manufacturer on giving a Bond, i.e., if, as would probably be the case, more than 50 gallons per annum is used—less than 50 gallons do not necessitate a Bond.

The new Act provides for the use of Industrial Alcohol in the composition of Soap, Compound Camphor, Aconite and Belladonna Liniments of the B.P. It will doubtless prove less irritating than the old Ordinary Methylated Spirit.—L. 1/07, 190. The Board allows these liniments but not the indiscriminate use of the Industrial Spirit.

"It is illegal to dispense the Industrial Spirit even on a doctor's prescription."—Disp. e.g. for a cooling skin lotion.

Not more than 4 gallons of methylated spirit may be sold to any one person at one time on one day, and not more than 200 gallons may be kept in stock by licensed retailers, nor may it be sold between the hours of 10 p.m. on Saturday and 8 a.m. on Monday.

Denaturalised spirit in Germany contains $2\frac{1}{2}\%$ of a mixture of wood spirit 80 parts, pyridine bases 20 parts.

U.S. gives a method of determining Methyl Alcohol.

Alcohol 75% (about 5 volumes of 90%, or of Methylated Spirit, to 1 of water) is used for sterilising the skin of patients, surgeons' hands and instruments.

Spiritus Colonlensis. Arzu. Eau de Cologne.

Oil of Bergamot 20, Oil of Lemon 20, Tincture of Musk (1 in 50 Alc. 45%) 5, Oil of Neroli 2, Oil of Cinnamon 1, Oil of Cloves 1, Oil of Rose 1, Alcohol (90%) 1,800 Distilled Water 150 (all by weight), Macerate for 8 days, and filter.

Spiritus Myrciæ, Bay Rum, U.S., 1890.

Oil of *Myrcia acris* (*Myrtaceæ*) 16, Oil of Orange Peel 1, Oil of Pimento 1, Alcohol (94%) 1,220. Mix, and add gradually Water to 2,000. After 3 days, filter. Cf considerable renown as a Hair Lotion.

Lotio Evaporans, St. M.'s H. Methylated Spirit 1 drachm, Solution of Ammonium Acetate 1 drachm, Water to 1 ounce.

Aqua Mellis, Honey Water.

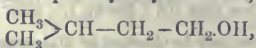
Yellow Sandal Wood, in shavings, 16, Alcohol (90%) 640. Macerate 7 days, and pour off the alcohol. Add to the marc, Concentrated Rose and Orange Flower Waters, of each 160, shake well, decant, and add to the alcohol set aside. To this mixture add English Oil of Lavender, Oil of Cloves, of each 2, Oil of Bergamot 1, Oil of Nutmeg, Oil of Sandal, of each $\frac{1}{8}$.

Alcohol Allylicum, $\text{CH}_2=\text{CH}-\text{CH}_2.\text{OH}=57.61$ (58.048 I. Wts.).

A colourless liquid miscible with water, with a pungent odour and burning taste. It inhibits bacterial growth.

Alcohol Amylicum. (*Off.*) $\text{C}_5\text{H}_{11}\text{OH}=87.43$ (88.096 I. Wts.).

Consists principally of iso-primary amylic alcohol,



and is prepared by purifying and fractionating fusel oil, collecting that distilling between 257° and 289° F. (125° to 143° C.). Closer range of boiling points has been recommended. If B.pt. $128^\circ-130^\circ$ C. Sp. Gr. is commercially about 0.833 at 15° C.

Alcohol Methylicum, $\text{CH}_3.\text{OH}=31.79$ (32.032 I. Wts.). **Pyroxylic Spirit.**

Dose.—30 to 60 minims (1.8 to 3.5 Cc.).

If absolute and "acetone-free" has Sp. Gr. 0.796, but is not allowed by the Excise to be retailed pure, unless duty-paid. Is recommended internally for vomiting of pregnancy, sometimes combined with menthol. The commercial substance known as Wood Naphtha, or Wood Spirit, is 60 to 90% pure and contains acetone and other empyreumatic impurities. A purer preparation used in the arts has Sp. Gr. 0.81. It is a solvent of pyroxylin. The Methylated Spirit license is not necessary for the sale of Wood Spirit, but that license does not, of course, cover the sale of pure Methyl Alcohol.

May cause optic atrophy, and so blindness, if drunk, or if too much be inhaled at work.—B.M.J., i./04,151; Lii./04,1255; Cushny, 144. B.M.J., ii./06,1855.

Method of detection.—P.J., ii./05,440. Tests and trade varieties.—P.J., i./07,404.

Antidotes.—In America poisoning by so-called deodorised spirit is common. In acute poisoning treat by rectal injections and stomach pump.—Give brandy, strychnine, coffee.

Further, for the subsequent amaurosis give pilocarpine and potassium iodide, and later strychnine hypodermically or *per os*.

Treatment: Pilocarpine sweats with Potassium Iodide or Sodium Salicylate in the early stages and full doses of Strychnine hypodermically when optic atrophy sets in.—B.M.J., ii./06,1855.

Acetone. DIMETHYL-KETONE. U.S. $\text{CH}_3.\text{CO}.\text{CH}_3=57.61$ (58.048 I. Wts.).

Dose.—60 to 90 m. (4 to 3 Cc.) daily.

A clear, colourless, light, neutral liquid, with ethereal odour and camphoraceous taste, obtained by the dry distillation of acetates, miscible with water, alcohol, ether, chloroform, and oils, and is a ready solvent of fats and resins, rubber, pyroxylin celluloid, also of cantharidin (about 1 in 40). It takes up about 25 times its volume of acetylene. If pure, its Sp. Gr. is 0.7966 at 15° C. U.S. about 0.790 at 25° C. Boils at 56.5° C. Is largely used in the manufacture of chloroform. It has been employed in dyspnoea in dose of 1 to 1½ drachms daily.

G. L. Cheatele uses Acetone for first cleansing of the skin prior to washing with 5% Phenol Lotion—it is excellent for the purpose.

Should be used as a solvent for other things besides pyroxylin. It dissolves many active principles *e.g.* cantharidin, also fixed oils and fats.—P.J.ii./09,142.

Inoperable cancer of the uterus has been treated by Acetone, the idea being to harden the surface of the cancer so checking the discharge until the escharotic portion is cast off. The free surface can then be again treated. From ½ to 1 ounce is used at a time being poured into the wound through a Ferguson's Speculum. Pelvis of the patient is raised as in the Trendelenburg position. The application lasts 15 to 20 minutes. No pain accompanies the cauterization. There is no return of hæmorrhage and the discharge ceases.—Pr. Feb./09,290.

This treatment of inoperable carcinoma does not cure but makes the life of the patient endurable.—B.M.J. E. i./10,8.

Iodo-Acetone.

Iodine 2% in Acetone is used to sterilise catgut. First steep in ligroin to free from fat.—L. i./06,1193. *Vide* also Iodised gut. Iodo-Acetone is also sometimes used "1 in 5 or 1 in 10."—L. i./06,1366. Boils treated with pigment of Iodine 2, Acetone 5.—M.P., Jan. 23/07,97.

ALDEHYDA.

Aldehydum Absolutum. *Syn.* Acetaldehyde.

$\text{CH}_3\text{.COH.} = 43.7$ (44.032 I. Wts.).

A colorless mobile liquid, irritating when inhaled. Sp. Gr. 0.7876 at 16° C. B.pt. 21° C. Becomes acid on keeping exposed to air—oxidation to acetic acid. Polymerises with rapidity in presence of sulphuric acid at atmospheric temperature into paraldehyde (*vide infra*), but if temperature be below 0° C, crystalline metaldehyde is formed.

Aldehydum Dilutum.

Contains 15% in Alcohol, is neutral to test paper, and has an ethereal suffocating odour, producing spasm of the glottis when respired. Diluted 1 in 1000 with water at 140° F has been used as inhalation in catarrh and ozæna.

Paraldehydum $(\text{CH}_3\text{.COH})_3 = 131.1$ (132.096 I.Wts.) (Off.) U.S.

Dose.—30 to 120 minima (1.8 to 7 Cc.), or more, in diluted syrup or almond mixture, repeated if needed in ½ an hour. (In the knowledge of the writers ½ ounce dose has been given.)

A colourless liquid crystallizing below 50° F.; Sp. Gr. 0.998; may be obtained by treating Aldehyde with dilute sulphuric or nitric acid. *Soluble* 1 in 10 of water, and in all proportions in alcohol 90%.

Uses. As a sedative, resembling Chloral but without action on the heart. In spasmodic asthma it relieves spasm and induces sleep.

Flavoring.—Prescribed as Elixir or Mistura Paraldehydi *q.v.* Extractum Glycyrrhizæ Liquidum covers the taste.

Elixir Paraldehydi.

Dose.—1 to 3 drachms (3.5 to 10.5 Cc.).

Paraldehyde 240, Glycerin 240, Alcohol (90%) 480, Oil of Cinnamon 4. Oil of Bitter Orange 8, Saccharin 1.

Strictly speaking, however, alcohol is physiologically incompatible with paraldehyde.

Mistura Paraldehydi.

Paraldehyde 2 drachms, Essential Oil of Almonds (*sine* Acid. Hydrocyanic) 3 minims, Syrup 1 ounce, Liquid Extract of Liquorice 2 drachms, Water to 4 ounces. This covers the nauseous taste to some extent and forms four doses of $\frac{1}{2}$ -drachm or two doses of 1 drachm.

Another form: Paraldehyde 1 drachm, Quillaia Tincture 20 minims, Water to $\frac{1}{2}$ or 1 ounce.—B.M.J. i./o6,318,480. The following are preferable:—

Paraldehyde Capsules, 20, 30 and 40 minims.

Dose.—1 or more.

Paraldehyde is diuretic but does not affect the skin, nor give rise to digestive disturbances or headache. Is satisfactory as an enema.

Occasionally it produces slight excitement and vomiting.

A case is recorded of three and a half ounces taken by error; 9 hours afterwards strychnine hypodermically and ammonia applied and injected, recovered consciousness in 34 hours. Two ounces have proved fatal.—W.W.W.

Combination with Trional as advised by Pouchet is useful. Dose can be diminished and thanks to the Trional lasts a long time.—B.M.J. i./o9,555.

Mistura Paraldehydi et Potassii Iodidi.

Dose.—1 drachm (3·5 Cc.).

Paraldehyde 1·25, Potassium Iodide 0·92, Liquid Extract of Liquorice 6·25, Water to 100.

In bronchopneumonia and capillary bronchitis in infants valuable. The constituents of the mixture are incompatible, Free Iodine being formed but not sufficient to harm. In severe cases the secretions dry up remarkably.—B.M.J. i./o8,258.

Aldehydum Formicum, H.CO.H.=29·79 (30·016 I. Wts.).

Formic Aldehyde in vapour is an active antiseptic, preventing decomposition and fermentation, while it is comparatively non-poisonous.

Formaldehydum Solutum, P.G. iv., P. Austr. Syn. FORMOL, FORMALIN, METHANAL, METHYL ALDEHYDE. Dose.—1 minim, well diluted. *Hypodermically* vide References *infra*.

An aqueous solution of Formic Aldehyde, containing by weight about 40%. Sp. Gr. 1·079. to 1·081. P. BELG. about 30%. Sp. Gr. 1·086 to 1·088. U.S. not less than 37%. Assay method by means of sodium hydroxide and hydrogen peroxide is given. *c.f.* also Y.B.P. 1902,83; '03,84.

'Formalinum,' FR. CX. and P. JAP. have 35%. P. JAP. has also Aqua Formalinata 1 in 35 of the 1 in 35 preparation.

It is prepared by oxidation of methyl alcohol.

Antidotes.—Stomach tube and emetics followed by alkaline drinks, sal volatile (or ammonia in other suitable form), alcohol.

Uses.—For wound treatment, and for sterilising surgical instruments

and the hands of operators, *e.g.*, as Lysoform, *q.v.* Has been suggested, 1 or 2%, as a pigment and spray for diphtheria. Also as Glycerin Pigment 2% to the throat in angina follicularis, and as lotion in pertussis 2% or less—with caution. As compresses to malignant tumours 2% or stronger either as palliative, or prior to removal. For alopecia 10% or stronger. Useful as a preservative for embalming and the preservation of corpses for dissection and for museum specimens generally—dilute about 10 times—to harden about 25 times, but for preservative purposes a far weaker solution is sufficient. It shrivels up soft corns causing them to drop off if applied daily. Under the name of **Durine** a preparation is made for this purpose.

For Room Disinfection (in addition to sunlight, fresh air and soap and water) 1 or 2% Formalin as spray (coloured fabrics not injured), or burn Formalin Disinfecting Tablets *q.v.* Potassium Permanganate 50 Gm. may be added to Formalin 100 Cc.—heat is generated and Formaldehyde is caused to escape—or bricks of the Permanganate with 15% Portland Cement may be made to act on the Formaldehyde Solution.—P.J. ii./07,607.

Kenwood (Feb. 1908) recommends for best result mixing 142½ Gm. of Permanganate and 285 Gm. of Formalin in a metal tray 7 inches in diameter and 3 to 4 inches deep. The **Formanganate Disinfector** consists of 16 ounces of Formalin solution (37 to 40%) and a box of two briquettes, each 120 Gm. Potassium Permanganate for 1,000 cubic foot of air space Warmth—at least 65° F.—and moisture 60 to 65% humidity are essential for proper disinfection with formalin.

These ingredients were found sufficient to disinfect 1,600 cubic foot of space.—Pr., Oct. 07,571.

The **Hygiene Lamp** volatilises Formaldehyde by glowing pieces of platinum decomposing methylated spirit in the reservoir and was found capable of killing *B. typhosus* in a confined space.

By the **Linley Process** meat is sterilised at 50° to 60° F. in "Chilling Rooms" and then to every cubic foot of space in the chamber a fan distributes 1 ounce of Formalin. This acts on the meat, which is finally frozen or shipment at 32°F.

REFERENCES TO USE OF FORMALIN.

Medical.—

Ophthalmia, trachoma (1 in 2,000 up to 1% used.—B.M.J. i./96,209) and sweating feet are well treated by a lotion. Ringworm, lupus, laryngeal growths by pigment of 1 to 3 glycerin. A spray or douche is useful for ozena (1 in 2,000 up to 1 in 500 with coarse spray).

General uses in phthisis.—B.M.J. ii./03,1050.

For puerperal fever uterine injection of 1 ounce of glycerin with 3% of Formalin.—L. ii./03,1229,1251. Also 1 minim doses *per os*.—L. ii./03,163.

Recurrent pleural effusion treated by intrapleural injection of Glycerin ounce, containing 10 drops of Formalin. Improved rapidly.—L. i./07,311.

Whooping cough treated by, *vide* Paraform, p. 111.

Eczema in *dry* form should be treated with moist formalin application, e.g., 1 of formalin (40%) in a starch and water jelly 99.

To eczema that is weeping, apply Lysoform or other formalin dusting powder, v.p. 110. Staphylococci of eczema are killed by 1% 'Formalin.'—E. Blake.

Disinfection of Railway Carriages with Formaldehyde, &c.—L.ii./o6. 1675. See also M.A. 1908,16.

Acute endometritis treated by injecting 50% solution of Formalin into the uterus and washing out again quickly. Not so dangerous as Zinc Chloride.—B.M.J.ii./o9,1031.

Scarlet fever treated with mild spray.—Pr. Oct. 1907, 840.

For a common cold inhalation of the Liquor well diluted will cure.

Insect bites well treated by Formalin (40%) 15, Acetone 4, Xylol 5, Canada Balsam 5, Aniseed Oil *q.s.*. M. 1908,224.

Cancer of the breast extirpated by plugging a sloughing mass of cancer with Formaldehyde and Water equal parts. Patient died of cancerous deposits in various internal organs.—B.M.J.i./o9,532.

In cancer Laurent of Brussels advocated enormous injections—20 Gm. (equal to 50 Gm. Commercial Formalin). We do not advise this amount.

Hydatid cysts of the liver treated by injections of 1% Formalin Solution left *in situ* 5 minutes, then withdrawn.—B.M.J.ii./o8,1617.

Formalin (40%) as an ingredient of a mouth wash should not exceed $\frac{1}{2}\%$.—C.D. i./10,64.

For the mouth and teeth in syphilis, a mouth wash containing Formalin Borax and Myrrh is useful.—Beddoes, 63. (*c. f.* ref. immediately above).

Disinfectants.—

Kenwood (*vide* C. & D. Aug. 29, 1908), concluded from results with fumigation by Formaldehyde in 1906, and by 1% Spray of Sublimate in 1907, that there was little to choose between the two. Washing infected rooms with soap equally important.

Formalin probably owes its antiseptic power to the ease with which it abstracts oxygen and becomes Formic Acid, a process which causes the breakdown of organic matter.—Pharmacol. 71.

A $\frac{1}{2}\%$ solution kills most organisms.

Most cultures of organisms are killed by dry Formalin gas. When the temperature falls below 65° F. and the moisture below 65% the gas may fail to kill non-spore-bearing organisms.—'Pres.' Feb. 07.

2% killed *B. Coli* in 60 minutes, *B. Diphtheriæ* in 10 minutes *B. Dysenteriæ* in 60 minutes, *B. Typhosus* in 40 minutes, *Staphylococcus pyogenes albus* in 60 minutes, *Staphylococcus pyogenes aureus* in 40 minutes.

5% killed *B. Coli* and *Staphylococcus pyogenes albus* in 30 minutes *B. Dysenteriæ* in 40 minutes, *Staphylococcus Pyogenes Aureus* and *B. Typhosus* in 20 minutes.

10% killed all the non-sporing organisms investigated in less than 10 minutes except *B. Dysenteriæ* and *Staphylococcus pyogenes aureus* which, however, were killed after 10 minutes—B.M.J.E. ii./o8,7.

See also chapter on Antiseptic Powers.

When properly used it is probably more active than Sulphurous Acid and Chlorine still more so. L. i./o9,744.

Formalin as Preservative.—

The Local Government Board issued report by Buchanan and Schryver on use of Formaldehyde and Paraform for meat preservation. Of the former mixture of Glycerin, Salt and Formalin is used. Paraform is volatilised in hip holds to kill mould not stopped by the cold. Can be detected in the meat. Recommendation to limit use to sanitary disinfection before meat is introduced. Schryver has worked out detection and estimation methods.—C.D. ii./09,343.

For Milk, etc., *see* Milk Analysis, p. 890.

Pharmaceutical.—

2% of Sodium Stearate added to 100 parts of the 40% article is stated to solidify it.—P.J. ii./08,294. We tried it and found 20% necessary. The content in moisture would naturally make considerable difference.—W.H.M.

Colorimetric determination of Formalin.—P.J. ii./08,840.

Collutorium Formalini. R.D.H.

Formalin 18 minims, Peppermint Oil 5 minims, Alcohol 90% 1½ trachms, Peppermint Water to 1 ounce. A few drops to ½ tumbler of water for use.

Gargarisma Formaldehydi, G.H.

Formalin Solution 1 minim to Water 1 ounce.

Formanilid. $C_6H_5NH.CO.H = 120.19$ (121.066 I. Wts.). Dose—2 to 4 grains (0.12 to 0.25 Gm.) hypodermically 17 minims. (1 c.c.) of 3% solution. Yellowish crystals soluble in water and alcohol, melts at 46° C. Employed in hæmorrhage and fevers. 20% solution said to produce local anæsthesia in 1 hour. 2 to 3% for urethral discharge.—M. Am., 1907. To be distinguished from Formamid, $HCO.NH_2$, v.p. 382.

Aldol. β -OXYBUTYRIC ALDEHYDE.

$CH_3.CH(OH).CH_2.CO.H = 87.40$ (88.064 I. Wts.).

Is produced by allowing hydrochloric acid to act upon aldehyde for several days. A thick liquid, soluble 1 in 2 of water, and easily soluble in alcohol. It polymerises to a solid crystalline compound, Paralldol. It is a powerful hypnotic.—C.D. i./06, 162. L. i./06, 1191.

Allmatein.

$H_2O_2 : (C_{16}H_{12}O_5)_2 : CH_2(?) = 623.50$ (628.224 I. Wts.).

A compound made by acting upon hæmatoxylin with formaldehyde. A reddish powder, *soluble* in alcohol and glycerin, suggested as a substitute for Iodoform.

Dose.—30 to 90 grains (2 to 6 Gm.) *pro die*.

In diarrhœa has given good results.

In tablets, powders, capsules, or mixture.

Useful in some cases of intestinal tuberculosis.—B.M.J.E. ii./09,44.

***Citarin.** *Syn.* SODIUM ANHYDROMETHYLENE CITRATE.

$CH_2 - COONa$

$CO < \begin{smallmatrix} CH_2 \\ CO \end{smallmatrix} > O = 246.29$ (248.048 I. Wts.).

$CH_2 - COONa$

Dose.—15 to 30 grains (1 to 2 Gm.) well diluted with cold water three or more times a day.

White crystalline powder with acid taste.

Soluble 1 in less than 1 of water, and only slightly soluble in alcohol 90%. A compound of formaldehyde and citric acid, liberating formaldehyde, in the treatment of gout and rheumatism.

Diformaldehyde-Uric Acid which is stated to be formed is soluble both in acid and alkali, and is therefore precipitated neither in the urine nor in the blood. It is obvious that for treatment at onset of an attack considerable doses are desirable.

Incompatible. Alkalis and their carbonates and hot liquids.

For headache depending on gout 15 grain doses, for gout 30 grains.—M.A. 1908,13.

Effervescent Citarin contains 15 to 30 grains in 1 and 2 teaspoonsful respectively.

Tablets 15 and 30 grains (1 and 2 Gm.) are prepared.

***Glutol.** *Syn.* FORMALIN-GELATIN.

A compound of formic aldehyde and gelatin in whitish granular insoluble powder; used as an antiseptic dressing for burns, cavities, and suppurating ulcers.

***Lysoform.** A liquid formaldehyde potash soap. It is highly antiseptic, relatively non-poisonous, inodorous, deodorant and cheap; has the highest bactericidal action, even in 2 to 5% solution; does not coagulate albumin, and is miscible with water and alcohol in all proportions. It is suitable for surgical operations and for instrument disinfection. A 5% solution is rapidly fatal to *B. typhi abdominalis*, *B. coli communis*, and the *Staphylococcus pyogenes aureus*, and a 3% solution destroys *B. anthracis* spores in 24 hours. A 2% solution is sufficient for general purposes, and is better freshly prepared. The stock bottles should be kept well corked. **Uses.**—In using warm solutions a temperature of 40° to 50°C. should not be exceeded; this is suitable for antiseptic irrigation of the vagina, uterus, abscess cavities, &c. Diluted it is useful for psoriasis, lupus, eczema, and as a wash for perspiring feet. Impetigo may be treated with 5% ointment combined with carbolic acid and ammoniated mercury, or same strength with zinc ointment (paraffin basis) for eczema. 25 to 50% ointments with lanolin basis are applied to ringworm and alopecia areata. A 10% ointment is used in psoriasis. 20 to 30% may be used to arrest sweating of the feet where of limited area. For seborrhœa a 10% ointment with 5% resorcin is useful. 10 to 15% in gall ointment is suitable for piles. A **Mouth Wash, Tooth Paste, Tooth Powder, Dusting Powder** for moist surfaces, bed sores and syphilitic ulcers, and **Toilet Soap** are prepared, also **Pessaries** of Cacao Butter, containing 2 grains each. In the sick room and operating theatre its deodorant properties will be evident. It cleanses suppurating wounds and has styptic action on bleeding surfaces. Two to 5% is also suitable for bites, stings and burns. It is used for hand disinfection 1 to 2%; it combines the mechanical action of soap, lathering profusely, with its bactericidal power, and, therefore, penetrates the skin, lubricates it, and keeps it soft. It is valuable also for general household disinfection, for deodorisation and cleaning. Good results have been obtained with it in veterinary use.—L. ii./03,1307.

Soap though not giving a high carbolic coefficient is a remarkable germicide.—M.P. ii./07,193.

Useful (diluted 2%) to wash the udders of cows before milking. Considerably reduces number of germs in milk.—P.J. ii./08,280.

For treatment of hair brushes Lysoform diluted 1 in 20 is a useful bactericide—Staphylococcus and Eberth's bacillus in this manner are killed in 6 hours.—P.J. ii./08,29.

Formalin is a most valuable asset in the treatment of septic conditions of the teeth.—Annus Medicus, L. ii./09,1896.

Lysoform Mouth Wash. An efficient antiseptic. A small quantity is added to the tumbler of water and used in the customary manner. Agreeably flavoured.

Ⓐ **Lysoform Dental Dressing** (containing 6% Cocaine) in paste form is also prepared.

Lysoform Pastils are useful to allay irritation and as antiseptic.

Ⓐ **Pasta Formalini, R.D.H.** Cocaine hydrochloride 1 drachm Thymol 1 drachm. Triturate thoroughly and add Formaldehyde Solution 40 minims, Glycerin 10 minims, Zinc Oxide 2 drachms. Mix.

Some valuable data on Formalin as an antiseptic.—In 10% solution is one of the most useful agents for disinfecting human discharges, allowing an exposure of 1 hour. Tubercle bacilli in sputum are killed by 5% solution in this time. Not only are diphtheria bacilli killed by 4% solution in six hours, but their soluble toxins are rendered innocuous.—L. ii./07,1178.

* **Paraform, Paraformic Aldehyde, Tri-oxy-methylene.** FR. CX. Formaldehydum Polymerisatum, P. Belg. $(H.CO.H)_3 = 89.37$ (90.048 I. Wts.).

A polymer of formic aldehyde, in white friable amorphous masses, but slightly soluble in water, with an irritating vapour. Heated by an enclosed spirit lamp, it sublimes, combines with the products of combustion, is converted into formic aldehyde, and is a convenient means of applying the latter in vapour as an antiseptic and disinfectant. **Room Disinfection:** Sunlight, fresh air, soap and water and Formaldehyde are now relied on.—*cf.* p. 107. Tablets of 1 gramme, **Formalin-Disinfecting Tablets**, are prepared for use in the Alformant vaporiser,—1 to 20 tablets per 1,000 cubic feet, the latter number ensuring thorough disinfection.

Catheters may be maintained aseptic by wrapping in lint impregnated with 20% of paraform.

Paraform Collodion, 25% strength, applied three times a day to warts is efficacious.

Whooping-cough has been treated by inhalation of Formalin vapour—*i.e.*, from Paraform.

Mixtures of Paraform with Sodium, Barium or Strontium Peroxide, when brought into contact with water, yield formaldehyde vapour—subject of a patent.—P.J. i./07,472.

* **Autan** is said to be such a mixture of 66% Barium Peroxide and 33% Paraform.—P.J. i./07,693. B.M.J.E.I./07,68. For Sterilising Catheters.—L. ii./08,139.

Tins of the mixture are prepared for 100, 175, 350, 700 etc., up to 4000 cub. ft. It is mixed with water in a pail. Ammonia generated afterwards removes the Formaldehyde odor.

The action of the preparation is not simply a liberation of Formaldehyde vapour

and water. It appears that only $2\frac{1}{2}$ Gm. per. cub. metre is evolved,—the amount ought to be twice this. B.M.J. ii./09, 1428.

Formozone. Formaldehyde Fumigating Cone.—

Each gives off, it is said, sufficient to disinfect 1000 cubic ft. room.—L. i./09, 43.

★**Formitrol Pastilles** contain about $\frac{1}{2}$ grain 'Formaldehyde' and are used similarly.

★**Formolyptol** is stated to contain Formaldehyde (0.2%) Aceto-boro-glyceride (5%) with the active balsamic constituents of *Pinus Pumilio*, *Eucalyptus*, *Storax*, *Myrrh* and *Benzoin*, is a colourless, fragrant, non-toxic, non-acid, non-irritant solution for use as a spray, gargle, in tampons, mouth wash, wet dressing, irrigating fluid, douche, or internally.

★**Formawn.**—Said to be a formaldehyde-menthol compound of the composition chloromethyl menthylether $C_{11}H_{21}OCl$. It is inhaled by dissolving a tablet in hot water in a special inhaler, and a "nose wool" is supplied for plugging the nostrils in nasal catarrh.—L. ii./04, 1792; B.M.J.E. ii./04, 8.

Formaldehyde Tablets for internal administration contain "Formalin" (i.e., Paraform) $\frac{1}{4}$ grain, Milk Sugar 2 grains, Citric Acid, Peppermint and Sugar, *q.s.* to 10 grains. Useful antiseptic to the mouth.

★**Formamint Tablets** are said to contain 0.01 Gm. "Formaldehyde" in each. In infectious diseases and as prophylactic.—B.M.J.E. i./06, 8.

They weigh 1 Gm. each, and are said to contain 2% of the compound $C_{12}H_{22}O_{11}$ (CH_2O) = 488.55 (492.356 I. Wts.).—P.J. i./07, 4; ii./07, 838.

Manufactured under patent No. 2672, of 1906, by mixing 1 mol. of Milk Sugar (or 1 by weight) and at least 5 mols. of Formaldehyde in solution (say $1\frac{1}{2}$ by weight of 40%) and heating in vacuum to 60–70° C. to density 32° Beaumé. Evaporated to dryness, the solid substance is odourless, soluble in water, Alcohol and Acetone, and decomposes with certain substances.—P.J. ii./06, 554.

Value as mouth disinfectant questioned.—Pres. 1910, p. 20.

★**Tholiaform Tablets** liberate Formaldehyde and contain Menthol and Paraform equal parts.

Increase the flow of saliva. For sore throats and mouth disinfection.

ALOES.

Aloe Barbadensis (Off.). 'Aloe' Fr. Cx. and P. JAP. is from 'various species. Dose.—2 to 5 grains (0.13 to 0.32 Gm.).

Barbados Aloes, from *Aloe vera*, *A. chinensis* (*Liliaceæ*), and other species, as formerly supplied in opaque pieces with fracture designated 'livery'; contains 10 to 30% Barbaloin and Iso-barbaloin. Aloes is, as a matter of fact, now very little prepared in Barbados. Commercially now comes from Curaçao in the Dutch West Indian Islands in several different forms, and is preferred to

Aloe Socotrina (Off.). Syn. HEPATIC ALOES.

Dose.—2 to 5 grains (0.13 to 0.32 Gm.).

Socotrine Aloes is from *Aloe Perryi* and probably other species; imported principally via Bombay.

The variety known as Zanzibar Aloes is in brown masses with dull fracture.

C.R. 1908 proposes to embody descriptions of Aloe Barb. and Aloe Soc. in one monograph to encourage the use of the better prepared Curaçao variety.

The Natal or Cape varieties of Aloes are not official—they are of vitreous fracture, and characteristic odour, and mostly used for veterinary purposes. Have been found to contain as much as 6% Barbaloin. 'Aloe' P. Helv. is from *Aloe ferox*, Miller. According to J. M. Wood, Cape Aloes is chiefly yielded by this plant.

FR. CX. states Cape Aloes from *A. Africana*, Mill., *ferax*, Mill. *linguaformis* D.C., *perfoliata* L., *spicata* Thunb. is mostly used in France.

Aloe (U.S.) replaces Aloe Barbadosensis and Aloe Socotrina in the 1890 U.S.P.

Aloe Purificata, U.S. Prepared by melting and dissolving in $\frac{1}{3}$ of its weight of alcohol, straining and evaporating to dryness.

Decoctum Aloes Compositum (Off.).

Dose.— $\frac{1}{2}$ to 2 ounces (15 to 60 Cc.).

Has Extract of Barbados Aloes 1 in 100. Was known as *Baume de Vie*.

Alternative Method of Making:—Rub the myrrh and potassium carbonate with a small quantity of water to form an emulsion, dissolving the aloes in water, or better in the compound tincture of cardamoms, adding the saffron to the mixed liquids; decant. Keeps well.—C.D. i./05, 484.

Flavoring.—Taste is fairly well masked already. Glyl Amygdalæ Amaræ or Syl Vanilla præpare.

Extractum Aloes Barbadosensis (Off.).

Dose.—1 to 4 grains (0.065 to 0.26 Gm.).

Barbados Aloes yield about 75% of Extract.

Extractum Aloes Socotrinæ. B.P. 1885 (not now official). Yield about 45%.

Dose.—2 to 4 grains (0.13 to 0.26 Gm.).

Extractum Colocyntidis Compositum (Off.).

Dose.—2 to 8 grains (0.13 to 0.52 Gm.). *Vide also* p. 283.

Contains about half its weight of Extract of Aloes. That of U.S. contains same quantity of purified Aloes.

Pilula Aloes Barbadosensis (Off.). As B.P. 1885.

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Pilula Aloes et Asafetidæ (Off.). As B.P. 1885.

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Pilula Aloes et Ferri (Off.).

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Exsiccated Ferrous Sulphate 1, Barbados Aloes 2, Compound Cinnamon Powder 3, Glucose Syrup 3 or *q.s.*

Tablets are also prepared 4 grains each. An excellent remedy for habitual constipation.—W. W. W.

Pilula Triplex.

Dose.—1 to 3 pills.

Aloes Extract 2 grains, Podophyllin $\frac{1}{4}$ grain, Mercurial Pill 1 grain.

Cathartic with peculiar action on the liver.

Pilula Aloes et Myrrhæ (Off.).

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Socotrine Aloes 2, Myrrh 1, Syrup of Glucose $1\frac{1}{2}$ or *q.s.* Tablets are prepared 4 grains each.

Ⓟ Pilula Aloes, Cascaræ et Hyoscyami.

Extract of Barbados Aloes 1, Extract of Cascara 1, Extract of Hyoscyamus 1. In grains for one pill, weighing 4 grains.

⑩ Pilula Aloes, Nucis Vomicae et Belladonnae.

Extract of Socotrine Aloes 1, Extract of Nux Vomica $\frac{1}{2}$, Extract of Belladonna $\frac{1}{4}$. In grains for one pill.

Pilula Aloes Socotrinae (Off.).

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Pilula Cambogiæ Composita (Off.).

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Gamboge 1, Barbados Aloes 1, Compound Powder of Cinnamon 1, Hard Soap 2, Syrup of Glucose 1 or *q.s.*

Tinctura Aloes (Off.).

Dose.— $1\frac{1}{2}$ to 2 drachms (4.3 to 7 Cc.) or $\frac{1}{2}$ to 1, drachm (1.8 to 3.5 Cc.) repeated.

Extract of Barbados Aloes 1, Liquid Extract of Liquorice 6, Alcohol (45%) *q.s.* to 40. Might be made with 30% alcohol. P. J. ii./09, 142.

U.S. has 'Purified Aloes' 1, Glycerin 2, Diluted Alcohol to 10.

Pruritus vulvæ,—tampons saturated with Aloes Tincture give relief.—B.M.J.E. ii./08, 23.

Glycerinum Aloes.

Evaporate Aloes Tincture 6 to 3, gradually adding Glycerin 30. Pigment for bed sores and anal fissures.

Dewees' Emmenagogue Mixture (H.).

Dose.— $\frac{1}{2}$ ounce thrice daily.

Tincture of Aloes 8, Tincture of Ferric Chloride 6, Tincture of Cantharides 2, Ammoniated Tincture of Guaiacum 3, Syrup to 90. Largely employed in the U.S. in functional and organic amenorrhœa.

Tinctura Aloes Composita, P. AUSTR.

Average Dose.—1 to 2 drachms (3.5 to 7 Cc.).

Cape Aloes 15, Gentian Root $2\frac{1}{2}$, Rhubarb $2\frac{1}{2}$, Zedoary Root $2\frac{1}{2}$, Saffron $2\frac{1}{2}$, Alcohol (70%) 500.

Tinctura Aloes et Myrrhæ, U.S.

Average Dose.—30 minims. Aloes purified 1, Myrrh 1, Glycyrrhiza 1, Alcohol $7\frac{1}{2}$, Water to 10.

For threadworms Aloes with carminative in the morning early. After evacuation an enema of 3 tablespoonfuls of salt—repeated during 10 days or so. Avoid salads and watercress.—B.M.J. i./07, 540.

Pulvis Aloes cum Canella, P. DAN, 1836. Hiera Picra.

Dose.—3 to 10 grains (0.2 to 0.65 Gm.).

Hepatic Aloes 16, White Canella Bark 3. Much used as a domestic emmenagogue.

Aloin, $C_{16}H_{16}O_7$, $3H_2O = 371.36$ (374.176 I.Wts.). (Off.). Jowett & Potter have recently confirmed Tilden's original formula for Barbaloin, which was $C_{16}H_{18}O_7 = 319.72$ (322.144, I. Wts.).

Official dose.— $\frac{1}{2}$ to 2 grains (0.032 to 0.13 Gm.). $\frac{1}{4}$ grain may be considered an aperient, and 1 grain a full purgative dose.—U.S. Dispensatory. The former is U.S. *Average dose.* In a pill with hard soap. Assuming Extract of Aloes to contain on an average 25% of Aloin it follows that $\frac{1}{4}$ grain of the latter is equivalent in activity to 1 grain of Extract.

A principle obtained officially from Barbados or Socotrine Aloes in odourless yellow crystals, having the characteristic taste of aloes; soluble in cold water,

1 in 149 (Barbaloin), in alcohol 90, 1 in 20, almost insoluble in Ether. Aloes contains as much as 30% of Aloin. Recent Aloin Chemistry.—Naylor, P.J., ii, 65, 73.

Aloin from Curaçao is soluble (U.S.) almost completely in 120 Water and in 15 Alcohol (U.S.)

Aloin. C.R. 1908 says always prepared commercially from Curaçao aloes, hence should be limited to this.

Tablets of Aloin, $\frac{1}{10}$ and $\frac{1}{2}$ grain.

① **Pilula Aloin Composita.**—For constipation, Sir A. Clark recommended Aloin, extract of nux vomica, sulphate of iron, myrrh, and soap, of each $\frac{1}{2}$ grain in a pill taken half an hour before last meal of the day. If fæces be hard and dry and there be no special heart weakness, add $\frac{1}{2}$ grain of ipecacuanha, and should griping be caused add also $\frac{1}{2}$ grain of extract of belladonna.

② **Tablets, Anti-Constipation.**—Represent the above without ipecacuanha.

③ **Pilula Aloin, Strychninæ et Belladonnæ.**

Dose.—1 or 2. Aloin $\frac{1}{2}$, Strychnine $\frac{1}{80}$, Alcoholic Extract of Belladonna $\frac{1}{8}$, in each; in fractions of a grain, make one pill; of a gramme, fifteen pills.

④ **Tablets of Aloin Compound** represent the latter with Ipecacuanha $\frac{1}{8}$ gr.

⑤ **Pilulæ Laxativæ Compositæ**, U.S. 100 pills contain Aloin 1·3, Strychnine 0·05, Extract of Belladonna Leaves 0·8, Ipecacuanha 0·4, Glycyrrhiza 4·6 Gm., Syrup, *q.s.*

Suppositoria Aloes.—Fr. Cx. Aloes 0·5 Gm., Cacao Butter 2·5 Gm.

⑥ **Marienbad Tablets.** Published formula :—Aloes Extract 1·25, Rhubarb 1·25, Podophyllin 0·25, Cascara Extract 0·50, Belladonna Extract 0·12. Divided into 50 tablets, keratined and silvered,—Pres., Mar., 1907.

ALUMINIUM.

Al = 26·90 (27·1 I. Wts.).

Glycerinum Aluminis (*Off.*). 1 in 6, *v.p.* 340.

Ophthalmic Discs contain $\frac{1}{80}$ grain of alum in each.

Points of Alum, also of Copper Sulphate, mounted in wooden cases, are prepared for ophthalmic and other uses.

Alumini Sulphas, U.S. (Aluminum Trisulphate). $\text{Al}_2(\text{SO}_4)_3 + 16\text{H}_2\text{O} = 625·90$ (625·93 U.S.) (630·666 I. Wts.). P. Jap., $18\text{H}_2\text{O}$.

White crystalline powder or lumps made by dissolving freshly precipitated Aluminium Hydroxide in Sulphuric Acid. **Soluble** 1 in 1 of water nearly. Loses about 45·7% water of crystallisation on heating to 200° C.

Incompatible : alkalis and alkaline carbonates.

Liquor Aluminii Acetici, P.G., P. AUSTR. *Syn.* BUROW'S SOLUTION. Solutum Aluminii Acetici, P. BELG.

Dissolve Aluminium Sulphate 30 in water 80, add Acetic Acid B.P., by weight, 34, and while constantly shaking pour in by degrees Precipitated Calcium Carbonate 13 mixed with water 20. Set aside for 24 hours to deposit, and shake frequently, then decant, press the sediment, and filter the

solution. Contains $7\frac{1}{2}$ to 8% of Aluminium Sub-acetate. Diluted 1 to 3 of orange flower water for mouth lotion.

Diluted with twice as much water, thus making a $2\frac{1}{2}$ % solution, it has been used as an antiseptic lotion, and gauze impregnated with a 5% solution has been used as a dressing (*vide* Gauze, Ribbon, p. 352).

C.L.T.E. has *Guttæ* of this liquor diluted 4 times—for use in acute otitis externa and media.

Aluminii Acetas, $\text{Al}_2(\text{OH})_2(\text{C}_2\text{H}_3\text{O}_2)_4(?) = 321.88$ (324.312 I.Wts.).

White powder slightly soluble in water. For mode of making *vide* Schmidt. Is used as a desiccant and deodorant in powder or with glycerin.

The basic Salt $\text{Al}_2(\text{OH})_4.(\text{O.C}_2\text{H}_3\text{O})_2(?)$ is insoluble in water.—Schmidt. Anthrax treated by fomentations with, especially when pustule is on the face.—B.M.J.E., i./09,40.

For ophthalmia neonatorum 10% Ointment is used in Germany applied between the lids every hour in place of Silver drops.—B.M.J., i./09,599.

Edematous swelling, antiphlogistic treatment with cooling applications, boric acid, acetate of aluminium.—B.M.J.E., i./10,36.

Aluminii Aceto-Tartras, PH. NED.—*Syn.* ALSOL.

Made by dissolving Aluminium Hydroxide freshly precipitated in Acetic and Tartaric Acids. We use 312, 360 and 450 parts respectively.

In shining masses, soluble in water. An astringent and antiseptic employed in 1 or 2% solution as mouth wash and gargle. Also for wound treatment the same strength. Alsol Liquid is also prepared 50% strength.

Solubility.—We find that a solution as strong as 50% in water can be made. Powder finely and allow to macerate a few hours with shaking. The salt is more rapidly soluble in Ammonium Chloride and in Ammonium Acetate Solutions.

For conjunctivitis.—B.M.J.E. ii./03,68.

Liquor Aluminii-Aceto-Tartratis, *Syn.* Aluminium Aceto-Tartaricum Solutum, P. Helv.

Dissolve Aluminium Sulphate 30 in warm water 100, cool and add Acetic Acid (30%) 36, then, with stirring, Calcium Carbonate 13 in water 35, allow to stand 24 hours with occasional shaking, filter off the solution and add to every 100 of filtrate Tartaric Acid $3\frac{1}{2}$.

Specific Gravity 1.055 to 1.059. Contains about 10% Aluminium Aceto-Tartrate. According to P. Helv. this is to be supplied when Liquor Aluminii Acetatis is ordered. This formula contains Aluminium Sulphate and an excess of Acid.

Stomatitis treated by frequent rinsing of the mouth with this Solution and Salol as paste to the parts.—L. i./09,396.

Escalin. *Syn.* ALUMINIUM-GLYCERIN PASTE.

Stated to be composed of Aluminium in fine powder 2, Glycerin 1. It is supplied in form of cylinders, called Pastils, weighing about 4 Gm. *Directions*.—Crush one into small lumps, place in an 8 ounce bottle, add an ounce of Glycerin and 4 ounces of Water. Shake until lumps disappear, fill up the bottle. Of this mixture a tablespoonful thrice daily between meals up to double this amount every two hours with complete abstinence from solid food.

Sciatica, hæmorrhagic vomiting in a case of exophthalmic goitre, gastric irritability, chronic dysentery, etc., have been treated. The action of the preparation seems to be mechanical, covering the mucous membrane, and is suggested in all cases where Bismuth fails. The Aluminium appears in the feces in 6 to 24 hours after administration.—M. P. Aug. 11,09, 142.

Escalin Suppositories (Cacao butter basis) are also made for treatment of anal fissures and suppression of hæmorrhoidal bleeding. Suggested to be used twice daily—morning and evening.

Powdered Aluminium in Glycerin for internal hæmorrhage, but is void of hæmostatic properties.—M.P., Sept. 18, 1907, p. 312.

Liquor Aluminii Formatis.—We find this may be prepared by precipitating the Hydroxide from 630 of Aluminium Sulphate crystals, and dissolving in 1152 of 25% Formic Acid. Thus made it contains the equivalent approximately of $\frac{1}{3}$ of its weight Aluminium Formate taken as $Al_2(H.CO.O)_6$. Other formulæ have been given for Aluminium Formate. Employed like the foregoing as a gargle diluted 1 to 3% with water, useful.

Aluminii Chloridum, $Al_2Cl_6.12H_2O = 479.50$ (483.152 I. Wts.).

Dose.—2 to 4 grains (0.13 to 0.26 Gm.).

A white, amorphous deliquescent powder. Of distinct service in locomotor ataxy; relieves the lightning pains. May be combined with other drugs.—L. ii./99, 1826; B.M.J. i./05, 5.

Liquor Aluminii Chloridi.

Dissolve Aluminium Chloride (+ $12H_2O$) 20, in water to produce 34 by volume = 42.5% by weight.

Alumini Hydroxidum, U.S.

Prepared by pouring hot potash alum solution into a hot solution of Sodium Carbonate.

Pulvis pro Pedibus, P. Helv.

Potash Alum 15, Talc 85, in fine powder. For tender feet. Another useful form is **Foot Powder**: Talc 2, Boric Acid 2, Orris 1, Zinc Oleate Powder 1. See also Lysoform, p. 110.

Alumnol is aluminium naphthol-sulphonate. Lotion, and gargle, ointment $\frac{1}{3}$ to 2% in pharyngitis, rhinitis, ozæna, and gonorrhœa.

Soldering Aluminium.—A large number of solders and appropriate fluxes are given C.D. ii./07, 631, to which reference should be made by those seeking information.

AMMONIUM.

$NH_4 = 17.94$ (18.042 (I. Wts.).

Ammonii Bromidum. (*Off.*) U.S. $NH_4Br. = 97.29$ (97.962 I. Wts.).

Dose, 5 to 30 grains (0.32 to 2 Gm.).

Small colourless crystals soluble in water 2 in 3, less in alcohol (1 in 15.)

Incompatible with mineral acids and silver nitrate. Causes less depression than other bromides.

C.R. 1908.—Limit of Lead 10 parts per million.

Flavoring.—Glyl Vanillæ, Glyl Rosæ (excellent); Syrupus Zingiberis, Extractum Glycyrrhizæ Liquidum.

Inhalation of vapour of ammonium bromide beneficial in various forms of asthma.—L. i./90, 1012, 1068.

The stimulant effects of Ammonium Salts on the central nervous system and medulla especially, are only observed when their solutions are injected. Given *per os* their excretion is more rapid than their absorption (*c.f.* Potassium Bromide).—B.M.J. ii./09, 540.

In tinnitus a course of ammonium bromide with Syrup of Glycero-

phosphates does well in some cases. The Bromide at bedtime.—Barr, B.M.J. ii./09, 1131.

Tablets, 5 grains (0.32 Gm.) and 10 gr. (0.64 Gm.).

Dose.—1 to 6 or more.

Effervescent Ammonium Bromide.

Dose.—1 drachm. Contains 5 grains.

Linctus Ammonii Bromidi. *Syn.* Elixir Ammonii Bromidi.

Dose.—1 to 2 drachms (4 to 8 Cc.) contains 10%.

A palatable method of administering for throat affections.

Pastilli Ammonii Bromidi. 1 grain in each with Glyco-gelatin basis. For whooping-cough, spasmodic affections of the throat, and loss of voice.

Trochisci Ammonii Bromidi with Gum basis, containing 1 grain each, are very useful sucked occasionally in asthma and for tickling cough.

Rubidium-Ammonium Bromide, v.p. 722.

Ammonii Carbonas. (Off.).

NH_4HCO_3 ; $\text{NH}_4\text{NH}_2\text{CO}_2 = 156.04$ (157.118 I. Wts.).

Dose.—3 to 10 grains (0.2 to 0.65 Gm.).

White masses with ammoniacal odour and alkaline taste consisting of ammonium bicarbonate and carbamate. A stimulant, carminative and expectorant. C.R. 1908.—Limit of Lead 5 parts per million.

Soluble 1 in 4 water, 1 in 5 glycerin.

The former in 3 to 10 grain doses was used as being less caustic in taste, *vide* Edn. XII., 115.

Incompatible with acids, iron salts and salts of alkaline earths. For equivalents to acids v.p. 924.

Method of direct titration.—P.J. ii./05, 864.

In broncho-pneumonia $\frac{1}{2}$ to 1 grain doses useful, combined with a little potassium iodide or ammonium chloride, tincture of nux vomica and syrup of tolu.—M.P. Jan. 16, '08, 601.

Ammonii Chloridum. (Off.) U.S.

$\text{NH}_4\text{Cl} = 53.13$ (54.502 I. Wts.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

White crystals soluble 1 in 3 of water.

C.R. 1908 advises limit of 5 parts per million Lead.

Liquid extract of liquorice disguises its nauseous taste.

Incompatible with carbonates of the alkalis and alkaline earth metals.

Flavoring.—Glyl Rosæ, Glyl Coriandri, Syl Lavardulæ, Syl Aurantii Amari; Extractum Glycyrrhizæ Liquidum, Syrupus Tolutanus.

Lotio Ammonii Chloridi, Gr. ORM. H.

Ammonium Chloride 15 grains, Methyated Spirit 1 drachm, Water to 1 ounce.

Tablets, 3 and 5 grains; also 3 gr. with Borax 2 grs.

Trochisci Ammonii Chloridi, T.H. 'F.' 2 grains, marked 'M.A.' One every 3 hours useful in congestion of the pharynx and larynx, loss of voice arising from cold and bronchial cough. U.S. contain $1\frac{1}{2}$ gr.

Trochisci Ammonii Chloridi cum Glycyrrhiza.

Contain 3 grains of each.

Tablets are prepared containing Ammonium Chloride 3 grains and Liquorice Extract 3 grains.

Trochisci Ammonii Chloridi Compositi, T.H. Contain Ammonium Chloride 1 gr., Potassium Chlorate 2 grs., and $\frac{1}{4}$ gr. approximately of Cubebs. Marked 'C.M.A.'

Vapor Ammonii Chloridi is used in affections of the throat and Eustachian tube. Produced by air being drawn through hydrochloric acid and ammonia in a suitable apparatus and purified by passing through water or a moist sponge.—*c.f.* B.M.J. ii./04,1170.

Inhalers, Ammonium Chloride.—Godfrey's, Basdon's, and Maw's are varieties on the market. They are all the same in principle, which consists in combining the vapour of ammonia and hydrochloric acid.

Ammonii Iodidum, U.S. $\text{NH}_4\text{I} = 143.84$ (144.962 I. Wts.). *Average dose*, 4 grains (0.25 Gm.).

A white granular salt containing not less than 97% pure ammonium iodide in minute crystalline cubes, very deliquescent and soon becoming yellow or yellowish-brown on exposure to air; odourless when white, with a sharp saline taste and a neutral reaction. Soluble 1 in less than 1 of Water, 1 in 3 of 90% Alcohol (by experiment). Should be kept from light and air, or free iodine is quickly liberated. It causes less depression than potassium iodide, and is preferred for syphilis and rheumatism.

Ammonii Nitras, $\text{NH}_4\text{NO}_3 = 79.52$ (80.052 I. Wts.). B.P. 1885.

The fused salt is used for the production of **Nitrous Oxide** $\text{N}_2\text{O} = 43.76$ (44.05 I. Wts.); on heating to 350°F . it splits up into this gas and water vapour.

The gas is passed through a strong solution of ferrous sulphate to remove nitric oxide—the traces of acid being removed by passing through alkali. This gas is considered one of the safest anæsthetics. The heart is not directly affected by its action.

New method of administering for prolonging anæsthesia in dental operations.—B.M.J. ii./08,1551.

There is no anæsthetic, providing administration is carefully performed, comparable to nitrous oxide for quietly and pleasantly inducing anæsthesia.—L. i./10,625.

Instructions for treatment if dangerous symptoms arise during administration of nitrous oxide.

Dangers arising under gas are almost invariably due to failure of the respiration caused either by obstruction or overdose. Obstruction may result from "falling back of the tongue," from pressure due to engorgement of the thyroid or thymus, or other glands in the neck, or from foreign bodies entering the respiratory passages—teeth, bloodclot, vomit, &c. Over-dose is more likely to occur if the patient's clothing be not loose.

If the breathing stop, give no more anæsthetic, clear the mouth and pharynx with a swab or towel round the finger, pull forward the tongue and compress the lower ribs; if no air enter or leave the chest, place the patient upon his side upon the floor, with a pillow or something equivalent under his shoulders. Loosen his clothing, pull the tongue forward and give the tongue forceps to an assistant to keep up the traction. Try to expel any possible obstruction by compressing the lower ribs and abdomen, and then turn the patient upon his back and begin artificial respiration, giving oxygen gas and applying nitrite of amyl or weak ammonia vapour to the nostrils meanwhile. If there be another assistant tell him to give a hypodermic injection of strychnine (Gr. $\frac{1}{60}$) or 1 drachm of ether or both, but do not stop the artificial respiration or waste time over the injection

yourself. If no air enter or leave the chest during the artificial respiration, do tracheotomy forthwith, and immediately the trachea is entered resume the artificial respiration and continue it for at least an hour, keeping the patient warm during this time.—R. D. H.

Ammonii Valerianas. Ammonii Valeras, U.S. $\text{NH}_4\text{C}_5\text{H}_9\text{O}_2 = 118\cdot25(119\cdot114 \text{ I. Wts.})$. FR. CX. Another formula : $\text{NH}_4\text{C}_5\text{H}_9\text{O}_2 + 2\text{C}_5\text{H}_{10}\text{O}_2 = 320\cdot87(323\cdot274 \text{ I. Wts.})$.

Dose.—1 to 8 grains (0·065 to 0·52 Gm.). In masses of flat colourless deliquescent crystals, with a strong valerian odour, very soluble in water and alcohol. A 25% aqueous solution is prepared for dispensing. *Soluté de Valérianafe d'Ammoniaque Composé*, a French 'Nerve Tonic' (FR. CX. and P. Helv.), is Valerianic Acid 3, Ammonium Carbonate *q.s.* (about 4) to neutralise, Extract of Valerian 2, Water to 100 all by weight. *Dose.*—2 to 4 drachms (7 to 15 Cc.).

Linimentum Ammoniaë (Off.).

Solution of Ammonia 1, Almond Oil 1, Olive Oil 2. Shake together.

To make more fluid mix the Almond Oil and the Ammonia Solution, and add the Olive Oil afterwards.—P.J. il./07,287.

'Hartshorn and Oil' is usually Solution of Ammonia 1 and Almond Oil 3. Shake together.

U.S. has Ammonia Water 35, Alcohol 5, Cotton Seed Oil 57, Oleic Acid 3. Other formulæ:—

Sesame Oil 60, Castor Oil 20, Ammonia Solution, 20. This forms a thick liniment.

Sesame Oil 50, Castor Oil 30, Ammonia Solution 20. This is thinner, and either are miscible with chloroform equal volumes, and with turpentine in the proportion of 1 to 5.

Liquor Ammoniaë (Off.—Sp. Gr. 0·959), 'Ammonia,' 'Ammonia Liquida,' PH. NED., Sp. Gr. 0·960. Aqua Ammoniaë, U.S., contains 10% by weight of NH_3 . FR. CX.—Ammoniaque Diluée about the same.

Dose.—10 to 20 minims (0·6 to 1·2 Cc.).—(Not official.) *Average dose* 15 minims (U.S.).

Hypodermic injections of 2 to 6 minims for collapse; or up to 36 minims for snake poisoning; internally is stimulant, diuretic and diaphoretic.

Liquor Ammoniaë Fortis (Off.), Sp. Gr. 0·891.

Dose.—3 to 6 minims (0·18 to 0·35 Cc.).

Contains "32·5%" by weight NH_3 . More correctly 31·5%. If of Sp. Gr. 0·88, is about 2·6% stronger. (Aqua Ammoniaë Fortior, U.S., contains 28%. Ammoniaque officinale. FR. CX. 20·18%.)

Germicidal action, see p. 851.

Liquor Ammoniaë Domesticus (vel Detergens) Household Ammonia.

Oleic Acid 1, Alcohol 1, mix and add strong Solution of Ammonia 7, Distilled Water 7; shake well. For use diluted as a detergent of the skin. In the bath 1 in 1,000 to 2,000 softens the water; also for general domestic purposes.

Cloudy Ammonia is made with tap water—for this the gravity of the preparation must not be too high, otherwise the lime salts constituting the 'Cloud' will settle down. We can recommend the following:—

Dissolve Castile Soap 1·3, in Water 60, and add strong Solution of Ammonia 27, Lime Water 0·6, and Water to 100.

Capsules of Aromatic Ammonia.

Encased in cotton wool and silk. Are intended as a restorative—to be crushed and contents inhaled—a portable form of smelling bottle.

Hair Lotion, Erasmus Wilson's.

Strong solution of Ammonia 1, Almond Oil 1, Spirit of Rosemary (B.P. 1885) 4, Honey Water 2.

For alopecia areata strong Ammonia Solution 1, Chloroform 1, Olive Oil 1, Spirit of Rosemary to 8 is useful.

Liquor Ammonii Acetatis (Off.).

Dose.—2 to 6 drachms (7 to 21 Cc.).

Dissolve Ammonium Carbonate 1, in Acetic Acid *q.s.* to neutralise. Add Water to 20. Keep in green glass stoppered bottles.

The method of neutralising a definite quantity of acetic acid with ammonium carbonate is recommended, and sp. gr. should be included.—C.D. i./66,110. The neutral point is found by trying effect on a little ammonium carbonate on a watch glass.

One can also determine the strengths of the ammonia and acetic acid separately before making, the former with sulphuric acid and methyl orange and the latter with soda and phenolphthalein, so as to get them evenly balanced.—P.J.i./07,548.

U.S. is similar and contains not less than 7% Ammonium Acetate [$\text{CH}_3\text{COONH}_4$]=76·51 (U.S. Wts.). That of P. Hung made from Liquor Ammoniae and dilute Acetic Acid contains about 5% Ammonium Acetate.

Liquor Ammonii Acetatis Fortior. B.P. 1885.

Dose.—25 to 75 minims (1·5 to 4·5 Cc.). Ammonium Carbonate 1, Acetic Acid *q.s.*, Water to 4, *i.e.*, 5 times as strong as the present Liquor. Acetate d'Ammonium Dissous (Solution Officinale). FR. Cx.

Contains 18·5% by weight of Ammonium Acetate.

Ammonii Acetas.— $\text{CH}_3\text{COONH}_4$ =76·52 (77·066 I. Wts.).

Dose.—10 to 30 grains (0·65 to 2 Gm.).

This salt is obtainable in white crystals, very soluble in water.

Incompatible with mineral acids, alkaline carbonates, potassium chlorate and dichromate, mercurous nitrate.

Serviceable in all fevers and delirium tremens, one drachm every hour at first, reduced gradually.

Mistura Febrifuga, N.H.W. Solution of Ammonium Acetate 2 drachms, Spirit of Nitre 20 minims, Sodium Bicarbonate 5 grains, Chloroform Water to $\frac{1}{2}$ ounce.

Liquor Ammonii Citratis. (Off.).

Dose.—2 to 6 drachms (7 to 21 Cc.).

Prepared by neutralising Citric Acid 10, with Ammonium Carbonate 7 or *q.s.* in Distilled Water *q.s.* to 80. Keep in green bottles.

Liquor Ammonii Citratis Fortior. B.P. 1885.

Dose.—30 to 90 minims (1·8 to 5·3 Cc.).

Was four times as strong as the present liquor (above).

Ammonii Citras.— $\text{C}_3\text{H}_4\text{O}(\text{COONH}_4)_3$ =241·44 (243·166 I. Wts.).

This salt is a deliquescent white powder, diuretic, and acts similarly to the acetate.

Dose.—30 to 60 grains (2 to 4 Gm.).

Pneumonia treated by large and frequent doses.—L. i./05,138. B.M.J. i./08,716.

A mixture of the following: Solution of Ammonium Citrate 30 minims with Potassium Iodide 4 grains, Potassium Citrate 10 grains in a tablespoonful of water every four hours,—an 8 ounce bottle made up as above in pneumonia proved an efficient treatment for the seventh time in a bad case.—L. i./09,160.

Ammonii Tartras $(\text{CHOH})_2(\text{COO})_2(\text{NH}_4)_2 = 182.80$ (184.116 I. Wts.)

White crystals soluble in water.

Irrigation (under Cocaine initially) with 5 to 10, and ultimately 20% solution, in a case of erosion of the cornea,—complete clarification.—M. /08,128.

Spiritus Ammoniae Fetidus (*Off.*). Asa ϕ tida 75, Strong Solution of Ammonia 100, Alcohol 90% to 1,000. **Spiritus Ammoniae**, U.S. *Syn.* Alcohol Ammoniatum. *Average Dose.*—15 minims. A solution in alcohol 90%. Sp. Gr. 0.808 at 25° C.

Contains not less than 10% gaseous ammonia by weight.

Uses.—Similar to Sal Volatile as stimulant, but not so palatable.

Flavoring.—Syl Menthae Piperitae, Syl Limonis, Syl Coriandri (all double dose); Syrupus Zingiberis (not so good).

Spiritus Dzondii, Ph. Bor. is a similar preparation.

Spiritus Ammoniae Aromaticus (*Off.*).

Dose.—20 to 40 minims, for repeated administration; single. 60 to 90 minims.

Contains approximately 2.4% by weight of NH_3 . That of U.S. contains Ammonium Carbonate 3.4, Ammonia Water 9, Lemon Oil 1, Lavender Oil 0.1, Clove Oil 0.1, Alcohol 70, Water to 100 and is not distilled.

AMYGDALA AMARA.

(*Rosaceae.*)

Bitter Almond. (*Off.*).

Oleum Amygdalae (*Off.*) is expressed from the seeds (Peach or Apricot kernel Oils, or mixtures are sold commercially as Oleum Amygdalae Persicae*), which yield about 40%, and the residue is utilised for the production of Essential Oil of Bitter Almonds* (Benzaldehyde, $\text{C}_6\text{H}_5\text{COH} = 105.25$ (106.048 I. Wts.), or Oleum Amygdalae Essentiale sine Acido Hydrocyanico). Benzaldehyde is official in U.S. *Dose.*— $\frac{1}{2}$ minim (0.03 Cc.). Produced artificially or as above, containing not less than 85% of benzaldehyde. Sp. Gr. 1.045 at 25° C. B.Pt., 179° to 180° C. Tests for hydrocyanic acid and

* $\text{\textcircled{D}}$ Almonds. Essential Oil of (unless deprived of Prussic Acid), also preparation^s or admixtures containing, is now from apricot (*Prunus Armeniaca*) kernels. Suggested to alter name to one derived from that of the apricot.—C.D., Feb.ii./05.

Sage's paper on oils.—P.J.ii./09,760. C.D. ii./09,929.

Bieber's modified Nitric Acid Test indicates presence of small quantities of Peach Oil in Almond Oil.—*Ibid.*

No pharmacological difference between this oil and the expressed oil of almonds, but therapeutically distinction essential.—P.J. i./05,81. Kernel Oil has the higher Iodine No., v.p. 413.

chlorinated products and assay process are given in U.S.* Is a flavouring agent—non-poisonous. The Essential Oil containing the Hydrocyanic Acid to the extent of about 5% is also prepared and must be carefully distinguished from this. (That ordered by U.S. contains not less than 2 or more than 4%.) The glucoside Amygdalin, $C_{20}H_{27}NO_{11} \cdot 3H_2O = 507.46$ (511.274 I. Wts.) (P. Svec.)—crystals soluble in 12 parts of water with slightly bitter taste and neutral action—under the influence of Emulsin, also a constituent in the seeds, of the nature of a ferment, hydrolyses (takes up water) on coming in contact with it, forming grape sugar and Benzaldehyde-hydrocyanic Acid, $C_6H_5COH + HCN = 132.1$ (133.066 I. Wts.). This latter compound is decomposed and the Hydrocyanic Acid is removed so as to produce the above Essential Oil suitable for flavouring purposes. A similar body to Amygdalin, or one identical with it, is contained in *Prunus Laurocerasus*† (Cherry Laurel leaves).

① Aqua Laurocerasi is standardised (Off., Fr. Cx., and F.I.) to 0.1% Hydrocyanic Acid. It also contains some Benzaldehyde. ② Aqua Amygdalæ Amaræ should contain the same amount of Hydrocyanic Acid.—F.I. and P. Jap. (U.S. is 1 of oil of bitter almonds shaken in 1,000 of water and filtered.) Average dose.—1 drachm.

Amygdalin is also contained in the bark of *Prunus serotina* (Virginian Prune or Wild Cherry bark), and the same occurs when this drug is bruised with water.

Solubility.—Almond oil dissolves in all proportions in chloroform, about 1 in $2\frac{1}{2}$ of ether and slightly in alcohol 90%.

Spiritus Amygdalæ Amaræ, U.S. Average dose.—8 minims. Oil of Bitter Almond 1, Alcohol 80, Distilled Water to 100.

Nitrobenzene, $C_6H_5NO_2 = 122.16$ (123.05 I. Wts.), "Oil of Mirbane," has an odour similar to Benzaldehyde, and is used in cheap perfumery; it is a dangerous poison used in sweetmeats. Deaths from.—L. i./o6, 986; L. i./o6, 88. Another case of poisoning by a mouthful. Copper sulphate given as emetic, further treatment: Calomel and Bismuth. Recovery.—L. i./o6, 1242. Fatal dose is about 1 Gm. Boot blacking caused poisoning.—L. ii./o4, 1439.

Antidote.—Strychnine hypodermically and stimulants.

Amygdala Dulcis also yields about the same amount of Oleum Amygdalæ (Off.) and contains Emulsin, but is free from Amygdalin.

Pulvis Amygdalæ Compositus (Off.). — Sweet Almonds powdered (s.g.) 8, Refined Sugar 4, Powdered Gum Acacia 1.

Mistura Amygdalæ (Off.) contains of this Powder 1, Water 8, rubbed smooth and strained.

* In commerce in America Benzaldehyde is largely substituted for Oil of Bitter Almonds. Frequently Hydrocyanic Acid in sufficient quantity is added to meet the requirements of the trade or the Pharmacopœia. Sp. Gr. should not be lower than 1.045 to 1.07 at 15°C.; e.g., a sample gave gravity 1.075, containing 6.44% HCN. A pure oil requires 1 to 2 parts of 70% alcohol for solution. As to chlorinated compounds: It is becoming possible to produce Benzaldehyde showing absence of chlorine compounds. However, the presence of chlorine is strong indication of substitution. Value of copper and silver nitrate tests carefully discussed. Benzaldehyde estimation: Sodium sulphite combination in the cold, with the aldehyde and the determination of the alkali liberated does not give concordant results.—Am. Jl. Ph. Apl. o8, 154.

† P. Jap. has *Prunus Macrophylla* B. and *Bakuchi* Leaves.

Emulsum Amygdalæ, U.S.—Average dose 4 ounces. Sweet Almonds 60, Acacia Powder 10, Sugar 30, Water *q.s.* to 1,000.

Sterilised Olive (*Oleum Asepticum, L.H.*), or **Almond Oil**, or **Liquid Paraffin**, intended for hypodermic injection (Olive Oil for subcutaneous feeding *L.H.*), or lubricating catheters, is prepared by sterilising the oil in small flasks or bottles tightly plugged with cotton wool at 120°—140° C. for $\frac{1}{2}$ hour.

Physicians and Surgeons should specify carefully which oil is to be employed for "Sterilised Oil."

Acidity of stomach contents is diminished by consumption of neutral liquid fats before food—the more so, the greater the tendency of the secretory activity to exceed the normal. In several degrees of digestive or continuous hypersecretion, often associated with chronic ulcer about the pylorus or duodenum, in which heartburn, acid pyrosis, sudden gnawing pain in the epigastrium ascribed to pyloric spasm, and the vomiting of acid fluid. *Dose.*—1 ounce first thing in the morning, repeated before subsequent meals if necessary. It is also valuable as nutritive, and is well tolerated.—*L. ii./09, 1739.*

Whooping cough often relieved by instillation of oil into the nostrils. Systematic hygiene of the upper respiratory tract so as to inhibit growth of any micro-organism desirable.—*L. i./09, 35.*

AMYL NITRIS (*Off.*).

Amylis Nitris, U.S. Ph. Ned., 80% pure (*Amylium Nitrosum, P. Austr., P. Belg., P. Jap., P. Hung.*). $C_5H_{11}NO_2 = 116.25$ (117.098 *I. Wts.*).

Dose.—By inhalation, the vapour of 2 to 5 minims (0.12 to 0.3 Cc.) up to 10 minims—*Martindale*. By the mouth, $\frac{1}{2}$ to 1 minim (0.03 to 0.06 Cc.). Hypodermically, 1 to 5 minims (0.06 to 0.3 Cc.).

A yellowish ethereal liquid with a peculiar not disagreeable odour; produced by the action of nitrous acid on fractionated amylic alcohol and consisting chiefly of iso-amyl nitrite.—*Sp. Gr.* 0.870 to 0.880; about 70% distils between 194° to 212° F. Amyl Nitrite is soluble in alcohol but insoluble in water. Should be kept cool; by exposure to the air it becomes comparatively inert. Tested by means of Allen's Nitrometer, a 5% solution in alcohol should yield not less than six times its volume of nitric oxide.

P. Jap. allows 0.6% acidity calculated as HNO_2 , *i.e.*, 5 Cc. shaken with 0.1 Cc. of Ammonia Solution 10% and 1 Cc. water—the water must not be acid. Examination of stock of Amyl Nitrite by the test showed considerably less than this. *U.S.* allows slightly over 1% acidity, which is too large an allowance.

Incompatible.—Alkaline Carbonates, Potassium Iodide, Bromides and Ferrous Salts.

Wilbert (*Am. Jl. Ph.*, Sept., 1906, 413) criticises *U.S.* monograph and says should read 'should assay at least 80% by the process given and at the same time 80% or more of the total volume should distil between 90 and 100° C.'

P. Helv. gives test for Valerianic Aldehyde in,—1 Cc. warmed with 3 Cc. of a mixture of equal parts of Alcohol and Silver Nitrate and a few drops of Ammonia; must not blacken.

U.S. directs to be kept in hermetically sealed Glass Capsules.

Amyl nitrite dilates the vessels and lowers blood-pressure. In 30 to 40 seconds after inhaling or swallowing a dose it flushes the face, and increases the heat and perspiration of the head and neck.

The effect on the pulse can be shown within ten seconds of inhalation. This is due to the large area of the lungs absorbing the drug—roughly 100 sq. meters—and to the thinness of the membranes (about $\frac{1}{1000}$ m.m.) separating the air of the pulmonary vesicles from the blood.—Marshall, '08.

Uses.—It has been successful in relieving angina pectoris, sea-sickness, ague, spasmodic asthma, migraine, neuralgic dysmenorrhœa, post-partum hæmorrhage, tetanus, as an antidote to chloroform, to ward off epileptic attacks, and for the spasm of false croup and whooping cough, and in cocaine and strychnine poisoning. Is largely employed in threatened fainting and collapse, and as a restorative after gas in dental extractions.

Capsules of Amyl Nitrite, Martindale.

Encased in cotton wool and silk; 1, 2, 3, 4, 5, 6, or 10 minims (0.06, 0.12, 0.18, 0.24, 0.3, 0.35 and 0.6 Cc.).

In use the glass capsule is broken, the liquid soaks the cotton wool and silk cover, and can be inhaled most conveniently. The 3-minim size meets most wants.

The contents of these capsules do not deteriorate on keeping. On the contrary, capsules 17 years old were found to be fully active.

Fr. Cx. has Azotite d'Amyle.—

“Preferably preserved in SEALED CAPSULES.”

HÆMOPTYSIS arrested in every case in which Amyl Nitrite was tried, whether of mitral obstruction or from phthisis. Normally the effusion of blood irritates the lung tissue, causing coughing. The strain raises the blood pressure, inducing fresh bleeding. A vicious circle is in this way maintained till eventually the loss of blood becomes so great, that the exertion of coughing no longer causes a marked rise of pressure, then the bleeding ceases. Amyl Nitrite accomplishes same effect without further loss of blood.—Edin. Med. J. July, 1904; L.ii./04,522,942,1446; M.A. 1906,240; B.M.J.E.i./06,79. In severe hæmoptysis—rupture of an atheromatous pulmonary vessel—free use satisfactory.—B.M.J. i./06,917.

Dose employed, 3 to 9 minims. Bleeding ceased immediately under Amyl Nitrite.—L. ii./06,1435.

In hæmoptysis—the most efficient and expeditious remedy we possess—sufficient must be inhaled to induce the physiologic action. In post partum hæmorrhage 5 minims inhaled will restore patient from collapse.

In hæmoptysis, the general widespread vasodilation produced by Amyl Nitrite is preferable to the vasoconstriction effected by Adrenalin internally.—L. ii./04,1446.

Post partum hæmorrhage immediately stopped by a Capsule. No further trouble followed.—B.M.J. ii./06,1125.

Hæmorrhage from bullet wounds in the chest, e.g. in battle, can be controlled by inhalation of 5 minim Capsule.—L. ii./07,941.

Hæmoptysis in pulmonary tuberculosis. 90 cases treated by immediate use of Amyl Nitrite, with few exceptions promptly effective.

Possession of the remedy secures peace of mind to sufferers.—L. i./o8,130.
In hæmoptysis of tubercular origin, completely successful.—*Semaine Mediceale*, 1906, Nos. 44, 492, 523.

In hæmoptysis amyl nitrite acts better the quicker it is used. In most cases it can be completely arrested if inhaled as soon as the first signs of blood show themselves in the sputum.

Comparison with Sodium Nitrite, Amyl Nitrite acts immediately, Sodium Nitrite in 15 to 20 minutes. M.o8,130.

Some convincing cases in which Amyl Nitrite saved life.—L. i./o7,939.

The bleeding in 25 attacks of hæmoptysis—many of them profuse—was immediately checked. If excitement afterwards of any kind, $\frac{1}{4}$ grain Morphine given. Amyl Nitrite, the drug *par excellence*, to be used first. Especially useful in sanatorium work where the patient is seen at the beginning of attack. By some Nitro-glycerin is preferred.

The hæmoptysis in majority of cases is the result of raised blood pressure in the systemic arteries; Nature points a method of treatment in that the hæmoptysis itself lowers the pressure, thus arresting hæmorrhage—therefore the Amyl Nitrite treatment is rational.—L. i./o8,565.

Hæmoptysis (tuberculous), Amyl Nitrite recommended.—B.M.J. i/o9,669.

In uterine hæmorrhage is efficient. 5 cases reported. Can be used to control flooding at periods. By dilating the arterioles generally it diminishes the peripheral resistance; thus reduces general blood pressure, and thereby the vascular distension of the uterine mucosa. May prove of value in tiding over fibroid disease until the menopause, without necessity for major operation. *Obviously patients should be prevented from using to arrest normal flow.*

In advanced malignant disease there is often low blood pressure—further sudden reduction by inhalation of the drug might be serious.—L. ii./o8,419,585.

In hæmoptysis uniformly successful—free inhalation of 5 to 6 minims. Whilst dilating all the other blood vessels it does not affect the pulmonary and retinal arteries, hence its value.—B.M.J. E. ii./o8,11.

In hæmoptysis if hæmorrhage at all serious Amyl Nitrite should be inhaled and the blood thus drained away from the bleeding area.—M.P.C., Sept. 29/o9,343.

Angina pectoris gravior. The more pronounced attacks were treated with Amyl Nitrite and Nitro-glycerin, which gave prompt relief.—B.M.J. i./o6,304.

In all spasmodic affections such as angina pectoris, one of the best remedies.—B.M.J. i/o9,994.

In shock vasodilators and sedatives should be given as shock develops. Amyl Nitrite advised.—B.M.J. i/o9,1181.

Angina pectoris. A discussion on—B.M.A. Meeting—"The Nitrites are indispensable."—Clifford Allbutt.—B.M.J. ii/o9,1122.

When the pain is acute Amyl Nitrite inhalation is the quickest means of relieving, if this fails try Chloroform inhalation.—Brunton, L. ii/o8,1132.

Pseudo-angina occurring, as a rule, in the young, not serious with regard to patient's life, and is not relieved by the Nitrites—it requires tonic treatment and exercise; true angina requires the Nitrites and Iodides. In 1867 Brunton observed that rise in tension occurred along with angina and probably caused it. He gave Nitrites early. The pain was relieved by lessening blood pressure with Amyl Nitrite.—B.M.J. ii/09,1128.

In vagal and vaso-vagal attacks deserves a trial at the outset, but where there is vaso-motor disturbances Nitro-glycerin is the most useful agent.—Gowers.—L. i./07,1554.

The best remedy in angina pectoris; patient's mind relieved by small doses of morphine, combined with the nitrite.—L. i./90,240. Brunton.—L. ii./05,325. In angina no drug can compare with Amyl Nitrite for immediate action and efficiency.—L. ii./05,812; L. i./98,837; B.M.J. i./98,808. In paroxysmal tachycardia.—B.M.J. ii./04,109.

For the treatment of angina pectoris 5 drops inhaled; the physiological action occurs in 30 to 60 seconds.

In chloroform syncope, Amyl Nitrite affords the quickest means of restoring the heart's action; and the capsules are the most convenient form of using it.

As an antidote to chloroform syncope, 3 minims inhaled.—L. ii./91,463; B.M.J. ii./88,179.

In ague, on the onset of the cold stage, 5 minims inhaled cuts short the attack and checks the recurrence of the paroxysms.

Longevity. An early recognition of excessive tension is one of the important steps towards, (Hill and Barnard's and Oliver's Sphygmomanometers indicate the oscillations readily and are recommended). The systolic pressure is taken to be that which suffices to stop the pulse altogether, and the diastolic that at which the index gives the maximum oscillation. Brunton finds normal systolic 100—120 m.m., for young adults, 115—135 or 140 for men in middle life and above 150 is abnormal. To lower pressure potassium iodide and cholagogues &c. are used, but Amyl Nitrite and isobutyl nitrite have more rapid action than any other drug and are useful in cutting short paroxysms of pain. Nitro-glycerin can be given in divided doses during the day and keeps the tension low. Nitro-Erythrol has a still slower and more prolonged action.—L. ii./06,1335.

In vertigo, in affections of the internal ear.—B.M.J.E. ii./07,50.

Is very useful in sea-sickness, 3 drops (from a glass capsule) should be inhaled and repeated every 2 or 3 hours if necessary, or may be given in alcoholic solution.

In diseases of optic nerve, good results.—M.A. 1906, 344.

To restore animation a dose should be given in doubtful cases of death, as from fainting or drowning.

In tetanus inhale a dose in every spasmodic seizure to gain time.—L. i./98,103.

Infantile convulsions are well treated by inhalation from 1 minim capsules.—Clinical JI. Dec. 3, 1902.

Is a powerful agent to relax uterine spasms and hour-glass contraction, whether natural or caused by ergot.

In uræmic asthma, Nitrite of Amyl capsules found useful.—B.M.J. i./83,811,956,1064,1115.

In puerperal eclampsia, excretion of uric acid largely increased under its use.—Pr. xxxiv.50.

Successful use in epilepsy, controlling the fits and preventing insensibility.—B.M.J. ii./89,599,688.

The sweating in influenza may, it is said, be controlled by $\frac{1}{30}$ minim doses on sugar thrice daily.—Pr. Jan. 1907.

Asthma is relieved by amyl nitrite relaxing the peripheral vasoconstriction which is an essential factor in the bronchial vascular distension responsible for the obstruction in respiration.—L. i./07,189.

Fear of death entirely disappeared as patient knew he would get relief from Amyl Nitrite or Nitroglycerin. Angina much more common amongst the rich than the poor, associated as a rule with gout.—L.ii./09,572.

Sterules, Hypodermic contain 17 minims (1 Cc.). (Note the hypodermic dose is 1 to 5 minims).

Amyl Nitrite in conjunction with **Pilocarpine Hair Lotion** (*q.v.*) has been used to increase the growth of the hair. Employ Amyl Nitrite 10% in Alcohol 90%. To be rubbed in the scalp alternate nights.

Amyl Nitrate. $C_5H_{11}NO_3 = 132.13$ (133.098 I.Wts.).

Colourless liquid, Sp. Gr. 0.999. Not used to any extent in medicine. **Amyl Acetate.** $C_5H_{11}.CH_3COO. = 129.13$ (130.112 I. Wts.).

PEAR ESSENCE.—Made by action of glacial acetic acid on amylie alcohol in presence of a little sulphuric acid. Colourless Liquid Sp. Gr. 0.876. Is used to dissolve resins in varnish making, also collodions.—*c.f.* p. 281.

AMYLENI HYDRAS. P.G. P.Helv.

$(CH_3)_2 : C(OH)C_2H_5 = 87.43$ (88.096 I. Wts.).

Syn. DIMETHYL-ETHYL CARBINOL, TERTIARY AMYL ALCOHOL. *Dose.*—30 to 80 minims (1.8 to 4.7 Cc.), flavoured with liquorice.

A colourless liquid, of pungent taste and odour, resembling a mixture of paraldehyde and camphor. Soluble in 8 parts of water, also in alcohol. Sp. gr. 0.815 to 0.820, boiling point 216°F. It is a hypnotic, occupying a position between chloral and paraldehyde.

Capsules contain 10 minims in each. *Dose.*—3 to 6.

Owes hypnotic power possibly to alkyl groups. Dimethyl carbinol is twice as weak as this Dimethyl-ethyl Carbinol and tri-ethyl carbinol is still more powerful. Amylene Hydrate is certain in action and free from danger.—B.M.J.i./09,554.

In puerperal eclampsia intramuscular injection of 3 to 4 Gm. into the gluteal region produced good result.—M. '08,129.

Amylene-Chloral, $CCl_3.CHOH.O.(CH_3)_2C_2H_5 = 221.79$ (223.454 I.Wts.). — *Syn.* ★ DORMIOL ; DIMETHYL - ETHYLCARBINOL-CHLORAL. *Dose.*—5 to 50 minims (0.3 to 3 Cc.).

Produced by the action of amylene hydrate on chloral.

An oily liquid with hypnotic properties. A 50% solution is supplied commercially.

Capsules contain $7\frac{1}{2}$ minims (0.5 Gm.) pure Dormiol.

Good hypnotic which may be used alternating with others.—B.M.J. i./09,554.

ANTIMONIUM.

Sb=119·00 (120·2 I. Wts.).

Antimonii Chloridum, SbCl_3 =224·57 (226·58 I. Wts.).

In colourless crystals. It is very corrosive and hygroscopic, hence Butter of Antimony used in veterinary practice is usually liquid; on addition to water, it decomposes into free hydrochloric acid and basic antimony oxychloride, powder of Algaroth; but is soluble in alcohol and carbon bisulphide.

Antidotes to Antimony Compounds.—Stomach tube (for Tartar Emetic, but not for Butter of Antimony), emetics, tannin, or tea followed by stimulants.

Accidental poisoning by. Recovery. Child was fed with milk and white of egg for the first 24 hours, afterwards barley water. A mixture of Compound Tincture of Cinchona and Tincture of Calumba was given.—L. ii./08, 1013.

Liquor Antimonii Chloridi. B.P. 1885.

A caustic liquid of reddish colour (due to iron as impurity) Sp. Gr. 1·47.

③ **Antimonii Arsenas**.

Dose.— $\frac{1}{100}$ to $\frac{1}{30}$ grain (0·00085 to 0·0022 Gm.) twice or thrice daily.

Max. single dose.— $\frac{1}{10}$ grain (0·0022 Gm.); $\frac{1}{3}$ grain (0·022 Gm.) in 24 hours.—M.A.

A mixture of Antimonic Oxide and 20% Arsenic Acid; a heavy white powder. Used in syphilis and skin eruptions. Nervine and muscular tonic. Is a constituent in Gélinau's Dragées, *q.v.*

Antimonium Sulphuratum (Off.). A mixture of the sulphides and oxides in orange red powder.

Stibium Sulfuratum Rubrum P. BELG. *Syn.* **Kermes Minerale** is made by boiling black Antimony Sulphide (Trisulphide) with Sodium Carbonate Solution, and allowing the liquor to cool.

C.R. 1908 states it consists chiefly of Sb_2S_3 and Sb_2S_5 with a large excess of sulphur. Test to be altered.

According to the FR. CX. method of making it, **Kermes Minerale** is a mixture of Antimony Sulphide and Sodium Pyroantimonate. It is made similarly to that of P. BELG.

Tabellæ, P. BELG., contain 0·01 Gm.

Dose.—1 to 2 grains. **Incompatible** with sodium bicarbonate and potassium acid tartrate.

Estimation Process. Oxidation with Sodium Peroxide, reduction and ultimate titration with Standard Iodine Solution. The Antimony content should never be less than 37%.—P.J. ii./09, 143.

Antimonium Nigrum Purificatum (Off.).

Sb_2S_3 333·46 (336·61 I. Wts.).

Greyish crystalline powder, decomposed by boiling hydrochloric acid.

Antimonii Pentasulphidum. **Pentasulfure d'Antimoine**, FR. CX.

Sb_2S_5 397·10 (400·75 I. Wts.).

May be made by decomposing Schlippe's Salt with dilute Sulphuric Acid.

Antimonii Oxidum (Antimonious Oxide) $\text{Sb}_2\text{O}_3 = 285.64$ (288.4 I. Wts.).

Dose.—1 to 2 grains (0.065 to 0.13 Gm.).

A heavy white powder, soluble in Hydrochloric Acid and in Alkaline Tartrate Solution; Caustic Potash, etc. Is expectorant and emetic.

Injectio Antimonii Oxidi.—Martindale.

Dose.—15 to 30 minims (0.9 to 1.8 Cc.).

Containing $\frac{1}{100}$ and $\frac{3}{80}$ grain respectively in Glycerin and water, equal parts. In the course of our experiments we found that a permanent solution as strong as 10% in pure Glycerin can be made by the aid of strong heat, but this will not suffer dilution with Water. In making the injection the Antimony Oxide should be in fine powder and the formation of Acrolein by too strong a heat is to be avoided. Prepared direct as above, however, the water being added to the glycerin solution (warm), a permanent preparation is obtained.

Injectio Antimonii Cinnamica.—Martindale.

Dose.—15 to 30 minims (0.9 to 1.8 Cc.).

Thirty minims contain Antimonious Oxide $\frac{1}{50}$ grain, with Sodium Cinnamate 1 grain in a mixture of Glycerin and Water, equal parts. Percentage parts—0.073 and 3.7 approx. respectively. To be prepared to make a permanent Solution.

Hypodermic Sterules of both the above, both 15 and 30 minims in each, are prepared.

These two injections are suggested for use in sleeping sickness as a substitute for the many varied arsenical treatments. We may repeat, solutions as strong as 10% of *Antimonious Oxide* can be prepared should they be required.

They may prove less irritating than the official tartrate.

They were also employed in malignant disease by injecting into the mass of the tumour.

Elixir Antimonii Cinnamicum is intended for internal administration.

Dose.—1 to 2 drachms (3.5 to 7 Cc.).

Containing Antimonious Oxide $\frac{1}{10}$ grain, Glycerin Sodium Cinnamate 3 minims, Cinnamon Water to 2 drachms. Percentage parts: 0.092 and 2.5 approx. respectively.

Antimony and Opium, useful remedies in treatment of many chest affections—*e.g.* in bronchitis.—B.M.J. Apl. 18, 1908.

Ⓜ **Antimonium Tartaratum.** (*Off.*). *Syn.* TARTAR EMETIC.

FR. CX. 'ÉMÉTIQUE.'

Ⓜ "And all preparations or admixtures containing 1 or more per cent of emetic tartar."

$[\text{K}(\text{SbO})\text{C}_4\text{H}_4\text{O}_6]_2 \cdot \text{H}_2\text{O} = 659.14$ (664.681 I. Wts.).

Dose.—Diaphoretic $\frac{1}{24}$ to $\frac{1}{8}$ grain, emetic 1 to 2 grains.

FR. CX. has *max. single dose* 3 grains; *max. in 24 hours* 9 grains.

Colourless crystals made by combining Antimonious Oxide with Acid Potassium Tartrate.

Soluble in 17 of cold water. Almost insoluble in alcohol 90%.

Incompatible with acids and alkalis, soap, and tannin. **Uses.**—Diaphoretic and emetic.

In chorea in children is less dangerous as emetic than apomorphine.—M.A. 1906,155.

Pulvis Antimonialis. JAMES'S POWDER.

Dose.—3 to 6 grains (0.2 to 0.4 Gm.).

Antimonious Oxide 1, Calcium Phosphate 2.

Ⓢ **Pilula Antimonii Conii et Quininæ.**

Dose.—As required in fever.

James's Powder 1 grain, Conium Extract 2 grains, Quinine Sulphate 2 grains. A pill on the lines of this formula had a reputation in Italy for treatment of malarial fevers. A most successful pill used in a variety of febrile conditions.—Drage.

In cardiac failure, *e.g.* in acute pneumonia, the old depressant treatment by full doses of Antimony abandoned.—West. Pr. Apr./08,435.

Ⓢ **Vinum Antimoniale. (Off.).**

Note. Ⓢ 'Preparations or admixtures containing Antimonial Wine.'

Dose.—10 to 30 minims (0.6 to 1.8 Cc.); as emetic 2 to 4 drachms (7 to 15 Cc.); contains 1 grain in 240 minims.

Tartarated Antimony 40 grains, boiling Distilled Water 1 ounce, Sherry to 20 ounces, *i.e.*, 0.46% w/v., F.I. requires 0.4% w/w. An unimportant alteration would have to be made owing to the wine being weighed in other countries.—C.R.

Flavoring.—It has little taste when diluted.

In **sleeping sickness** Tartar Emetic and Antimonyl Sodium Tartrate (*vide infra*) are given intravenously, as otherwise too painful. The method alone (without Mercury or some other powerful adjuvant) is not effective, it drives the trypanosomes from the blood, but they still remain in the cerebrospinal fluid. An **Antimonial Cream** (Metal Antimony in fine suspension in oil) has been tried, but is said to be hopeless by reason of the pain it produces.

Syphilis. Monkeys can be rendered immune to the disease by injecting organic compounds of Antimony, but inorganic compounds, *e.g.*, Metallic Antimony and Sodium Antimonate, were ineffective. Tartar Emetic gave inconstant results in animals so far as prevention went, but in man it was found that Tartar Emetic is an active drug in treatment of syphilis. Primary, secondary, and tertiary lesions are said to clear up, but relapses may occur.

Dose.— $\frac{3}{4}$ to 1 grain (0.05 to 0.065 Gm.) intravenously daily, increasing to 1½ grains (0.1 Gm.).—L. i./09,727.

Syphilis treated by intravenous injection of Tartar Emetic in 1 in 1000 Solution made isotonic by using Normal Saline Solution. A daily dose for 11 to 12 days of 0.1 to 0.12 Gm. without causing inconvenience. As a rule well borne. Greatly improves certain cutaneous manifestations, but has no specific action on the progress of the disease.—L. i./09,1080.

Antimonii et Sodii Tartras. Antimonyl Sodium Tartrate. $[\text{Na}(\text{SbO})\text{C}_4\text{H}_4\text{O}]_2\text{H}_2\text{O} = 627.24$ (632.480 l.Wts.) White Trimetric hygroscopic crystals. In the experimental treatment of trypanosomiasis in

rats a number of drugs were tried including this compound. A rat, whose blood was teeming with trypanosomes, after 0.35 Cc of a 1% solution of this drug showed complete disappearance from the blood in half an hour.—Ninth Report of the Sleeping Sickness Commission of the Royal Society (*q.v.* for further details of the compound).

0.5 Cc of 1% solution per Gm. weight of rat is considered maximum dose. Its quickness of action is remarkable. A few very persistent forms can still be found in the liver, they need to be tired out by successive doses.—Plimmer and Thomson, Roy. Soc. Na. Jan. 9, '08, 238. Li/09.778.

Experiments to determine the resistance of the trypanosome of sleeping sickness to Antimony, Arsenic and Bismuth showed that of each 1 in 200,000 was sufficient to banish the parasite. 1 mgr. of Antimony destroyed the parasites in a 200 Gm. rat. Arsenic acted more slowly and in the case of Bismuth the damage done to the host was generally irreparable. The trypanosomes, however, not permanently destroyed—they return in course of time, and ultimately antimony and arsenic-resistant trypanosomes are produced and retaining this property can be propagated from rat to rat—the arsenic resistant trypanosomes are still susceptible to Antimony and Bismuth. Suggestion to treat patients with all three drugs at once. Cushny, L.i/09.239.

Linctus Expectorans.

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.) Sulphi Stibici (Antimoni Sulphurati) 2, Syrupi 450, Aquæ Amygdalæ Amaræ 50. To be shaken before administering. Said to be of value for cough. Ph. Notes.—Denmark.

Antimony, Crocus.—Employed for veterinary use, is a mixture of Tri-oxide (about $\frac{2}{3}$) and Tri-sulphide ($\frac{1}{3}$). Formed by heating equal weights of Antimony Tri-sulphide and Potassium Nitrate to which $\frac{1}{4}$ of Hydrochloric Acid has been added.—U.S.D.

APIOL.

Dose.—3 to 6 minims (0.18 to 0.35 Cc.), in Perles, 3 minims in each. or Capsules 3, 5, and 10 minims.

A liquid preparation obtained from, and containing the active properties of, the fruit of *Apium Petroselinum*, common parsley. It is usually a transparent green fluid, but is also met with as a dark oily liquid, with a peculiar odour and a pungent taste like parsley. Soluble readily in alcohol and ether.

It has decided efficacy in primary amenorrhœa or deficiency of secretion, as well as in accidental suppression and in dysmenorrhœa. A perle should be given night and morning for 4 or 5 days during the epoch.

Apioline.—A yellow liquid from green Apiol with Sp. Gr. 1.125 to 1.135, boiling at 280 to 300° C. Soluble in alcohol. May be prescribed in $\frac{1}{2}$ grain doses with same quantity of menthol, six of such doses *e.g.* in Capsules to be taken within 2 hours at onset of pain.

Apioline Capsules are made.

Apiol, Crystallised.

'White Apiol.' ÉTHER MÉTHYLÉNIQUE ET DIMÉTHYLIQUE DE L'ALLYL-APIONOL. CAMPHRE DE PERSIL. FR. CX.



In acicular crystals. For amenorrhœa a sterilised solution in olive oil containing 3 grains (0.2 Gm.) in 15 minims (1 Cc.) has been given—injecting once daily for some days before the period. Also a quinine substitute in malaria.

① Capsules of Apiol and Ergotin.

Contain Apiol 5 minims (0.3 Cc.) and Ergotin 2 grains (0.13 Gm.).

① Ergoapiol. Under this name capsules are supplied for amenorrhœa, dysmenorrhœa and allied troubles.

Toxicity of Apiol is proportional to volatility of the Oil.—L. i./09,1542.

Apium graveolens. (*Umbelliferae*) ACHE DES MARAIS.—FR. Cx. Celery.

The entire herb is used in 'SIROP DES CINQ RACINES.'

APOCYNUM, U.S.

American Indian Hemp Root.—*Syn.* APOCYNUM CANNABINUM CANADIAN HEMP.

Average Dose (of root in powder) 15 grains (1 Gm.).

Does not contain Alkaloid and is not in Poisons Schedule but caution: a powerful drug.

Pharmacology of—

The tincture (10%) is about 1½ times more toxic than Tinctures of Digitalis and Squill, and nearly six times less toxic than the Tincture of Strophanthus. Produces its diuretic effect best on patients with cardiac disease and a failing heart. Ranks next to Strophanthus as regards toxicity to frog's heart and it is more toxic than Digitalis and squill. No special difference in action on the kidneys, but apocynum most likely to produce hæmaturia owing to its irritant properties.—L. i./10,81.

Tinctura Apocyni. 1 in 10 of proof spirit.

Dose.—5 to 60 minims (0.3 to 3.5 Cc.).

Uses.—A powerful emetic, diaphoretic, cathartic, anthelmintic, and diuretic, is useful in cardiac dropsy and Bright's disease..

Uræmia is warded off by the profuse diuresis it produces and it is very valuable in removing pleuritic effusion.

Decoctum Apocyni 1 in 60. *Dose.*—½ to 1 ounce.

Fluidextractum Apocyni, U.S.

Average Dose.—15 minims (1 Cc.). 1 = 1 glycono-hydro-alcoholic. Useful in dilatation of heart, mitral, and other valvular lesions.

① APOMORPHINÆ HYDROCHLORIDUM.

① *Apomorphine and its Salts.*

① **Apomorphine Hydrochloride** (*Off.*; U.S. P. AUSTR., P. HELV.

P. JAP. Chloratum Apomorphicum, P. DAN.

$C_{17}H_{17}NO_2 \cdot HCl = 301.36$ (303.614 I. Wts.).

E. Schmidt says, although originally described as anhydrous he finds 3.61 to 95% H_2O which cannot be accorded with either $2(C_{17}H_{17}NO_2 \cdot HCl) \cdot H_2O$ or $C_{17}H_{17}NO_2 \cdot HCl \cdot H_2O$.—P. J. li./08,516.

Dott thinks the formula should be $C_{34}H_{34}N_2O_4 \cdot 2HCl \cdot 2H_2O$ (2 mols. Morphine = 1 mol. H_2O assumed to yield apomorphine) but says further investigation necessary. He found 5.21% loss on water bath; theory requires for $2H_2O$ on the formula 5.44 loss.—P. J. li./08,801.

Dose.— $\frac{1}{32}$ to $\frac{1}{16}$ grain (0.002 to 0.004 Gm.), increased, as an expectorant (not official); $\frac{1}{10}$ to $\frac{1}{4}$ grain (0.0085 to 0.016 Gm.) as an emetic; $\frac{1}{40}$ to $\frac{1}{10}$ grain (0.0032 to 0.0065 Gm.) hypodermically.

A derivative of morphine or codeine obtained by heating them with an excess of hydrochloric acid in sealed tubes. Apomorphine is morphine deprived of a molecule of water. In commerce the hydrochloride occurs in minute pale greyish-white, acicular crystals.

C.R. 1908 proposes that the B.P. should permit use of the salt even if it produce a green solution.

Soluble.—1 in 60 of water, 1 in 51 of alcohol 90% ; the solution turns emerald-green in colour, but some state loses little of its medicinal powers. This discoloration is said to be due to the action of free ammonia in the air. For method of making colourless injection *vide infra*. Insoluble in ether and chloroform.

Incompatible with sodium carbonate and bicarbonate, tannin and iron salts.

Uses.—It acts as a non-irritant emetic and anti-stimulant; in bronchial asthma doses of $\frac{1}{6}$ grain are very useful. Small doses are expectorant and relieve bronchitis. May be given as—

Ⓟ **Tabellæ Apomorphinæ**, $\frac{1}{30}$ grain (0.0013 Gm.) in each, with chocolate. G. H. contain $\frac{1}{30}$ grain.

Ⓟ **Tablets, Compressed**, contain $\frac{1}{30}$ and $\frac{1}{100}$ grain.

Ⓟ **Injectio Apomorphinæ Hypodermica.** (*Off.*)

Apomorphine Hydrochloride 1, Diluted Hydrochloric Acid 1, Distilled Water to 100. $\frac{1}{10}$ grain in 11 minims.

Dose.—5 to 10 minims (or more) as an emetic. The addition of a trace of acid keeps it stable and colourless.

In alcoholism valuable as hypnotic in $\frac{1}{10}$ to $\frac{1}{20}$ grain doses. The patient, however wild or noisy, sleeps 10 to 12 hours and awakes refreshed.—*L.i./o8,1316.*

For cases of puerperal convulsions it soon causes vomiting and free perspiration, patient sleeps and awakes quiet.

The following will also remain colourless:—Shake Apomorphine Hydrochloride 1, with Alcohol, 90% 50—add Water 140 and finally Diluted Hydrochloric Acid 10.—*Pharm. Zeitung 61,640.* We found this on trial very satisfactory—the solution remained colourless for weeks.

Ⓟ **Hypodermic Tablets** are prepared containing $\frac{1}{20}$, $\frac{1}{15}$ and $\frac{1}{10}$ grain in each.

Ⓟ ‘**Sterules,**’ Hypodermic contain $\frac{1}{10}$ grain.

Ⓟ **Syrupus Apomorphinæ (Hydrochloridi), B.P.C.**

Apomorphine Hydrochloride 0.05, Diluted Hydrochloric Acid 0.25, Alcohol (90%) 4.5, Distilled Water 4.5, Syrup to 100.

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.), contains $\frac{1}{30}$ grain Apomorphine Hydrochloride in 1 drachm.

Apomorphine invariably produces vomiting by a single dose, $\frac{1}{2}$ grain by the mouth or $\frac{1}{10}$ -grain hypodermically. The vomiting is not accompanied by any ill effects.

Is of great value as an emetic in all cases of poisoning.

In a case of obstruction of the œsophagus by a plum-stone, the injection of Apomorphine hypodermically caused vomiting and its removal.

As an expectorant $\frac{1}{20}$ grain every 2 hours is useful, or, given with the

same quantity of morphine every 2 or 4 hours, it lessens cough and increases quantity of sputa.

In pertussis Apomorphine is given with good effect.

Nothing more remarkable in medicine than the effect produced by a small injection on a mad drunk patient. L. i/os, 128.

② **Linctus Apomorphinæ cum Codeina St. G. H.**

Apomorphine $\frac{1}{25}$ grain Codeine Phosphate $\frac{1}{12}$ grain, Diluted Hydrocyanic Acid 2 minims, Syrup of Virginian Prune 1 drachm.

③ **Apocodeinæ Hydrochloridum.**

$C_{18}H_{19}NO_2.HCl = 315.27$ (317.630 I. Wts.).

Dose.— $\frac{1}{10}$, gradually increased to 1 grain (0.0065 to 0.065 Gm.). A greyish powder soluble in water

A good expectorant hypodermically. Solution must be neutral; dose up to 25 minims of 2% solution. Internally, 10 to 30 minims of 1% solution caused no nausea or vomiting, but produced free expectoration. In pill 3 or 4 grains daily may be safely given.—B.M.J. i./91, 455.

Uses.—Is a sialogogue, sedative, increases peristalsis, and is not emetic.

As **Hypodermic Purgative**, 30 minims of 1% solution = $\frac{1}{3}$ grain (0.02 Gm.), produced purgation in half an hour without vomiting.—B.M.J. ii./02, 1247. But certainly in our knowledge may prove emetic.

ARGENTUM.

Ag = 107.11 (107.88 I. Wts.).

Argenti Acetas.

$CH_3COO Ag = 165.69$ (166.904 I. Wts.).

In white crystals, soluble in water. A 1% solution to prevent purulent ophthalmia in infants. Dilute Sodium Chloride Lotion may be used after it.

Argenti Citras. P. Helv.—*Syn.* ★ITROL.

$C_3H_4.OH.(COOAg)_3 = 508.95$ (512.680 I. Wts.).

White powder (about 63% silver), soluble 1 in 4,000 of water. In acute gonorrhœa urethral injection 1 in 8,000 repeated.

④ **Argenti Cyanidum, U.S.**

$AgCN = 132.96$ (*Off.* and U.S. Wts.) (133.89 I. Wts.).

Dose.— $\frac{1}{30}$ to $\frac{1}{15}$ grain (0.001 to 0.003 Gm.). (U.S. gives no dose.)

White powder containing 80.48% Ag. Used for producing extemporaneously Acidum Hydrocyanicum Dilutum (U.S.) by treatment with dilute Hydrochloric Acid. Antipyretic occasionally in epilepsy and chorea.

⑤ **Pilula Argenti Cyanidi** contains $\frac{1}{60}$ grain.

Argenti Fluoridum. Ag F = 126.88 (I. Wts.). *Syn.* Tachiol.

Yellowish deliquescent mass. Soluble 1 in less than 2 of water, and about 1 in 3 of alcohol 90%. It is a powerful non-toxic bactericide.

It blackens linen with which it comes in contact. In cystitis, urethritis, and similar affections the strength of the solution may be 1 in 5,000 or 1 in 1,000, as a slight caustic may be increased to 1 in 100.

Has been suggested to sterilise water 1 in 500 strength.

Argenti Iodidum Recentum. Ag I = 233·01 (234·80 I. Wts.).

In the freshly precipitated form this salt has been used in cases of ophthalmia, especially those arising from cold.

Also advocated in emulsion for use in urethritis and other similar conditions. The nascent silver iodide in 3% suspension may be produced from silver nitrate 2·2 Gm., potassium iodide 2·2 Gm., distilled water 50 Cc., mucilage of Irish moss N.F. to 100 Cc. The degree of fineness of the precipitate is photographically of importance, so also by analogy therapeutically. To produce a coarse precipitate the salts are separately dissolved in 5 Cc. of the water, shaken and diluted with the mucilage. For a light flocculent precipitate dissolve each in 50 Cc. of water.—Am. Jl. Ph., Feb. 06, 64.

Argenti Lactas. Syn. ★Actol.

$\text{CH}_3\text{.CHOH.CO}^0\text{Ag, H}_2\text{O} = 213\cdot36$ (214·936 I. Wts.).

Dose.— $\frac{1}{2}$ grain (0·01 Gm.).

White powder, soluble 1 in 160 of water, used in 1 in 1,000 to 200 as an antiseptic for gonorrhœa, in dental abscesses, &c. Statements appear to the effect that this salt is soluble 1 in 15 of water, but our experiments do not confirm this.

Argenti Nitras. $\text{AgNO}_3 = 168\cdot69$ (169·89 I. Wts.).

(*Off.*). P. Austr. Syn. LUNAR CAUSTIC.

Dose.— $\frac{1}{4}$ to $\frac{1}{2}$ grain (0·016 to 0·032 Gm.) in a pill, best with kaolin ointment as an excipient—not with bread crumb,—this contains salt, which decomposes it.

Incompatible with organic material, *e.g.*, rose water, if used instead of distilled water for preparing a lotion or pigment; also with Tartaric Acid, Hydrocyanic Acid, Iodine, Potassium Iodide and Bromide.

Soluble 1 in 0·53 of water (P.J. ii./03,881) and 1 in 20 of alcohol 90%.

Uses.—Internally for epilepsy, but has been discontinued because long administration causes staining of the skin. Checks diarrhœa of children. In typhoid where there is hæmorrhage $\frac{1}{2}$ grain every 3, 4 or 6 hours, or even as often as every 2 hours.—Med. News, July 23, 1904. Rectal injections are also useful for the bleeding of dysentery. In laryngeal phthisis a spray $\frac{1}{4}$ to 2 grains to the ounce.—H.

In uterine ulceration and leucorrhœa, where the cervix is boggy and tender the fused sticks are employed.

In vomiting of pregnancy $\frac{1}{2}$ grain in a wine glass of water every 6 hours. When slight improvement has occurred a capsule of Cocaine $\frac{1}{8}$ grain, Cerium Oxalate 3 grains, Bismuth Subnitrate 5 grains, every 4 hours.—Can. Jl. Med., June, 1907, p. 919.

Hyperacidity treated by lavage with Silver Nitrate Solution.—M. 08,135.

In later stage of treatment of chronic eczema, particularly of mucous surfaces, anus, lips, vulva, nipple, stimulating action of Solution 10 to 15 grains to the ounce, alternating with Lotio Calaminæ Oleosa (*q.v.*) valuable.—B.M.J. i./09,1342.

Pigments, containing from 10 to 60 grains to the ounce of water are used for the throat, and applied to ulcers as a stimulant. Lotions, eye-drops and solutions for urethral injections vary from 1 in 1,000 to 1 in 100.

To prevent purulent ophthalmia Crédé recommended 2% drops.—1% is even better.—L. ii./07,538. Always successful.—B.M.J. i./08,55.

Stephenson finds 1% solution efficient and relatively non-irritant.—M.P. Feb. 3, 08, 110.

Injections of weak solution into the bladder useful in cystitis.—B.M.J.E. ii./92, 38.

Urethral and Vaginal Injections. 0.1 to 0.5% usually employed. Gonorrhœa treated by solution of nitrate of silver (10 grains to the ounce), applied on a mop of cotton wool to the inflamed part of urethra through an endoscopic tube.—L. i./92, 461. Cocaine nitrate (not hydrochloride) may be added.

As caustic solution (60 grains to the ounce) to ulcer of throat which proved to be due to pneumococcic invasion.—B.M.J., i./09, 1525.

Gonorrhœa treated by 0.005% solution of each silver and zinc nitrates, the latter salt said to increase the activity of the silver.—M. 08, 136.

Glycerin 15% added to $\frac{1}{2}$ to 2% silver nitrate solution renders distinctly less painful, and possibly more effective.—B.M.J.ii./08, 744; L.ii./08, 561.

Experiments proved that inorganic silver, especially nitrate, penetrated more deeply than organic. After long use the latter led to epithelial growth.—Pr. Apr. 09, 542.

Pruritus ani—parts painted with solution of silver nitrate beneficial.—B.M.J.E. i./10, 5.

A strong plea on behalf of Silver Nitrate as against organic silver compounds in ophthalmology. The penetration of a 20% Argylol Solution is practically nil in comparison with a weak Silver Nitrate solution. Silver Nitrate is on the alert to react (e.g., precipitate with soluble chloride) in such manner that its electrical state and stability of its ions are altered—herein lies its nature.—Burdon Cooper. —Oph., Jan., '07; M.A., 1908, 31.

Antidote to Silver Nitrate.—Common salt, given in some demulcent drink (excess should be avoided as it is very irritant to the stomach). Salt is also used to arrest its action locally as a caustic. The pain caused by application of solutions of silver nitrate may be alleviated by previous application of a solution of cocaine nitrate.

Argenti Nitras Mitigatus (Off.). U.S. P. Austr.

Silver Nitrate 1, Potassium Nitrate 2, fused together and moulded into sticks for use as caustic.—P. Jap. uses equal parts.

Argenti Nitras Fusus. U.S. P. Austr. Contains 94.8% of Silver.

Silver Nitrate 100 Gm., Hydrochloric Acid 4 Gm. Melt at low temperature and pour into suitable moulds.

Silver Nitrate-Coated Sounds are used by Unna:—Silver Nitrate 1, Cocoa-nut Oil 90, Yellow Wax 2, Balsam of Peru 2, are melted together, and the sounds dipped and dried. On passing, the heat of the body melts the coating. Brilliant results in obstinate cases of gonorrhœa.—H.

Argenti Nitras Induratus, Toughened Caustic (Off.). Contains 5% of potassium nitrate moulded into caustic points.

Caustic Points are supplied in glass tubes, and in wood and vulcanite cases.

Argentio Hair Dye (Black or Brown).

No. 1 Solution.—Silver Nitrate 1, Distilled Water to 12.

No. 2 Solution.—Sulphurated Potash 1, Distilled Water to 8. After washing and drying the hair, the solutions to be applied separately, in above order, and after 2 minutes the hair well washed with rain water. This dyes black, but lighter shades may be obtained by using a weaker strength of No. 1 solution, which should not be allowed to touch the skin.

Pyrogallol Hair Dye (Black).

No. 1 Solution.—Pyrogallic acid 1, Alcohol (90%) 8, Distilled Water 40. Apply before No. 2.

No. 2 Solution.—Silver Nitrate 1, Strong Solution of Ammonia 1, Distilled Water to 8. Use as last.

ONE-SOLUTION HAIR-DYE (COPPER AND PYROGALLOL).—The following was given by C.D., it is said to produce a good and inexpensive dye: Copper Chloride 2,200 grains, Distilled Water 11 ounces, Ammonia (0·880) 5 ounces. Mix, and add gradually, with constant stirring, to a solution of Pyrogallic Acid 3,000 grains, Hydrochloric Acid 22½ ounces, Distilled Water 32 ounces. Next stir in Ammonia (0·880) 6½ ounces, followed by Hydrogen Peroxide (20-vol.) 16 ounces. Finally make up to 1 gallon with Distilled Water, and keep in a wide-mouth jar, exposed to the air, for at least fourteen days, stirring occasionally.

Ophthalmic Discs of Silver Nitrate contain $\frac{1}{500}$ grain in each combined with gelatin.

Pigmentum Argenti Nitratis Æthereum, L.H.

Silver Nitrate 20 grains, Distilled Water 1 drachm, Spirit of Nitrous Ether to 1 ounce. Caustic even when painted on a greasy skin. For pruritus ani, 3 grains to the ounce.—B.M.J. ii./04,981.

Eczema of the flexures has been well treated by a pigment of strength 10 grains to the ounce.

For pruritus vulvæ an application of 5 to 10 grains to the ounce gives relief.—B.M.J. ii./08,632.

③ **Pilula Argenti Nitratis et Morphinae Acetatis**, Crocq's Pill, contains $\frac{1}{8}$ grain of each salt made with Kaolin Ointment.

Argenti Oxidum (Off.).

$\text{Ag}_2\text{O}=230\cdot10$ (231·76 I. Wts.).

Dose.— $\frac{1}{2}$ to 2 grains in a pill with kaolin ointment.

Is not so caustic in action as silver nitrate. Continued administration may discolour the skin. It readily yields its oxygen, and will explode (if mixed) with such bodies as phenol and creosote.

Uses.—Has been given in epilepsy, chorea, and dysentery. It stains the skin less than the nitrate.

*Argentamin. ETHYLENEDIAMINE-SILVER PHOSPHATE

A solution of silver phosphate 10% in ethylenediamine solution (10%).—Schmidt. Injections for gonorrhœa, 1 in 2,000—4,000 solution.

(Ethylene Diamine. $\text{C}_2\text{H}_4(\text{NH}_2)_2 = 59\cdot70$ (60·034 I. Wts.).

A substitution compound of Ethylene and Ammonia.

As an albumin solvent, e.g. for false membrane in diphtheria).

Argentol.—Syn. ARGENTIC QUINASEPTOL.

$\text{C}_9\text{H}_5\text{N}\cdot\text{OH}\cdot\text{SO}_3\text{Ag}=329\cdot58$ (332·008 I. Wts.).

An antiseptic and hemostatic with deodorant properties, promotes granulation of wounds.

Argonin. Contains about 4% Silver.

A silver nitrate-casein compound, in white powder, slightly soluble in water solutions 1 to 5% in gonorrhœa, and $\frac{1}{2}\%$ in ophthalmic practice.

Solubility of Argonin, Atrol and Protargol increased and decomposition prevented by addition of glycerin, in making aqueous solutions in the cold.—P.J. i 00,364.

Argyrol.—*Syn.* VITELLIN.

A salt containing 30% metallic silver, with a proteid obtained from wheat.

Soluble in water in all proportions—solutions keep well. **In-compatible** with Cocaine Hydrochloride and other alkaloids. In purulent conjunctivitis (gonorrhoeal neonatorum, &c.), free instillation of 25% solution every 3 or 4 hours; catarrhal conjunctivitis, 5 to 20% one or more times daily; trachoma, 25% solution rubbed with force on wool into lids once daily; dacryocystitis, corneal ulcers, &c., 25% solution.

Argyrol does not react with a soluble Chloride—the soluble Chlorides influence the rate of penetration. The intense colour of Argyrol Solution is a false expression of its energy. Argyrol may have a mechanical effect—its sedative action is due to the large amount of silver it contains. Protargol, however, reacts with a soluble Chloride.—Burdon Cooper. Oph. Jan. 1907,16. Further comparison.—B.M.J., II, 07,1475.

Marshall and Macleod reported to the B.M.A. 1906, on bactericidal powers of many of the Silver Compounds—they consider Argyrol and Collargol to be practically void of action.

For ophthalmia neonatorum, a drop every $\frac{1}{2}$ hour of 25% solution.—B.M.J. i 09,599.

Unguentum Argyrol 2% with paraffin basis in eczematous conjunctivitis and keratitis. Stephenson.—M.P. Aug., 1905.

Ulcerative colitis treated by washing out with 1½ pints of 1% argyrol solution at 60° F.—B.M.J. i 06,80.

Follicular conjunctivitis has been treated by emptying the follicles by pressure between the two thumb nails, and then touching the spots with 20% Argyrol Solution. The argyrol solution is fixed in the tissue by applying a little Adrenalin 1:1000.—L. ii, 05,1161.

Suppositories containing 1 to 4 grains have been used.

'Sterules' of Argyrol Solution, 10 and 25% strength are prepared.

***Collargolum, Colloid Silver.**—*Syn.* ARGENTUM COLLOIDALE, ARGENTUM CRÉDÉ.

Dose.— $\frac{1}{2}$ to 2 grains (0.032 to 0.15 Gm.) in pills or solution. Tablets contain 1 grain.

Black scales, miscible in all proportions with water, but does not form a clear solution even when dilute.

Used as a bactericide, 1 in 100 to 10,000 in equal parts of glycerin and white of egg or aqueous Solution.

Internally has been used for gastric and intestinal catarrh; also intravenous injections of a $\frac{1}{4}$ to 1% solution for septic affections such as endocarditis, also in difficult labors where septic complications feared. 0.1 to 0.15 Gm. in 1% solution as a dose.—B.M.J.E. II, 08,6.

Hair is stated to grow on the parts as result of subcutaneous injections of 5 to 10 Cc. of 1–2% solutions combined with 2% egg albumen solution and 1% encain solution, in treatment of leprosy.—M. '08,133.

For ophthalmic use 1 to 5% solutions are employed. In septic infections of the eye 15% solutions with good results.—Oph., May 1906,300.

Diphtheritic membrane is said to disappear under swabbing with 5% solution.—M. '08,133.

Suppositories of Collargol. Collargol 2½ grains, Glycerin and Cacao Butter *q.s.* for one suppository, or

Ⓢ Compound Suppository, Collargol 2½, Dionin $\frac{3}{4}$, Extract of Indian Hemp 2 grains, Glycerin and Cacao Butter *q.s.* In pelvic suppurations with pain, tenderness and general septic symptoms.

Unguentum Crédé. Collargol 15, Adeps Benzoatus 75, Cera Alba 10.

For eczema, syphilis, and gonorrhœa, and as a prophylactic to gonorrhœal ophthalmia.

In Landry's paralysis found of value rubbed in to the spinal regions.—L. ii/07,898.

***Ichthargan.** Silver Thio - hydrocarburosulphonate. Silver Ichthyolate (30% Silver).

A brown powder which forms a non-transparent liquid with 2 of water, but even 1 in 10 is not perfectly clear.

Used in ophthalmia and urinary diseases, 1 to 3% solutions brushed on in trachoma. From 1 in 3,000 up to 1 in 500 solutions are used for injection in gonorrhœa; 4% for nose and throat in glycerin or water.

Has strong penetration, but when introduced into the posterior portion of the urethra caused proliferation of the mucous membrane.—Pr., Apl. 09,542.

In acute contagious ophthalmia 10% Solution has been used.

***Protargol, P. Austr. Argentum Proteinicum, P. HELV. (8% Ag.). P. BELG. P. JAP. (8 to 12% residue on ignition soluble in nitric acid.)**

Dose (internally).—1 to 3 grains (0.085 to 0.2 Gm.).

A proteid compound, containing 8% of silver, very soluble in water.

Decomposes with heat.

Solutions $\frac{1}{2}$ to 1% (or stronger up to 10 and 40%) for ophthalmic use, and from 4 to 20% for wounds and ulcers, are prepared by rubbing the powder into a paste with water and diluting as required with cold or lukewarm (not hot) water. Stains the conjunctiva to some extent. Ointments 5 to 10%. It is alkaline to litmus and precipitates alkaloids, e.g., cocaine salts.

Acute muco-purulent conjunctivitis (due to the *Koch-Weeks bacillus*) more satisfactorily treated with Protargol (solutions perfectly safe up to 33%) than with either Argylol or Silver Nitrate.—Oph., Jan. 1907, 14.

For middle ear disease.—Pr. lxxi. 449.

Preferred to Argylol but is more painful (though less painful than Silver Nitrate).—L. i/07,525.

In gonorrhœa nothing like so penetrating as Silver Nitrate.—Pr. Apl. 09,542, $\frac{1}{2}$ to 10% solutions useful.

For eczema scabs Protargol recommended.—B.M.J.E. 1/10,36.

Gonorrhœa—Local applications—organic silver preparations gave better results than inorganic silver salts.—B.M.J. 1/10,508.

THE SILVER PREPARATIONS COMPARED AS TO BACTERICIDAL POWER.—B.M.J. i./07,632; L. i./07,675.

Tested on the *Staphylococcus pyogenes aureus*:—

Silver Nitrate $\frac{1}{2}$ to 2% killed in 2 to 5 minutes.

Protargol 2 to 4% killed in 3 to 5 minutes.

Collargol 4% did not kill in 20 minutes.

Albargin 10% killed in 2 to 5 minutes (irritating).

Ichthargan $\frac{1}{10}$ to 1% arrested growth in 1 to 4 minutes (very irritating).

Argentamin as Ichthargan.

Argonine 5% killed in 3 to 6 minutes (not irritating).

Argylol.—The power is extremely weak.

For the ophthalmic surgeon Silver Nitrate (in $\frac{1}{2}$ to 2% solution), is the best bactericide: Protargol (5 to 20%) is serviceable for home treatment: Argylol (20 to 30%) is useful, mild, astringent and sedative. In angular or Morax-Axenfeld conjunctivitis, silver salts useless.—Zinc Sulphate specific 8 to 10 grains per ounce may be necessary.—Pr. Aug. 09,246.

Pyorrhœa alveolaris may be cured by local use of protargol with glycerin as vehicle, on the terminal of a battery electrode.—B.M.J. ii./08,147.

Liquor Protargol, R.O.H. 10 to 40 in 100. Useful in various forms of Ophthalmia.

Properly prepared Lotions are said to be non-irritating.—M.A. 1908,27.

'Collapsûbes' of Protargol Ointment of paraffin basis, 2% and stronger

as required, with catheter attachment are prepared for urethral medication in gonorrhœa.

'Sterules' of 10 and 25% solutions are prepared.

'Solubes' contain 4·4 grains for preparing an ounce of 1% solution of Protargol.

***Albargin.**

A non-irritant compound—15% silver, of sand-like appearance. Soluble in water (about 1 in 2), and in alcohol 90% about 1 in 130. For gonorrhœa a 0·2% solution injected 4 or 5 times daily. 0·5 to 3% for ophthalmic use.

—M. 1906, 26.

Incompatible with Chlorides and Tannin.

In gonorrhœa, produces no epithelial proliferation.—Pr., Apl./09, 542.

Tablets are prepared containing 3 grains (0·2 Gm.).

The so-called 'Metallic Ferments,' Electrargol, etc., are prepared by allowing a series of electric sparks to pass between two electrodes of the metal it is desired to use through a little pure sterilised water. 3 or 4 amperes with a voltage of 110 is said to be best.—L. ii./08, 722.

Estimation of traces of Silver. Solutions of Silver Salts when heated with a little Sodium Hydroxide and a little Cane Sugar became brown. 50 Cc. of a solution containing 1 of Silver in 25 million can be recognised.—Whitby Int. Cong.

Ⓐ ARSENICUM.

As = 74·5 (74·96 I. Wts.).

Ⓐ "Arsenic and its Medicinal Preparations."

(Organic Arsenic Compounds are also Ⓐ.)

Ⓐ Preparations or admixtures containing Arsenic except those coming within the above.*

Ⓐ Applicable to Ireland. 'Arsenic and its preparations.'

Agricultural and Horticultural Poisons.

According to the Poisons & Pharmacy Act, 1908, Poisonous Substances, i.e., those containing Arsenic, Tobacco, or the Alkaloids of Tobacco (i.e. Nicotine in particular), used exclusively for the above purposes for destroying insects, fungi, or bacteria, or as sheep dips or weed killers, may be sold in Great Britain and Ireland by Pharmaceutical Chemists, Chemists and Druggists, and Registered Druggists and by persons licensed by local authorities who conform to the Regulations of the Privy Council (for Gt. Britain see P.J. i./09, 501; C.D. i./09, 558; for Ireland C.D. ii./09, 176) as to storage, transport, etc., providing the Regulations at commencement of the Schedule (p. 931), the provisions of the Pharmacy Act 1868, and those appertaining to Arsenic (p. 932) in the case of Arsenical Preparations are complied with.

Ⓐ Acidum Arseniosum (Off). $As_2O_3 = 393·28$ (395·84 I. Wts.)

U.S. $As_2O_3 = 196·44$. P. Austr. Syn. ARSENIC; WHITE ARSENIC (ARSENIOUS ACID, B.P. 1885). P. Svec. ARSENI TRIOXIDUM U.S.

Obtained by roasting arsenical ores, occurs in heavy lumps or white powder.

C.R. 1908 advises formula As_2O_3 instead of As_4O_6

* Note.—This may be correct legally but the distinction is difficult. We prefer to class as Ⓐ as a general rule. c.f. Preface.

Dose.— $\frac{1}{80}$ to $\frac{1}{15}$ grain (0.001 to 0.0043 Gm.).

P.G. maximum single dose 0.005 Gm.; maximum daily dose 0.02 Gm.

Soluble 1 in 100 of water. This solution is practically neutral, at any rate is compatible with both acids and alkalis. The solubility in weak Hydrochloric Acid solution is about the same. More soluble in alkaline hydroxide and carbonate solutions. Is also soluble in 5 of Glycerin (*Off.*). Our experiments did not confirm this latter solubility by any means. Physical characters of specimens, however, vary considerably.

Incompatible with Iron Salts, Lime Water, and Magnesia.

Uses.—It is given internally immediately after meals as a general tonic and nerve tonic, as for chorea, in diabetes and anæmia, as antiperiodic for malaria, for chronic skin diseases, and in association with iron, which it appears to render more easily assimilated. It is said to increase respiratory power and to improve the complexion. All preparations of arsenic should be given after food. Externally it has a caustic action and is put into the cavities of carious teeth to kill the nerves. In Austria arsenic has been added to the diet of the Styrian mountaineers under the belief that it improves their capacity for breathing. Recommended for treatment of asthma.—M.A. 1906, 132. In chorea.—M.A. 1906, 155.

Therapeutic uses of arsenic and atoxyl.—L. i./07, 1152.

For further uses see *Liquor Arsenicalis* and *Liquor Arsenici Hydrochloricus*.

Arsenic Eating.—20 grains of coarse powdered arsenic consumed daily in an arsenic factory. Wishing to give it up, the man promptly had severe gastric pain and diarrhœa, collapse, and death.—B.M.J. ii./09, 1803.

Arsenical Poisoning, Royal Commission on.—B.M.J. ii./03, 1557, 1610; L. ii./03, 1674. Year's Investigation in Government Laboratories.—L. ii./07, 542.

Hammond's Vermin Remedy contains a great proportion of Arsenic.

Horticultural Use.—Method of applying wash, spray, and paste.—P.J. ii./08, 722.

Detection of Arsenic in Drugs.—The Pharmacopœia Committee of the General Medical Council recommend the following for insertion in Appendix III. of the B.P. in place of the present remarks on arsenium.

A solution of 4 Gm. of the drug is to be prepared as described in a series of special notes, and is to be diluted with water to a volume of 25 Cc. This solution is to be placed in a test tube of about three-quarters of an inch (about 2 Cm.) in diameter and 7 inches to 8 inches (18 to 20 Cm.) in length. Fragments of granulated zinc are to be put into the test tube until they reach to about two-thirds of the height of the liquid. Immediately after adding the zinc a small plug of cotton-wool is to be placed in the test tube above the liquid, and then a plug of plumbised cotton-wool, so as to leave a short space between the two plugs, and a closely fitting cap formed of two mercurialised test papers to be fastened on; it must not be torn at all when fastened on the test tube. The test is to be allowed to continue for two hours at least, and the test paper is to be examined by daylight for a yellow stain. The test should be conducted in a place protected from strong light. It is applicable both in the case of arsenious and arsenic compounds. For comparative purposes the stain given by 0.012 milligramme of arsenium is utilised.

Limit of Arsenical Contamination.—The present limit of arsenium in the B.P. is taken at 3 parts per million; this proportion might for the drugs given in small doses be adopted as the limit. It is equivalent to $\frac{3}{80}$ grain white arsenic per pound. The limit for tartaric and citric acids, which are largely used in foods and drinks, is placed at $\frac{1}{160}$ grain of arsenious oxide per pound, i.e., 1.07 of arsenium per million, c.f. also p. 83.

This limit is confirmed by McFadden's Report to Local Government Board. B.M.J. ii./07, 1140.

In sulphuric, nitric and hydrochloric acids the limit of $\frac{1}{10}$ ths of one part per million of arsenium is recommended, and for solution of ammonia so small a content as $\frac{1}{15}$ is attainable.—P.J. ii./04, 373, 424, 807; C.D. ii./04, 434.

Bettendorf's Reagent for arsenic is a concentrated solution of stannous chloride in hydrochloric acid. A colourless arsenical solution will deposit brown metallic arsenic in the cold or on warming.

Gutzeit's Test. The substance to be examined is placed in a test tube with some arsenic-free zinc and sulphuric acid. The tube is plugged with cotton wool, and covered with filter paper having a spot of silver nitrate solution. A yellowish stain resulting in a few minutes indicates presence of arsenic. A control with lead acetate paper should be conducted to obviate confusion with sulphur.

A modification of the test consists in employing alkali instead of acid for generating the hydrogen and using a spot of mercuric chloride as in the B.P. Test for arsenic in glycerin.

U.S. fixed limit of impurity for arsenic and heavy metals at 1 in 100,000, and employs this test modified for the former.

Improved apparatus and method for determining small amounts by this method.—Gen. Chem. Co., Int. Cong.

Modified Apparatus for Gutzeit's Test. Four ounce wide mouth bottle, fitted with I.R. cork and glass tube 200 mm. long and internal diameter 5 mm., open at both ends, the lower end drawn out with small hole about 1 Cm. from end at constriction. This arrangement allows condensed water to drip back into bottle while providing free upward passage for the gas. Roll of lead paper 10 Cm long prepared with 10% solution of lead acetate and subsequently dried and pushed into tube so that upper end is 2 Cm. from top of tube. Cap of mercuric chloride soaked filter paper (5.5 Cm. in diam.) fits over top in ordinary manner. The hydrochloric acid used should contain small percentage of stannous chloride to assist in gas evolution and to reduce arsenic to the "ous" state. Also to make results comparable with the standard, which is arsenious anhydride in hydrochloric solution, strength 1 Cc.=0.00001 Gm. Stannous chloride is made by diluting the B.P. solution with equal volume of hydrochloric acid and boiling to eliminate arsenic completely. Filter and make up to original strength. One per cent. of this is added to the strong hydrochloric acid employed in the tests. Use 10 Cc. of the acid (containing 1% stannous chloride solution), 50 Cc. water and 10 Gm. zinc. $\frac{1}{100}$ th milligram of arsenium calculated as arsenious oxide gives distinct yellow stain, i.e., one part in 5,000,000 can be detected and estimated. In the estimation of iron compounds distil the arsenious chloride after reducing to the "ous" condition. After dissolving, i.e., in hydrochloric acid and potassium chlorate, add stannous chloride drop by drop to reduce completely, as seen by the yellow colour of the solution being discharged.—C. D. ii./05, 648; P.J. ii./04, 600.

Method of employing arsenic-free ammonium chloride and magnesium powder produces a constant stream of arsenic free hydrogen. The compound $MgCl.OH$ is formed. Mercuric bromide is more sensitive than mercuric chloride.—P.J. i./06, 555.

Marsh's Test consists in generating hydrogen by means of pure acid and zinc, and to these is added the substance to be tested. If arsenic be present arseniuretted hydrogen is evolved, which deposits metallic arsenic in the cooler parts of the delivery tube, which is heated at several points by aid of Bunsen burners.

The addition of a little copper sulphate gave a mirror with only 0.0001 mgr. of arsenic, whereas platinum chloride (the customary addition to activate) only showed presence with 0.001 Mg.—P.J. ii./06, 325.

Reinsch's Test consists in introducing copper to a hydrochloric solution. Cuprous chloride and hydrogen are formed. The latter reduces the arsenic to hydride; this reacts with the cuprous chloride, giving hydrochloric acid and depositing copper arsenide on the strip of metal employed.

Urine containing arsenic, methods of detection.—P.J. ii./03, 402

① Tablets of Arsenious Acid contain $\frac{1}{100}$, $\frac{1}{50}$ and $\frac{1}{20}$ grain.

Antidotes.

Stomach tube and emetics, olive oil, calcined magnesia in large quantity, mucilaginous drinks, stimulants and especially—

Antidotum Arsenici, Antidote to Arsenic. P. Dan. (1907). U.S. (Ferri Hydroxidum cum Magnesii Oxido.) P.G.ii., P.Helv. and P.Jap. use Ferric Sulphate, and in other pharmacopœias.

Ferric Chloride 3 (or Strong Solution of Ferric Chloride B.P. 3), Water 17. When required for use, add this solution to Calcined Magnesia 1, previously mixed with Water 19, and shake well. Should be freshly prepared, and given in doses of a tablespoonful every 5 or 10 minutes, until the symptoms are relieved. Ferric Hydrate should be administered in at least 12 times the quantity of the Arsenic supposed to have been swallowed. The Antidote contains about $2\frac{1}{2}\%$ of the hydrate.

The diluted Ferric Solution and the mixture of Magnesium Oxide should be kept ready in separate bottles for immediate use.

④ **Liquor Arsenicalis, Fowler's Solution (Off.).** FR. CX. P. Jap.

Syn. LIQUOR POTASSII ARSENITIS, U.S.

Dose.—2 to 8 minims (0.12 to 0.48 Cc.). Contains 1% of arsenious anhydride—F.I. Means by weight.—C.R.

FR. CX.—*Max. dose* during 24 hours, 25 minims approx.

Incompatible with Liquor Strychninæ Hydrochloridi, Employ Liquor Arsenici Hydrochloricus. Poisoning has occurred.—L. ii./07,1173.

Exophthalmic goitre.—Arsenic is a routine treatment, 5 minim doses of Liquor Arsenicalis thrice daily except during one week in each month, or during the menstrual period, for 6, 8 or even 12 months. Tincture of Convallaria is recommended if pulse rate be over 110.

In treatment of lymphadenoma arsenic most reliable.—B.M.J. i./09, 1302.

In pernicious anæmia a sheet anchor, starting with 4 minims and rising to 12 or 15 minims if possible. Slow gradual reduction of the dose also essential.—B.M.J.i./09,1349.

In enlargement of mediastinal glands associated with Hodgkin's disease arsenic is indicated in increasing doses.—L.ii./08,362.

Valuable in chorea; should be given to limit of toleration.—L.ii./92, 19,909; B.M.J.i./02,961. $1\frac{1}{2}$ grains of Arsenic in 72 hours—no ill effects. In form of the Arsenical Solution 10 minims every 4 hours.—B.M.J.i./07,1302. There is no specific for the disease. If not tolerated Zinc Sulphate may be useful in 2 to 3 grain doses gradually increased.—B.M.J.ii./08,699.

Of great value in diabetes, after sugar reduced by dieting and codeine. Should be given for at least 3 months, restrictions in diet being gradually removed. Also in asthma, especially in children and old emphysematous people.

Phagocytosis is greatly diminished by arsenic in strong proportion and considerably increased when in diluted solution—being doubled when working in a solution of 1 in 200,000.—L.ii./08,1297.

④ **Liquor Arsenici Hydrochloricus (Off.).** U.S.

Dose.—2 to 8 minims (0.12 to 0.48 Cc.). Contains 1% of arsenious anhydride. Is compatible with acid mixtures.

Methods of making—the Solution takes time.—P.J.ii./08,291.

Use a litre of water instead of half that quantity. Solution is more easily effected.—P.J.ii./09,315.

① **Tablets of Arsenious Acid and Mercuric Chloride** 1/64 grain (0.001 Gm.) of each.

In Basedow's disease one thrice daily has been found useful.—M. 1908 109.

① **Mistura Arsenii Quininæ et Ferri.**—*Syn.* BACELLI'S MIXTURE (slightly modified).

Dose.—½ to 1 ounce (15 to 30 Cc.).

Dissolve Quinine Sulphate 3 in Water 150 with aid of a little Dilute Sulphuric Acid. Then dissolve Green Ammonio-Citrate of Iron 5 in Water 150, mix and add Fowler's Solution 3.—M. '08,110 modified. Is employed in malaria.

① **Arsenii Bromidum.**

$\text{AsBr}_3 = 312.55$ (314.72 I. Wts.).

Dose.— $\frac{1}{80}$ to $\frac{1}{12}$ (0.001 to 0.0054 Gm.).

In yellowish white deliquescent crystals, soluble in water. Is recommended for diabetes and epilepsy.

① **Liquor Arsenici Bromatus.** *Syn.* LIQUOR POTASSII ARSENATIS ET BROMIDI. CLEMENS' SOLUTION.

Dose.—1 to 5 minims (0.06 to 0.3 Cc.), once or twice a day.

Potassium Carbonate 1, Arsenious Anhydride in powder 1, Distilled Water 80. Boil until dissolved. When cooled, add Bromine (by weight) 2, and Distilled Water, *q.s.* to 100. Heat until decolourised. A solution of potassium arsenate and bromide is formed. Is useful in epilepsy and diabetes with careful diet.

① **Pilula Arsenicalis.**

Arsenious anhydride should be well and carefully triturated with milk sugar before any liquid excipient is added. Those containing $\frac{1}{80}$, $\frac{1}{30}$, $\frac{1}{20}$, $\frac{1}{10}$, and $\frac{1}{5}$ grain are generally kept made.

① **Granula Dioscoridia.** (P. Dan. and Fr. Cx.).

Contains 1 milligramme Arsenious Anhydride. *Dose.*—1 to 5.

① **Pilula Arsenicalis et Strychninæ** contain $\frac{1}{80}$ grain (0.0013 Gm.) of each.

① **Pilula Asiatica.** *Dose.*—1 or 2 daily.

Arsenious Anhydride, $\frac{1}{15}$ grain (0.005 Gm.), Black Pepper $\frac{1}{4}$ grain (0.05 Gm.), Gum Acacia *q.s.* In chronic skin affections.

In psoriasis convenient method of giving arsenic.—L. i./09,967.

① **Pilula Ferri Arsenicalis.** *Dose.*—1 thrice daily.

Arsenious Anhydride, in fine powder $\frac{1}{80}$, Exsiccated Ferrous Sulphate 3, Syrup $\frac{1}{2}$; in grains, for one pill; in grammes, for fifteen.

In chlorosis and anæmia most efficacious.

① **Pilula Ferri Arsenicalis cum Strychnina** is the same with Strychnine Hydrochloride $\frac{1}{80}$ grain.

① **Pilula Acidi Arseniosi et Ferri Redacti.** MONCKTON.

Dose.—1 to 3 grains. Arsenious anhydride, 12 grains. Reduced Iron 1 ounce. Excipient *q.s.* Mix.

① **Tablets, of Arsenious Acid** $\frac{1}{4}$ grain and Blaud's Pill 4 grains.

Dose.—1 to 4.

⑪ **Tablets of Arsenic, Iron and Quinine** contain Arsenious Acid $\frac{1}{10}$ grain, Ferric Hypophosphite 2 grains, Quinine Acid Sulphate 1 grain.

⑫ **Pasta Arsenicalis.** Martindale. For dental caries to destroy the nerve.

Arsenious Anhydride, levigated, 30, Plaster of Paris 15, Morphine Sulphate. 20, Cocaine 5. Mix and add Clove Oil 5, Phenol 25. R.D.H. has Arsenious Acid 2, Morphine Acetate 1, Creosote *q.s.* to form a paste.

The two latter preparations are very poisonous.

About $\frac{1}{10}$ grain of Arsenious Acid is sufficient.

Apply as follows:—Remove as much carious tissue as possible, exclude moisture and disinfect. Apply the paste as near pulp as possible and protect by concave cap. Seal cavity carefully with Mastiche in Chloroform.

⑬ **Baldock's Paste** is also used by many dentists.

Desirability of giving up the use of Arsenic in dentistry.—Sir Malcolm Morris.—B. M. J. ii./09, 547.

⑭ **Dental Arsenical Fibre.** *Syn.* Arsenious Wool.

Gossypium Arseniosum, R.D.H. Arsenious Acid 5, Tannin 2,

Morphine Acetate 10, Carbolic Acid liquefied *q.s.* to make a mass.

Mix with a sufficiency of finely cut cotton wool and allow to dry. Used in the same way as Pasta Arsenicalis. Some formulæ contain creosote *vice* carbolic acid.

⑮ **Arsenii Iodidum.** (*Off.*). U.S. $\text{As I}_3 = 452.2$ (455.72 I. Wts.) (452.1 U.S. Wts.).

Dose.— $\frac{1}{10}$ to $\frac{1}{2}$ grain (0.0032 to 0.013 Gm.), in a pill.

Soluble, forming slightly cloudy solutions in water 1 in 11, in alcohol 90% 1 in 40.

The two elements combine forming orange-coloured crystals. It should be recrystallised so as to exclude a melted mixture of Arsenium and Iodine. Solution 1% 1 to 10 drop doses in milk, useful for lymphatic and scrofulous children, has marked iodine effect. Also used externally.

New method of making:—Arsenium powdered 10, Iodine resublimed 51, mixed in presence of water, digest at gentle heat for a time and evaporate to dryness.—P. J. ii./05, 131.

The content of AsI_3 may be estimated by titrating a weighed quantity in an aqueous Sodium Bicarbonate Solution with decinormal Iodine Solution.—P. J. i./04, 8.

The solution should be neutral to litmus (B.P. says should not change the colour of).—C. D. i./05, 708. C.R. says 'acid and colourless.'

⑯ **Injectio Arsenii Iodidi Hypodermica.**

Dose.— $\frac{1}{100}$ grain (0.00065 Gm.) in 6 minims (0.35 Cc.) of sterile water.

The strength may be increased if desired

⑰ **Sterules Hypodermic** contain 1/100 grain.

⑱ **Liquor Arsenii et Hydrargyri Iodidi** (*Off.*). P. Jap. (U.S. has much smaller average dose, $1\frac{1}{2}$ minims.) *Syn.* DONOVAN'S SOLUTION.

Contains Arsenious Iodide and Mercuric Iodide, of each 1%, or $87\frac{1}{2}$

grains of each in Distilled Water *q.s.* to 20 ounces. *Dose*.—5 to 20 minims (0·3 to 1·2 Cc.).

Given for syphilitic skin diseases.

Incompatible with potassium iodide and Sal Volatile (*c.f.* Nessler's reagent); also with alkaloids and acids.

① **Pilula Arsenii et Hydrargyri Iodidi** contains $\frac{1}{15}$ grain (0·005 Gm.) of each salt = $9\frac{1}{2}$ minims of the above solution. *Dose*.—1 or 2, *v.p.* 368.

② **Potassii Arsenis**.—*Dose*.— $\frac{1}{30}$ to $\frac{1}{15}$ grain (0·0022 to 0·004 Gm.).

The dry salt $KAsO_2 + HAsO_2 + H_2O = 270·23$ (272·044 I. Wts.), containing about 73% As_2O_3 made from arsenious acid and potassium bicarbonate.

Used occasionally in place of arsenious anhydride.

May contain considerable amount of carbonate.—*Am. JI.Ph.*, Dec. 07, 556.

③ **Cupri Arsenis**. $Cu_3As_2O_6 = 433·64$ (436·63 I. Wts.). Pure Scheele's Green.

Dose.— $\frac{1}{100}$ to $\frac{1}{15}$ grain (0·00065 to 0·0026 Gm.).

Amorphous green powder, used in various intestinal affections, cholera morbus, cholera infantum, diarrhoea, dysentery, and typhoid. *Dose* for adults, $\frac{1}{8000}$ to $\frac{1}{6000}$ grain every 10 minutes for an hour, then hourly; for children, half this quantity. Small repeated doses essential. For chlorosis and functional anæmia, $\frac{1}{10}$ to $\frac{1}{15}$ grain thrice daily are given.

Horticultural use of Aceto-Arsenite of copper.—*P.J.* ii./08,722.

④ **Acidum Arsenicum**.—*Syn.* Ortho-Arsenic Acid. $H_3AsO_4 \cdot \frac{1}{2}H_2O = 149·96$ (150·992 I. Wts.).

Dose.— $\frac{1}{60}$ to $\frac{1}{15}$ grain (0·001 to 0·0043 Gm.). A crystalline powder soluble about 2 in 1 of water, and very in Alcohol 90% (arsenites are said to be twice as active as arsenates). The following salts are in use:—

⑤ **Ferri Arsenas** (*Off.*). *Dose*.— $\frac{1}{18}$ to $\frac{1}{4}$ grain (0·004 to 0·016 Gm.) in a pill.

(For *Hypodermic Injection* see *Injectio Sodii Arsenatis et Ferri.*)

This is an amorphous greenish powder and consists of Ferrous Arsenate, $Fe_2(AsO_4)_2 \cdot 6H_2O = 550·12$ (553·566 I. Wts.) (not less than 10%) with Ferric Arsenate $Fe_2(AsO_4)_2 = 387·24$ (389·62 I. Wts.), and Iron Oxide. The Ferrous Arsenate rapidly oxidises in the air. In chronic skin affections of all kinds. Tablets contain $\frac{1}{4}$ grain (0·008 Gm.).

Useful in night-sweats.—*L.* ii./94,1023.

The *Ph. Cx.* preparation (method given) has formula $(AsO_4)_2Fe_3 + 3H_2O$ —Ferrous Arsenate—with a little Ferric salt. To be kept in bottles sealed down with fat. *Maximum single dose* $\frac{1}{4}$ grain; maximum during 24 hours $2\frac{1}{2}$ grains approximately.

The pharmacopœial test permits of no deduction as to proportion of Arsenic contained; also doubt as to whether the Ferrous Arsenate in the *B.P.* article has the formula $Fe_2(AsO_4)_2 \cdot 6H_2O$. For a Soluble Scale Preparation containing an amount of Arsenic equivalent to 34-35% anhydrous Ferric Arsenate.—*vide P.J.* ii./08,342,409.

⑥ **Quininæ Arsenas**, *v.p.* 569.

⑦ **Sodii Arsenas**. $Na_2HASO_4 = 184·78$ (185·968 I. Wts.). (*Off.*).

Dose.— $\frac{1}{40}$ to $\frac{1}{10}$ grain (0·0016 to 0·0065 Gm.).

Sodium Arsenate crystallises with either 7 [$\text{Na}_2\text{HAsO}_4 \cdot 7\text{H}_2\text{O} = 309\cdot94$ (312·080 I. Wts.)], U.S., FR. Cx. Ph. Ned., P. Belg., or 12 molecules [M.W. = 399·34 (402·16 I. Wts.)] of water. It is official in the anhydrous state, in white powder, dried at 300° F., containing 61·8% of As_2O_5 . 1 of the anhydrous salt equals 1·68 of the salt with 7 H_2O .

F.I. requires a crystallised salt containing 36·85% of arsenic acid. 'The crystalline Salt would have to be defined.'—C.R.

Soluble 1 in 5 of water (B.P. 1 in 6). Slightly soluble in alcohol.

FR. Cx. (*vide* above) has *max. single dose* $\frac{1}{8}$ grain. *Max. during 24 hours* $\frac{1}{2}$ grain approximately.

In trypanosomiasis.—B.M.J. i./05, 1140, ii./07, 834.

Ⓢ **Sodii Arsenas Exsiccatus**, U.S., is anhydrous and 98% pure. Soluble 1 in 3 of water at 25° C.

Ⓢ **Pilula Sodii Arsenatis**, $\frac{1}{32}$ and $\frac{1}{16}$ grain.

Ⓢ **Injectio Sodii Arsenatis et Ferri**.

This has been largely employed in Italy in leucocythemia in two strengths,—

"No. 1 grade." Hypodermic dose 1 Cc. = 0·025 Gm. "Soluble Iron Arsenate" equivalent to $\frac{1}{2}$ milligram of Arsenious Acid, and the other

"No. 2 grade" (double strength) 1 Cc. = 1 mgr. of Arsenious Acid.

Injections may be made (as deeply as possible) with advantage at 1 to 2 days interval, and commencing for the first few doses with $\frac{1}{4}$ to $\frac{1}{2}$ Cc. only of the No. 1 when the stomach is empty. The course of the treatment extends over 1 to 2 months.

Ⓢ 'Sterules' of "Arsenic and Iron" are prepared of each of the above.

Dose.—17 minims (1 Cc.) hypodermically.

Physicians should carefully specify which strength is required.

Ⓢ **Guttæ Sodii Arsenatis et Ferri**.—"IRON AND ARSENIC DROPS." *Dose.*—5 drops (or minims) containing $\frac{3}{4}$ grain (0·05 Gm.) of "Soluble Iron Arsenate," equivalent to $\frac{1}{84}$ grain (0·001 Gm.) of Arsenious Acid—*per os*.

A gradual increased dose up to 20 drops is recommended during treatment.

For use in affections of the anæmic type Zambelletti prepares special solutions of the two latter medicines.

Postural albuminuria in a boy of 12 healed by arsenic and iron and application of massage and electricity to the legs greatly improved the condition.—L. i./10, 19.

Ⓢ **Injectio Sodii Arsenatis et Strychninæ**.

Dose.—5 to 10 minims (0·3 to 0·6 Cc.) hypodermically. Sodium Arsenate 2, ($\frac{1}{30}$ gr. in 10 m.) Strychninæ Hydrochloride 1 ($\frac{1}{60}$ grain in 10 m.) Water to 600.

Ⓢ Sterules, Hypodermic contain 10 minims of above.

Ⓢ **Injectio Sodii Arsenatis et Strychninæ et Quininæ** contains 1 grain Quinine Acid Hydrochloride added to 10 minims of the above.

Ⓢ Sterules, Hypodermic contain 10 minims.

① **Liquor Sodii Arsenatis** (*Off.*), U.S.

Dose.—2 to 8 minims (0.12 to 0.48 Cc.). 1%.

This could be left unaltered.—C.R.

Sodium Arsenate has been given hypodermically to cure disease set up by tsetse fly in Africa for cattle, and its use suggested for man.—L. ii./04,15.

① **Pearson's Solution of Arsenic** used on the Continent, is 1 of crystallised Sodium arsenate in Water 600.

① **Arsenical Cigarettes** are made of paper impregnated with sodium arsenate, so that each contains $\frac{3}{4}$ grain (0.05 gramme) of the salt. The patient ought to inspire the fumes deeply three or four times.

① **Mercury Salicyl-Arsenate.** *Syn.* ENESOL.

White powder containing 38% mercury. *Soluble* in water 1 in 25. Solution said to be painless on injection.—B.M.J. ii./04,1324.

① **Sterules, Hypodermic** are prepared containing 1 grain in 30 minims.

① ORGANIC ARSENIC COMPOUNDS.

A paper on this subject by one of us (W.H.M.) to the Int. Cong. 1909, gave details of the bulk of organic arsenic compounds hitherto employed or tried medicinally. In view of the fact that the results obtained with some of the more popular arsenic compounds are not always satisfactory, we have here incorporated some of the bodies referred to in that communication and have introduced several more recent data. One or more of these may possibly prove of service. It should be understood that the therapeutic limit doses have in many instances not been established, and in any case we may here throw out a very strong word of caution as to the 'pushing' of organic arsenic. Patients should be most carefully watched for any sign of disturbance of vision (post-bulbar neuritis) occurring during a course of treatment *cf.* Refs. pp. 156, 157. Blindness cause in trypanosomiasis in the Uganda, also Lane,—B.M.J. i./10,599.—sudden blindness by a course of 10 grain injections on alternate days, also blindness caused by 15 injections of 5 grains—four cases in all being reported in addition to the Uganda cases of which there is possibly no record; *vide* also B.M.J. i./10,197, 'possibility of causing optic atrophy' with such bodies—'must be employed with caution and discrimination.

In the descriptions of the organic arsenic compounds the following terms are used :

Arsonic Acid indicates arsenic acid, $\text{AsO}(\text{OH})_3$, in which one of the hydroxyls is replaced by an organic radicle. An *arsonate* is a salt of this acid.

Arsinic Acid constitutes a dialkyl or dialkyl derivative of arsenic acid—*i.e.*, 'acydic acid'—and its homologues; *e.g.*, phenyl-arsinic acid, $(\text{C}_6\text{H}_5)_2\text{AsO}(\text{OH})$. French and German chemists do not as a rule make these distinctions.

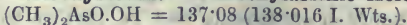
Arylarsonate.—This term indicates an aromatic arsonate. Aryl indicates, *e.g.*, phenyl, tolyl, xylyl, or naphthyl as applied to substituted hydroxyl in arsenic acid.

Arsanilic Acid is a name given to *p*-aminophenyl arsonic acid, the sodium salt of which is in repute.

Arsenoic.—In French literature refers to aromatic arsenic bodies containing two atoms of arsenic believed to be coupled together by a double linkage—*e.g.* $C_6H_5-As=As-C_6H_5$, arsenobenzene, comparable with $C_6H_5-N=N-C_6H_5$, azobenzene.

(I). *Aliphatic Series.*

① **Acidum Cacodylicum.** Dimethylarsinic Acid.



Dose.— $\frac{1}{2}$ to 2 grains (0.032 to 0.13 Gm.).

The ultimate product of oxidation of Arsenium-dimethyl (Cacodyle), *Syn.*—Tetramethyl Diarsine $(CH_3)_2As-As(CH_3)_2$, and of Cacodyle Oxide (Alkarsin, $(CH_3)_4As_2O_2 = 224.52$ (226.016 I. Wts.). Colourless crystals neutral to Methyl Orange and Phenolphthalein. *Soluble* about 2 in 1 of water and 1 in 4 of alcohol 90%, and although containing 54.3% arsenium, equivalent to 71.6% arsenious acid, it is relatively non-toxic—similarly with the Salts. It will be noted that this acid has only 1 OH group, hence is not so toxic as its parent arsenic acid, with 3 OH.

During the last few years other Organic Arsenic Compounds (*c.f.* Arsamin) have supplanted the Cacodylates to some extent.

② **KAKODYLE** was discovered by Bunsen, 1842.

Cacodylates pass through the system and appear, principally in the urine, in an unaltered condition. Another portion is reduced in passage through the organism to a volatile cacodyle oxide which is exhaled.

③ **Ferri Cacodylas.** $[(CH_3)_2AsO_2]_3Fe = 463.84$ (466.874 I. Wts.).

Dose.— $\frac{1}{2}$ to 5 grains (0.05 to 0.32 Gm.) *per os* per diem, or $\frac{1}{2}$ to 1½ grains (0.03 to 0.1 Gm.) hypodermically per diem.

Yellowish powder soluble 1 in 15 of water, used for anæmia and chlorosis also in glandular swellings, *e.g.*, in syphilis, hypodermically.

④ **Guaiacol Cacodylas.** $(CH_3)_2AsO.OH.C_6H_4OH(OCH_3)(?) = 260.21$ (262.08 I. Wts.). *Syn.* CACODYLIACOL.

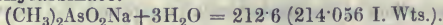
Dose.— $\frac{1}{2}$ to 2 grains (0.03 to 0.13 Gm.) *per os* or hypodermically in sterile oil in affected regions for tuberculosis. Soluble 1 in 25 water, 1 in 1.5 alcohol 90%.

⑤ **Magnesii Cacodylas.** $[(CH_3)_2AsO_2]_2Mg.2H_2O$.

Dose.— $\frac{1}{2}$ grain (0.05 Gm.) hypodermically, gradually increased (5% solution suitable). White amorphous powder soluble 1 in 3 of water.

Uses, etc., as the Sodium Salt, *q.v.*

⑥ **Sodii Cacodylas.** P. Helv. FR. CX. (*N.B. Anhydrous*). Sodium Dimethylarsinate.



Dose.—Average per rectum and hypodermically $\frac{1}{2}$ to 1 grain (0.03 to 0.065 Gm.).

FR. CX. (*vide* above) has *max. single dose* 3 grains and during 24 hours 3 grains approximately.

The dry salt contains 46.8% of arsenium, equivalent to 61.8% arsenious acid or 35%. As on above formula. In commerce usually contains 18 to 25% of water. It frequently contains some uncombined cacodylic acid and should therefore be carefully examined, and, being a deliquescent salt, solutions should be standardised.

Soluble 2 in 1 water, in alcohol 1 in 1.

Uses.—In tuberculosis generally, in diabetes mellitus, exophthalmic goitre, pernicious anæmia, cancer (particularly of the stomach), malaria, chorea, leprosy, psoriasis, and other chronic skin affections, and in all cases in which arsenic has been used, but when given by the mouth or per rectum may cause renal congestion with albuminuria and fall in the quantity of urine excreted.

The cure of tubercle is slow, and if fever be present it will only fall a few tenths of a degree per month. If there is loss of appetite this always returns after the (third or fourth injection, while the patient's weight and strength increase. As much as 30 grains for a dose with success in desperate case.—M.'06,3.

Tests to distinguish from Arrhenal, Atoxyl etc., v.p. 152.

① **Elixir Sodii Cacodylatis** (Standardised).

Dose.—30 minims (equivalent to $\frac{1}{2}$ grain of the salt).

This forms a palatable method of administering the salt.

② **Pills** contain $\frac{1}{2}$ grain (0.03 Gm.).

The following formula in grains is useful:—

Sodium Cacodylate 50, Benzoin 50, Liquorice Powder 50, Acacia Powder 25, Alcohol 90% *q.s.* Divide into 100 pills. **Dose.**—1, three or four times a day.

Sodium Cacodylate 3 grains, Tragacanth Powder 1 grain, Powdered Sugar 2 grains, Wheat Flour 6 grains—for 12 pills each containing $\frac{1}{4}$ grain.—P.J. ii. '09,711. The formula is stated to work well.

③ **Hypodermic and Intravenous Injection.** A sterile preparation is made and standardised to contain 0.05 Gm. ($\frac{3}{4}$ grain) of Cacodylic Acid in 1 Cc. (17 minims) an average dose once in 24 hours. To avoid pain, solutions should be fairly diluted. The same dose diluted with 4 drachms of water is used for **Rectal Injection**.

In psoriasis subcutaneously, but administration of Arsenic *per os* preferred.—L. i./'09,967.

④ **Steriles, Hypodermic** contain the above average dose.

⑤ **Injectio Cacodylatum Compositum.** **Dose.**—(average of) 17 minims (1 Cc.) containing Sodium Cacodylate $\frac{3}{4}$ grain, Iron Cacodylate $\frac{1}{2}$ grain, Strychnine Cacodylate, $\frac{1}{8}$ grain. It should, we find, be rendered slightly acid with Cacodylic Acid at the finish.

Gautier recommends: Cacodylic Acid 5 Gm., Sodium Carbonate *q.s.*, Cocaine Hydrochloride 0.08 Gm., Creosote 6 drops, dissolved in Alcohol 8 Gm. with Sterile Water *q.s.* to 100 Cc., *i.e.* 17 minims (1 Cc.) contain $\frac{3}{4}$ grain, (0.05 Gm.) of Cacodylic Acid for a dose—hypodermically—which is not to exceed 0.1 Gm. ($1\frac{1}{2}$ grains) *pro die*, the average being 0.02 to 0.05 Gm. every 24 hours.—F. N. 1908,46.

⑥ **Solutio de Cacodylato de Sodio Iodo-mercurico Esterilizado.** Sodium Cacodylate 6, Mercuric Iodide 0.75, Sodium Iodide 0.75, Water to 150.

Dose.—Each Cc. contains 0.04 gram of sodium cacodylate and 0.005 Gm. of mercuric iodide.—C. D. ii./'09,194.

⑦ **Strychninæ Cacodylas.** $(C_{21}H_{22}N_2O_2(CH_3)_2AsO.OH = 468.83$ (472.212 I. Wts.)

Dose.— $\frac{1}{30}$ to $\frac{1}{2}$ grain (0.0022 to 0.02 Gm.).

White crystalline powder hardly soluble in water. Should prove a useful salt.

⑩ **Acidum Ethyl-Cacodylicum.** *Syn.* DIETHYLARSINIC ACID.
 $(C_2H_5)_2AsO.OH = 164.90$ (166.048 I. Wts.)

and the propyl derivative $(C_3H_7)_2AsO.OH = 192.72$ (194.080 I. Wts.) have also been prepared.

⑪ **Di-sodium Methylarsenate.** *Syn.* SODIUM METHYL ARSONATE, ARRHENAL "New Cacodyle" $Na_2AsCH_3O_3.H_2O = 200.69$. (202 I. Wts.). FR. CR. (+ $5H_2O$).

Dose.— $\frac{2}{3}$ to 3 grains (0.025 to 0.2 Gm.) *per os* or hypodermically.
 FR. CX.—*Max. single* and during 24 hours *dose* 3 grains.

Prepared by the interaction of Methyl Iodide and Sodium Arsenate in presence of excess of Alkali,

Soluble about 1 in 1 in water, only slightly in alcohol 90%.

Arsenic-content. (With 1 mol. H_2O) = 37.1%.

Uses.—Similar to Sodium Cacodylate *q.v.*

It is stated not to produce Cacodyle Oxide when given by the mouth.

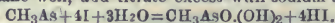
⑫ **Sterules, Hypodermic** $\frac{2}{3}$ grain (0.025 Gm.).

Tests to distinguish organic arsenic bodies.—

A solution of the salt (strongly acidified) gives, with H_2S , a precipitate of mono- and di-sulphide of methylarsine. Arrhenal solutions do not precipitate with baryta water (sodium cacodylate does) neither with magnesia mixture (nor does sodium cacodylate) nor by cold solution of calcium chloride (ditto sodium cacodylate) but are precipitated by nitrates of silver (white silky ppt.; sodium cacodylate none) and mercury (also sodium cacodylate; both yellow, arrhenal the darker of the two). Mercuric chloride, gives a reddish-yellow ppt. with arrhenal, and a white precipitate with sodium cacodylate.

Sodium-*p*-aminophenylarsonate gives a white precipitate with these reagents in every case.

Arrhenal may be estimated by dissolving about 0.2 gram. in 1 to 2 Cc. of water and adding 15 to 20 C.c. of a special hydrochloric and hypophosphorous acid test (*v. infra*). After twelve hours dilute with 20 Cc. of water and filter, washing the residue with water. To the filter and its contents add a known excess of N/10 iodine solution, shake well, and titrate excess with sodium thiosulphate—



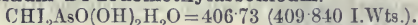
The black body CH_3As is quantitatively produced from 1 molecule CH_3AsO . $(ONa)_2$ therefore 4 atoms of iodine = 1 molecule arrhenal.

To prepare the test dissolve sodium hypophosphite, 20 Gm., in 20 Cc. water and add 200 Cc. hydrochloric acid (1.17 sp. gr.). Sodium chloride is thrown out and removed. To apply the test for detecting traces of arsenic in glycerin (arsenite or arsenate) 5 Cc. glycerin are mixed with 10 Cc. of the reagent. Place in water-bath—brown deposit.

This *Methylarsine* CH_3As , is also obtainable by action of sodium hypophosphite, and sulphuric acid on sodium cacodylate, $2H_3PO_2 + AsCH_3O(OH)_2 = 2H_3PO_3 + CH_3As + H_2O$, as a yellow oil insoluble in water, with strong garlic odour. It polymerises to $(CH_3As)_n$.

⑬ **Basic Quinine Arrhenalate,** $C_{20}H_{24}N_2O_2.AsO.(OH)_2CH_3 = 460.89$ (464.212 I. Wts.). Colourless bitter crystals, melting at 139° , containing about 16% methyl arsenic (arrhenalic) acid, very slightly soluble in water, has been made, as also the corresponding strychnine salt.—C.D. ii./05, 140.

⑭ **Acidum Di-Iodomethylarsonicum.**



Preparation.

By oxidising with nitric acid in the cold the body CHI_2AsI_2 , a constituent of the black oil formed by interaction of 5 parts amorphous arsenic with 42 parts iodobrom in presence of benzene or toluene at water bath temperature. When the interaction is complete, distil off the solvent. After oxidising, filter off the magma

(much charged with iodine), wash it with cold water, and evaporate the acid liquor gently at not exceeding 40°-50°. Yellow crystals throw out containing 1H₂O, which should be recrystallised from warm water.

The insoluble portion is treated with boiling benzene or toluene to remove the iodine. The residual yellow powder contains tetra-iodocacodylic acid (*v. infra*).

⑨ **Sodii Di-Iodo-Methyl-Arsonas**,—CH₂AsO.OH.ONa + Aq. feathery white crystals, very soluble in water.

⑩ **Acidum Tetra-Iodocacodylicum**.—As (CHI₂)₂O.OH = 636.68 (641.664 I. Wts.). Small yellow crystals insoluble in water.

⑪ **Sodii Tetra-Iodocacodylas** (CHI₂)₂ As O.ONa.6H₂O. = 765.84 (771.752 I. Wts.). Beautiful yellow crystals. A very soluble compound (1 in 2). Suggested for use medicinally. See conclusions.

⑫ **Magnesii Ethylarsonas**. C₂H₅ AsO.OOMg. = 175.14 (176.32 I Wts.).

Prepared by treating a Potassium Arsenite Solution with Ethyl Iodide. After reaction the solution is acidified with dilute Hydrochloric Acid and filtered. Chlorine is passed into the filtrate, and Iodine removed. The liquid is made alkaline with Ammonia, treated with Magnesia Mixture in excess, and left 24 hours. The liquid is filtered and evaporated.

White powder soluble readily in acids, very slightly in water. Usually contains 1 molecule H₂O. It is decomposed by heat.

⑬ **Acidum Propylarsonicum**. C₃H₇AsO.(OH)₂ = 166.87 (168.032, I. Wts.)

Prepared by interaction of Arsenious Oxide, Potassium Hydroxide and *n*-Propyl Iodide.

⑭ **Magnesii Propylarsonas**. Has the composition C₃H₇AsO.OOMg. = 189.05 (190.336 I.Wts.).

For these two latter bodies consult complete paper.

(II.) Aromatic Series.

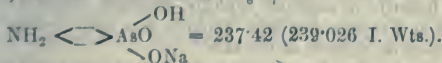
⑮ **Acidum p-Tolyl-Arsonicum** CH₃.C₆H₄.AsO.(OH)₂ = 214.51 (216.032 I.Wts.) is of interest in view of a report of its efficacy on trypanosomes (*vide* Sodium Arsanilate).

Prepared by passing Chlorine through p-Tolyl-Arsenious Chloride. C₇H₇AsCl₂ in presence of water, then warming to 60°-70° the liquor evaporated to dryness, and the substance crystallised from water.

⑯ **p-Aminophenylarsonic Acid**. *Syn.* **Arsanilic acid, Anilin-arsenic acid**. NH₂.C₆H₄.AsO(OH)₂ = 215.54 (217.034 I.Wts.)

Arsanilic Acid is weakly basic. Its Hydrochloride is immediately hydrolysed by water. It is soluble, however, in methyl and ethyl alcohol. It has been employed as

⑰ **Sodii p-Aminophenylarsonas** *Syn.* ★ARSAMIN, ★ATOXYL ★SOAMIN, SODIUM ARSANILATE. C₆H₇N AsO₃Na or



(Usually in commerce + 4H₂O = 308.94 (311.09, I.Wts.)

Our own experiments indicate a water content in this salt of 19 to 22%.

5H₂O = 27.4%, 4H₂O = 25.0%, 4H₂O = 23.0%, 3H₂O = 19.2% nearly. Ehrlich and Berthelm state the salt may be produced with 2 and with 6H₂O. Another statement is to the effect that it contains 4H₂O, another 5H₂O with efflorescence to 3H₂O. The water content varies according to the solvent employed for crystallising.

The efflorescence may be due to the fact that the salt has been crystallised from water. To employ alcohol would, therefore, be preferable.

Dose.— $\frac{1}{2}$ to 3 grains (0.05 to 0.2 Gm.). This dosage *per os* for syphilis has been advised daily for a week, then to be intermitted, but caution is recommended.

Intramuscular injections are made of much larger doses, 10 grains dissolved in water at a time in a total course of 100 grains in treatment of

syphilis, as a substitute for Mercurials. N.B. Not without danger. The upper third of the buttock is the usual site of injection.—B.M.J. ii./o8,393.

Solutions should be freshly prepared with cold boiled water, and may be slightly warmed at time of injection. If kept likely to decompose.

Manufacture.—It was originally prepared by Béchamp *vide* Comptes Rend., 1863, vol. 56, I., p. 1172. Aniline Arsenate is converted into *p*-Aminophenylarsonic Acid by heating to 190° C, using Arsenic Acid and an excess of Anilin. This attained, one neutralises with Sodium Carbonate, decomposes with Nitric Acid, collects the crystalline Acid, neutralises with Sodium Hydroxide, and evaporates to crystallise. Recrystallise from 90% Alcohol.

The now somewhat classic confusion between Béchamp's arsenic anilide and the acid obtained from commercial atoxyl, which was called meta-arsenic anilide (though a sodium salt), may be cleared up by the statement that Ehrlich and Berthelm found the two substances to be identical chemically.

That atoxyl is sodium arsaanilate, and not the anilide of arsenic acid, $C_6H_5NH.(OH)_2AsO$, nor the anilide of met-arsenic acid, $C_6H_5NH.AsO_2$, can be shown—

(1) By the fact that it cannot be hydrolysed into aniline; (2) it contains a primary amino group by the Diazo Reaction—action of Nitrous Acid forms Diazo Compound which combines with Amines and Phenols forming Azo dyes. (3) The Arsenic Acid radicle can be replaced by Iodine yielding *p*-Iodoaniline by the action of Hydriodic Acid by which re-action the Arsenic Acid radicle is completely replaced by Iodine.

A white crystalline powder, with slightly saline taste.

Arsenic Content.—Theoretically on $4H_2O=24.09\%$ (I.Wts.)

Soluble about 1 in 6 of water (some samples may dissolve in a little less. Also soluble about 1 in 125 of alcohol 90% and more so in Methyl Alcohol.) The Anhydrous substance is readily soluble in Methyl Alcohol and practically insoluble in Ether, Acetone, Benzol, or Chloroform.

Incompatible with Mercurials (*e.g.*, Perchloride.—L. i./o8,113) (*c.f.* Hydrarz. Arsanilas) and other heavy metals in solution, also with Acids.

It is stated that Atoxyl is not decomposed by Hydrogen Sulphide Solution. Discussion has arisen on this.

Flavoring.—Is practically tasteless, but any desired Glyl or Syl may be used if preferred.

Uses.—Large quantities of arsenic can be given by it in skin diseases (psoriasis, lichen), in anæmia, syphilis, sarcoma, elephantiasis, malaria, tuberculosis and trypanosomiasis. Syphilis has been treated with 50% Ointment used on chancre of the skin.

The drug is stated to have less than 1/40 the toxicity of Arsenious Acid.

ⓂPills of Arsamin contain $\frac{1}{2}$ grain and upwards. ⓂElixir Arsamin contains $\frac{1}{2}$ grain in each drachm and may be prepared stronger if required. ⓂSterules (Hypodermic) of Arsamin $\frac{1}{2}$ also $\frac{3}{4}$ grain in 17 minims (1 Cc.) of water, and larger up to 15 grains in each.

Solutions internally are not advised as the acidity of the stomach may decompose it and produce toxic symptoms.—L.ii/o8,802. It has been suggested to overcome this with Ichthyol-Salieyl (*q.v.*) added to a pill.—B.M.J.E. ii./o7,7.

Purves Stewart has prescribed the Elixir considerably in cases of disseminated sclerosis and tabes without having witnessed bad effects from the drug, but cases must be watched carefully.

Wray suggested that Atoxyl should be first heated with a little alcohol, in which it is only slightly soluble, to sterilise it prior to dissolving it in boiled water for injection.—B.M.J. ii./08,862.

④ **Atoxyl Paste.** 10% may from our experiments be prepared with *Pigmentum Caseinæ q.v.*

In syphilis early application to primary sores, with large injections simultaneously into the buttock.—L.ii./08,505.

④ **Tablets Arsamin** contain one grain. ④ **Capsules Arsamin 1,** and 2 grains, also ④ **Capsules Arsamin 1** grain with **Blaud Pill** 5 grains and with **Quinine** 3 grains are prepared and are useful for treatment in cases where the added drugs suggest themselves.

Testing the purity of Sodium Arsanilate.

Apart from estimation of arsenic contents *vide p. 162* and determination of water of crystallisation, it may be mentioned that precipitation with Silver Nitrate is of little use to indicate arseate as impurity. From our experiments it will not show more than 0.5% by color of the precipitate.

Sodium Arsanilate in Marsh apparatus is reduced yielding usual black stain on porcelain.

To detect Arsenate as impurity in Sodium arsanilate we found after experimenting that the best mode of proceeding is to dissolve 0.5 Gm. in 2 Cc Hypophosphorous Acid, warming and diluting to 10 Cc. with water, then add 5 drops Hydrochloric Acid, pass H_2S through the liquid, and warm slightly alternately. A bright orange yellow pp. will form rapidly if 0.1% Sodium Arsenate be present as impurity (W.H.M.).

References to Use of Sodium Arsanilate.

In Trypanosomiasis.—Leader on. Ultimate conclusion is that it should be given with a mercurial, *e.g.*, 2 or 3 doses, and with the second and third give Mercury Succinimide with perhaps a third dose alone afterwards. The combination with Iodipin also of value.—L. i./08, 113. This mode of use has been carried out more recently by the use of Hydrargyri Arsanilas, *vide infra*.

Alone and combined with Trypanroth. Aqueous solutions 5% strength in 5 Cc. doses intravenously or subcutaneously.—M.A. 1906,510; B.M.J. i./05,1140.

Sir P. Manson gave $2\frac{1}{2}$ grains every third day.—B.M.J. ii./06,796.

At the London Hospital 25 to 30 minims of 10% solution used on alternate days with benefit. Also large number of other recorded results.—B.M.J. i./07,132.

Koch states no doubt exists as to specific action of the drug. 900 patients under treatment.—B.M.J. i./07,152.

Value still problematical.—L. i./07,282.

Thomas of Liverpool first applied Atoxyl in trypanosomiasis. 2 Cc. of saturated solution (about 20%) as first dose—after 18 days repeated. Immediate effect is magical, but it only helped the sufferers in dying. The actual chemical substance Sodium *p*-Amino-phenyl Arsonate might work as well as "Atoxyl."—L. ii./07,1161.

Not more than $\frac{1}{4}$ Gm. to be given to start with. May be increased to 1 Gm.—L. ii./07,767.

Atoxyl will cause trypanosomes in rats to disappear, but they recur, and death is only delayed. *p*-Tolyl-arsonic acid (*antea*) caused an

effective temporary disappearance of trypanosomes, even in a recurrent case after use of atoxyl. Proc. Roy. Soc., /07, B.79,505.

Trypanosomiasis treated with Atoxyl apparent recovery.—L.ii./08,867.

International Sleeping-Sickness Bureau Report,—Bagshawe. A few resistant trypanosomes are left behind after Atoxyl,—in the bone marrow,—so cannot cure; they break out again. Recommends Antimony or Mercury to follow up the treatment.—L., i./09,111.

In Trypanosomiasis combined use of Atoxyl and Mercury, 50 to 60% of rats treated were saved. The Amido group seems essential to trypanocidal action. Nierenstein.—B.M.J., ii./08,840.

The trypanosomes become tolerant to the drug (arsenic in general), and when this property is once acquired it remains as an hereditary characteristic. In mice the trypanosomes can all be killed before this tolerance is acquired, but in man and other animals this is not so. Similar tolerance can be obtained to other trypanocidal drugs, but the tolerance to arsenic is of a degree out of all proportion to that which can be obtained with other substances. The explanation may be that the drug is not absorbed by the cell.

The Committee on Sleeping Sickness of the Royal Society hit upon antimony as possibly better—as having little tendency to induce condition of tolerance. Woodhead and Dixon found Tartar Emetic (*q.v.* for further information) rapidly kills trypanosomes, and animals affected with either sleeping sickness or nagana can be cured by injections. Injections, however, cause tissue destruction and sloughing sores at the site of injection. This type of action easily explains temporary benefit arising from arsenic in pernicious anæmia. This disease is probably caused by a protozoon. Quinine, antimony, mercury, which specifically affect protozoa, should be tried in pernicious anæmia.—Dixon, Pr. Feb. '09,248.

The parasite disappears from the blood under atoxyl—it actually creeps through the walls of the blood-vessels to escape from the arsenic and returns when the medicine is stopped.—Cantlie C.D. ii/08,593.

Hodge reported on Sleeping Sickness to the Bureau that though so far organic arsenic is best the outlook is not hopeful.—B.M.J. ii./09,1569.

In sleeping sickness best given hypodermically not *per os*, nothing gained by injecting into the spinal canal. In the majority of cases the parasites are promptly removed from the blood. *The treatment is not void of danger.* First symptom is *contraction of fields of vision*, which must be carefully looked for during treatment. Useless to prolong treatment for a period of several months. Arsanilate cannot be given in large enough quantity to act as a complete steriliser. Have any cures resulted from Arsanilate alone? Answer uncertain.—Bagshawe.—L.ii./09,1196.

Sodium Arsanilate plus Mercury.—Combined have been used without much favor.—*Ibid.* **Sodium Arsanilate plus Orpiment** (Arsenic Trisulphide $As_2S_3 = 244.46$ (246.13 I. Wts.) is largely given at the time of writing, but no conclusion. Ehrlich thinks the trypanosomes never become resistant to inorganic Arsenic.—*Ibid.*

Sodium Arsanilate plus Tartar Emetic.—This seems to be more effective than any other combination, the Arsanilate under the skin once a week and the Antimony Salt into a vein once or twice a week or in series. Previous administration of Caffeine before Antimony is advised.—*Ibid.*

In *syphilis* injections 10% strength are made into the buttock.

Dose.—Two injections of 0.75 Gm. at two days interval then 4 injections of 0.50 Gm. (3 days interval).—B.M.J. i./07,1458. Similar dosage.—B.M.J.E. i./08,8.

Syphilitic affections of the optic nerve and of the central nervous system not benefitted.—B.M.J.E. i./08,19.

Doubt as to value of.—M.A. 1908,1,6.

Three grains (0.2 Gm.) in 10% solution daily doses never exceeded. No advantage in large quantities.—B.M.J.E. ii./08,20.

Syphilis (30 cases) treated by Arylarsonates. 10 grain doses of Soamin at each injection on alternate days, until a total of 100 grains has been given. All cases did well.—L. ii./08,810.

Syphilitic ulcers cured by 8 grain doses of Soamin. (Intramuscular Injections).—L. ii./08,1447.

The drug is eliminated by the skin and especially by the kidneys, and in some cases causes a transitory albuminuria. Liable to accumulate in the system. *Inter alia* may produce blindness. $\frac{1}{2}$ Gm. dose every other day should not be exceeded—10 days treatment, then 14 days interval. Primary chancres remained stationary even on prolonged treatment. Will never become a specific.—B.M.J.E. i./09,39.

Four cases of total blindness following Atoxyl treatment in Uganda. Soamin is a staple preparation used successfully, but now Arsacetin preferred.—B.M.J. ii./09,381.

In locomotor ataxy with benefit. Not necessary to give intramuscularly, subcutaneously as good. The Soamin to be in 2 drachms of water, however.—B.M.J. ii./09,204.

Question as to decomposition of Arsacetin by corrosive sublimate in same manner as Atoxyl is decomposed. Had given up Atoxyl on account of cases of optic atrophy.—B.M.J. ii./09,500.

Syphilis. 120 cases treated with Arsenic (Organic), and had found less soreness of the throat than with Mercury, but since observations in the Uganda had given up Atoxyl.—L. i./09,396.

A case presenting the earlier symptoms of general paralysis—recovery under Soamin: there was not the slightest suspicion of syphilis.—B.M.J. i./10,192.

In syphilis early application necessary.—L. ii./08,505.

Virulent syphilis, soamin and potassium iodide—a cure. Soamin enabled this patient to take potassium iodide, which he could not tolerate at all previously.—B.M.J. i./10,504.

Tuberculosis treated by 10 grain injections.—L. i./10,176.

Malaria treated with success by subcutaneous injection of 1.2 Cc. of 10% solution.—B.M.J.E. ii./07,52.

Elimination of total Arsenic of Atoxyl was found in the case of man to be complete in nine hours. The blood of rabbits after intravenous injection of Atoxyl was found to contain same almost exclusively in the blood serum, and only in very minute quantity in the corpuscles. The former fact may have bearing on the therapeutic value in hematozoal diseases, while the latter accounts for the resistance which the malaria parasite exhibits towards Atoxyl.—B.M.J.E. i./09,95.

Relapsing Fever treated by Atoxyl. Large quantities were given, *e.g.*, doses of from 9 to 23 Cc. of 20% solution.—M.P., Oct. 16, '07, p. 420.

Kala Azar, a case without improvement.—L. ii./08,444. Successful treatment by 3 grains of Atoxyl every third day.—B.M.J. i./09,843.

Banti's disease treated successfully by injections up to 2 grains every second day.—M.P.C. Sept. 22/09, p. 322.

GENERAL REFERENCES.

History and Romance of Arsenic.—David Livingstone, Explorer, Missionary (1813-1873) recommended Arsenic in tsetse fly disease.—Gordon Sharp, P.J. ii./08,186,232.

Atoxyl and Soamin are Trade names for Sodium Arsanilate.—B.M.J. i./09,370.

Self-drugging with Organic Arsenic preparations by the mouth, much unnecessary mental torture was caused.—L. i./09,613.

Atoxyl is said to decompose in solution, even in the cold, into Anilin and Sodium Arsenate. Not so Acetyl-Atoxyl *q.v.*—L. ii./08,1315. We tried this and did not find it true.

In interstitial keratitis Atoxyl 0.25 to 0.5 Gm. once a week in mild cases, more frequently in severe, efficacious—not more than 6 Gm. in all to be given. A course of 12 injections usually cures or almost cures, treatment to be in conjunction with mercury intramuscularly.—S. Stephenson, L. ii./08,728.

On carcinomata effect is sometimes most striking—tumour ceases to grow, then becomes smaller and harder. In a case of epithelioma of the tongue the shrinkage was obvious. There is, however, not a proportionate increase in strength—in fact an asthenia is produced requiring treatment.—B.M.J. ii./08,1720.

In tuberculosis use of Atoxyl in 15% Solution, intravenous dose 0.05 to 0.3 Gm. (or Cc. approx.) combined with small doses of Tuberculin.—B.M.J.E. i./09,48.

A paper by Nierenstein showed that the substance atoxyl does not act simply as an antiseptic, and that the killing power on trypanosomes is not therefore proportional to the amount of arsenic introduced into the system by this non-toxic body: there is a co-operation between the living tissue and the drug.—Annals of Tropical Medicine. Parasitology, Vol. ii., No. 3, July, '08 (Liverpool School Trop. Medicine).

The substance is eliminated by the skin and especially by the kidneys. May cause transient albuminuria. May accumulate.—B.M.J.E. i./09,39.

Ehrlich has pointed out that a drug can only be of value in infectious diseases if taken up more readily by the parasite—bacterio-tropous (*syn.* ætiotropous)—than by the organism—organotropous. Many protozoa take up dyes, so that Trypan Red (from 1 molecule tetrazotised benzidine-mono-sulphonic acid and 2 molecules sodium naphthylamine-3:6-disulphonate) is active against trypanosomes.

He would, apparently, use simultaneously a number of substances, *e.g.* Atoxyl, Parafuchsin, Trypan Red and Trypan Blue, chosen in such manner that their actions are concentrated on the parasites—whilst in the

organism of the vertebrate they are distributed over several different organs—by such means he hopes to cure the disease. He puts forward the idea of combining a potent substance which will kill off the bulk of the trypanosomes with a weaker one, which will account for the few remaining trypanosomes, which otherwise would certainly cause a relapse in course of time.

Thus Mercuric Chloride has been demonstrated a useful adjuvant to Atoxyl treatment—alone it (Mercuric Chloride) is incapable of complete curative action.

Changing the medicine is often the secret of success—thus in this instance Arsenic is given to drive the trypanosomes out of the blood vessels, then Mercury is administered.—Cantlie, C.D. i./o8, p. 302.

Alternate use of Arsenic and Mercury suggests a new lease of life for Donovan's Solution.—P.J. ii./o8, 234.

The untoward effects occasionally resulting from atoxyl have been thought to be due to anilin poisoning, but it has been shown that neither anilin nor *p*-aminophenyl-sulphonic acid can be found in the urine after administration of atoxyl.—Biochem. Zeitsch. 1908, 10, 240.

On the contrary, it is apparently rapidly eliminated in the urine wholly unchanged, or as an allied derivative. Some of it is, however, broken up and taken into the body.—Chem. Zentr. 1908, ii./1542, 1543.

According to Igersheimer sodium arsanilate may produce effects on the nervous, excretory, and alimentary systems.—Arch. Path. Pharm. Suppl. 1908, 282.

Cerebro spinal meningitis treated by intravenous injection of soamin.—B.M.J. i./10, 193.

Ⓔ **Hydrargyri Arsanilas.** MERCURY ATOXYLATE (MERCURY *p*-AMINO-PHENYLARSONATE). (*Patented.*) *Syn.* ASYPHIL.-Ciùffo, Int. Cong.; P.J. ii./o9, 867. $(\text{NH}_2-\text{C}_6\text{H}_4.\text{AsO.OH.O})_2\text{Hg} = 627.88$ (632.052 I. Wts.).

Dose.—Vide infra.

More efficacious than Mercury or Atoxyl alone in syphilis. Very slightly soluble in water, but kills trypanosomes and spirochetes.—M.'o8, 151; B.M.J.E. i./o9, 56; P.J. ii./o9, 373.

Lambkin found the combined treatment simultaneously with Mercury and an Arylarsonate valuable (contrary to existing opinion that Mercurial and Arsenical injections might prove dangerous). He has been using *Mercury Atoxylate*, which contains 23.7% Arsenic and 31.6% Mercury. (It contains no water of crystallisation). Its solutions do not precipitate Albumin. May be given intramuscularly in Olive Oil, Liquid Paraffin or Creosote-Camphoric-Palmitin—a proprietary preparation.

Dose.—Intramuscularly (not subcutaneously), of a suspension strength Mercury Arsanilate 1 drachm, vehicle 9 drachms.

	1st injection	...	...	7 minims.	= $\frac{3}{4}$ grain.
After 3 days	2nd	„	...	7	„ = $\frac{3}{4}$ grain.
„ 3	3rd	„	...	12	„ = 1 $\frac{1}{2}$ grains.
„ 7	4th	„	...	12	„ = 1 $\frac{1}{2}$ grains.

Complete course being eight injections, then one month's rest and repeat. No toxic symptoms. Thirty cases derived benefit.—L. i./10, 23.

In syphilis of value. Small doses used.—B.M.J.E. i./10, 36.

Ⓐ Acetyl-*para*-amino-phenyl-arsonic Acid.—

$\text{CH}_3\text{CO.NHC}_6\text{H}_4\text{AsO}(\text{OH})_2 = 257.24$ (259.05 I. Wts.).

Preparation.—Mix Sodium Arsanilate 31 with Acetic Anhydride 55, heat is produced, the mixture boils up and forms a clear solution and then converts itself into a mass of crystals. Cool and add water 300 and Hydrochloric Acid (Sp. Gr. 1.12) 52. After standing several hours collect acetylated product, wash with water, alcohol and ether—yield stated to be practically theoretical. This substance is stated to be stable at 200° C. Forms glistening leaflets, easily hydrolised by hot alkalies and acids.

Arsenic content 28.93%.

Is used in the form of the Sodium Salt.—

Ⓐ Sodium Acetyl-*p*-amino-phenyl-arsonate. *Syn.* ★**Arsacetin** (Patented). Sodium Acetyl-Arsanilate, Acetyl-Atoxyl.

$\text{C}_2\text{H}_3\text{O.NH.C}_6\text{H}_4\text{AsO}(\text{ONa})(\text{OH}), 5\text{H}_2\text{O} = 368.52$ (371.122 I. Wts.).

Dose.—Similar to that of Atoxyl, but see refs. later. Can be prepared by adding Acetyl-Arsanilic Acid (*v. ante*) to warm concentrated Soda Solution *q.s.* On cooling, the salt crystallises in fine light needles which are easily soluble in water and Methyl Alcohol.—Berichte, No. 12, July 20th, 1907, page 3292., and which stand boiling.—L. ii./o8,1315.

Soluble.—1 in 10 of water.

Even less toxic than Atoxyl.—Ehrlich L.i./o7,1,634 ; ii./o7,9,351.

Trypanosomiasis cured in over 93% of cases with this substance, whilst largest safe doses of Atoxyl yielded only 8% of cures.—L.i./o8,1154 B.M.J.i./o8,929.

Uses.—Said to be successful in syphilis—an average of twenty injections of 9 grains suffices—each week two injections being made on two successive days. There appears from information received to be some doubt, however, as to which is the more efficacious, the acetylated or the parent substance.

Mice infected with most virulent strains of trypanosoma, and which without treatment would die within three days, can in a large proportion of cases be saved by Acetyl-Atoxyl if it is given 12 to 14 hours before death occurs in the control animals.

Tests to distinguish Arsacetin from Sodium Arsanilate.

	ARSACETIN.	SODIUM ARSANILATE.
5% Solution with equal volume of Liq. Sod. Hypochlor.	Nil.	Brownish yellow color.
The above with a few drops of Liquid Phenol (Indophenol Test U.S. as under Antifebrin.)	Very light blue color coming slowly. Unaffected by strong Ammonia.	Immediate dark brownish green becoming purer green with strong Ammonia.
To 2 Cc. of 5% Solution add 5 drops Hypophosphorous Acid 30% and 5 drops strong Hydrochloric Acid.	White Crystalline pp. in the cold turning yellow on boiling.	Nil in the cold. Slightly yellow on boiling, pale yellow pp. on standing.
Zinc and Sulphuric Acid as reducing Agent.	Greenish scum on surface after 2 to 3 minutes.	Yellow pp. after 2 or 3 minutes.
2 Cc. of 5% Solution with 1 Cc. Formalin and $\frac{1}{2}$ Cc. Strong Hydrochloric Acid.	Reddish brown color coming on boiling 3 or 4 seconds.	As Arsacetin—but color comes slightly earlier.

	ARSACETIN.	SODIUM ARSANILATE.
<i>On hydrolysis with Dilute Sulphuric Acid.</i>	Acetic odor.	Nil.
<i>Silver Nitrate on Neutralised hydrolysed product.</i>	Creamy colored gelatinous pp.	Heavy white pp.
<i>Addition of equal vol. of Dilute Sulphuric Acid to a 4% Solution of the original Salts.</i>	Abundant crystalline pp.	Nil.
<i>Addition of 4 or 5 drops $\frac{N}{10}$ $K_2Mn_2O_8$ to about 2 Cc. of 5% Solutions.</i>	Red color, no pp. on boiling.	Brown color pp. on boiling.
<i>Barium Chloride Solution and Strong Ammonia equal parts added to 5% Solutions.</i>	Dense Crystalline pp.	Nil.

The first five tests are referred to.—J.C.S.A.ii./o8,1000. The others we arranged.

Arsacetin References.

In sleeping sickness 12—15 grain doses without inconvenience, but $7\frac{1}{2}$ grain doses in syphilis have produced toxic symptoms.—L.ii./o8,1315.

Dose.—Into gluteal muscles 20% (1) Solution, 3 Cc. for a dose,—equal to 0.6 Gm. (9 grains); solution, needle and syringe to be warmed. In primary, secondary and tertiary syphilis curative action obtained. Recurrence of symptoms however. Mercury had to be employed—action not durable—symptoms of intoxication, headache, nausea, oliguria, and albuminuria occurred.—B.M.J. E.i./o9,79.

In syphilis dose as above of Acetyl Atoxyl combined with energetic mercurial injection on two consecutive days in each week.—L.ii./o8,392.

Lambkin employed Arsacetin—cases responded in a marked manner. He used 50 minims of 15% solution (=8 grains) every alternate day until 100 grains had been given, as a rule alone, but simultaneous use with Mercury also useful in some cases. A second course should be given after three months (earlier if necessary) and a third course in six months whether signs of recurrence or not.—L.ii./o9,551; B.M.J.ii./o9,381.

In sleeping sickness therapeutically equals Atoxyl, and it is more stable, but blindness occurs after its use.—Bazshawe.—L. ii./o9,1193.

In the treatment of syphilis with Arsacetin, and subsequently with mercury, it is necessary to wait a fortnight after the last injection before beginning with Mercury.—B.M.J. ii./o9,820.

A leader or organic arsenic.—Pres. 1910, p. 1.

Ⓐ **Arsenophenylglycin.** $(AsC_6H_4NH_2CH_2COOH)_2 = 446.96 (450.068 \text{ I. Wts.})$.

In sleeping sickness said to be most promising. Ehrlich thinks it acts (1 Gm. doses stated to be borne by man!) on that part of the trypanosome which is concerned with multiplication—not necessary to kill all the parasites in the organism. Word of warning as to use of, on cases previously relapsed under other treatment.

Tryparosan. Ehrlich says is a powerful adjuvant to Arsenophenylglycin.—L. ii./o9,1196.

Ⓑ **Sodium Arsenophenylglycin.** $(AsC_6H_4NH_2CH_2COONa)_2 = 490.72 (494.052 \text{ I. Wts.})$. Yellow easily soluble powder. For various eye affections and eczema 5% ointment employed. The Salt has to be kept in sealed tubes (P.J. i./o9,344)—this is a disadvantage —L. ii./o9,552.

Ⓒ **Para-Oxybenzylidine Arsanilic Acid.** Tri-oxybenzylidin Arsanilic

lic Acid, 'Arsacetin' and Arsenophenyl-glycin, the latter partially oxidised, and finally pure Arsenophenyl-glycin made *in vacuo* were employed experimentally on trypanosomes in animals. The last mentioned was was found to be an almost ideal medicament in nagana.—B.M.J.E. i./09, 91.

Para-Aminophenyl-Stibinic Acid.—Analogous with Arsanilic Acid. Has been used in sleeping sickness,—injections too painful for general use.—L.ii./09, 1195.

① **Acidum Dimethyl-Amino-Phenyl-Arsonicum.** $(\text{CH}_3)_2\text{NC}_6\text{H}_4\cdot\text{AsO}(\text{OH})_2=243\cdot36$. (245.066 I. Wts.)

Preparation.—

15 grams dimethyl-anilin are mixed with 25 grams arsenious chloride and heated two hours on a water-bath, and poured into 300 to 400 Cc. cold water. The mixture dissolves in the water. Add sodium hydroxide in excess until the dimethyl-anilin-arsenious oxide at first thrown out re-dissolves (it goes milky at first). Shake out the dimethyl-anilin used in excess with petroleum ether and add hydrogen peroxide to the alkaline liquor. Dilute acetic acid throws out the body.

② **Sodii Dimethylaminophenylarsonas** *Syn.* Sodium Dimethyl-Arsanilate. $(\text{CH}_3)_2\text{N}\cdot\text{C}_6\text{H}_4\cdot\text{AsO}(\text{OH})\text{ONa}\cdot 5\text{H}_2\text{O} = 354\cdot138$ (357.138 I. Wts.).

Sodium dimethyl-arsanilate crystallises in leaflets, is soluble about 1 in 14 in cold water and slightly in alcohol, more so in hot and in dilute acetic and mineral acids.

③ **p-Amino-Phenyl-Arsonic Toluene-Sulphonate.** $\text{C}_6\text{H}_4\text{NH}_2\cdot\text{AsO}(\text{OH})\cdot\text{O}\cdot\text{SO}_2\text{C}_7\text{H}_7=368\cdot49$ (371.152 I. Wts.).

A new compound prepared by the Schotten and Baumann reaction by condensing para-toluene sulphone-chloride, $\text{C}_7\text{H}_7\text{SO}_2\text{Cl}$ (a by-product in sulphonating toluene), with sodium arsanilate.

As suggested by G. T. Morgan this would have the advantage of splitting up into a comparatively innocuous body $\text{C}_7\text{H}_7\text{SO}_2\text{NH}\cdot\text{C}_6\text{H}_3$ in the system

It is obtainable in a white crystalline condition soluble in hot water.

④ **Bis-amino-phenyl Arsinic Acid** $(\text{C}_6\text{H}_4\text{NH}_2)_2\text{AsO}\cdot\text{OH}$. and the bis-aminotolyl body have been prepared as also Triamino-Triphenylarsine Oxide $(\text{C}_6\text{H}_4\cdot\text{NH}_2)_3\text{As}\cdot\text{O}$ (Trans. Chem. Soc. 1909, Vol. 95, p. 1473).

⑤ **Acidum Di-Camphoryl-Arsinicum** $(\text{C}_{10}\text{H}_{15}\text{O})_2\text{AsO}\cdot\text{OH}=407\cdot22$ (410.208 I. Wts.). Made, by condensation of Arsenious Chloride with Sodium Camphor in dry Toluene, hardly soluble in water, readily in Benzene, Chloroform, etc. The alkali salts are, however, extremely soluble.

ESTIMATION OF ARSENIC IN ORGANIC SUBSTANCES.

Several methods are provided in the complete paper referred to. The following is simplest (arranged by the Author), and gives good results: Powder the substance carefully, mixing with about equal quantity of potassium nitrate, moistening with water, then oxidise with nitric acid—taking up the dried material with acetic acid, adding sodium acetate solution, and titrating with Standard Uranium Acetate Solution 1 c.c.=0.0053 gram arsenium. For example, 0.464 gram "arsamin" required 20.2 c.c. uranium solution = 0.10706 gram arsenium = 23.08 per cent. (theory with $\frac{4}{3}\text{H}_2\text{O} = 23.4$ per cent.).

Quite recently a Sodium Peroxide fusion method with ultimate reduction of the arsenic to arsenite and titration with Volumetric Iodine solution has been advocated (see Trans. Chem. Soc., 1909, vol. 95, p. 1478). Though a little tedious, the process gives remarkably concordant results.

CONCLUSION.

Inorganic arsenic taken internally is slowly eliminated; it remains stored up in the system—liver, kidneys, etc.—for a long time; but the same does not appear to be true with regard to the organic compounds which have been used medicinally. The ideal organic arsenic body should pass away quickly from the region of the stomach, but, on the other hand, for the treatment of diseases of the nature of trypanosomiasis and syphilis a slowly dissolving body would seem to be of importance so as to prolong the action.

It is difficult to generalise on the effects which all these bodies would have on the system. So far as the organic radicle is concerned, if its importance is not outweighed by the arsenic and the arrangement of that element in the molecule of the substance, one may point out that in general fatty bodies tend to give rise to tremor, convulsions, and paralysis, whilst aromatic bodies produce anæsthesia.

The chemistry of the arsenic body administered may be tolerably well known, but the protoplasmic molecule with which it is brought in contact is not understood.

The following figures have been calculated showing the actual Arsenic content of some of these bodies. Their Solubilities have also been determined in a number of cases.

ARSENIC COMPOUND AND FORMULA.	Molecular Wts., employing inter- national 1910 Atomic Wts.	Arsenic content per cent.	SOLUBILITIES.	
			Water.	Alcohol 90%.
Acid, Arsenic, $\text{AsO}(\text{OH})_3$	141.984	52.8	2 in 1	Very
Acid, Cacodylic, $(\text{CH}_3)_2\text{AsO.OH}$	135.016	54.3	2 in 1	1 in 4
Cacodylic, $(\text{CH}_3)_2\text{As}-\text{As}(\text{CH}_3)_2$	210.016	71.1		
Cacodyl Oxide $(\text{CH}_3)_4\text{As}_2\text{O}$	226.016	66.3		
Sodium Cacodylate $[(\text{CH}_3)_2\text{AsO.O}]\text{Na}_3\text{H}_2\text{O}$	214.056	35.0	2 in 1	About 1 in 1
Magnesium Cacodylate $[(\text{CH}_3)_2\text{AsO}_2]_2\text{Mg}$	298.336	50.25	1 in 3	Insoluble
Iron Cacodylate $[(\text{CH}_3)_2\text{AsO}_2]_3\text{Fe}$	466.874	48.17	1 in 15	Insoluble
Guaiacol Cacodylate, $(\text{CH}_3)_2\text{AsO.O.H.C}_6\text{H}_4.\text{OH}(\text{OCH}_3)$	262.080	28.6	1 in 25	1 in 1.5
Acid, Ethyl-cacodylic (diethyl-arsinic), $(\text{C}_2\text{H}_5)_2\text{AsO.OH}$	166.048	45.1		
Acid, propyl Cacodylic, $(\text{C}_3\text{H}_7)_2\text{AsO.OH}$	194.080	38.6		
Di-sodium Methylarsenate (Arrhenal) $\text{CH}_3\text{AsO}(\text{ONa})_2\text{H}_2\text{O}$	202.0	37.1	1 in 1	Slightly
Quinine Arrhenalate, $\text{C}_{20}\text{H}_{24}\text{N}_2\text{O}_2\text{CH}_3\text{AsO}(\text{OH})_2$	461.212	16.1		
Acid, Di-iodo Methylarsonic $\text{CHI}_2\text{AsO}(\text{OH})_2\text{H}_2\text{O}$	409.840	18.2	1 in 10	1 in 10
Sodium Di-iodo Methylarsonate $\text{CHI}_2\text{AsO}(\text{OH})_2\text{ONaAq}$ (on anhydrous salt)	413.816	18.1	1 in 1	Slightly
Acid, Tetra-iodo Cacodylic $(\text{CHI}_2)_2\text{AsO.OH}$	641.664	11.7	Insoluble	1 in 600
Sodium Tetra-iodo-Cacodylate $(\text{CHI}_2)_2\text{AsO.O}.\text{ONa}.6\text{H}_2\text{O}$	771.752	9.7	1 in 2	Slightly

ARSENIC COMPOUND AND FORMULA.	Molecular Wts. employing Inter- national 1910 Atomic Wts.	Arrive content per cent.	SOLUBILITIES.	
			Water.	Alcohol 90%.
Magnesium Ethyl Arsonate, $\text{MgAsO C}_2\text{H}_5\text{O}_2$.	176.32	42.5	Very slightly	Almost insoluble
<i>n</i> -Propyl-arsonic Acid, $\text{C}_3\text{H}_7\text{AsO}(\text{OH})_2$..	168.032	44.6		
Magnesium Propyl Arsonate $\text{C}_3\text{H}_7\text{AsO}_2\text{O}_2\text{Mg}$.	190.336	39.4	Pract. insoluble	
<i>p</i> -Tolyl-Arsenic Acid, $\text{CH}_3\text{C}_6\text{H}_4\text{AsO}$ $(\text{OH})_2$	216.032	34.7	Slightly (more so hot).	Slightly
<i>p</i> -Amino-phenyl-Arsenic Acid, $\text{NH}_2\text{C}_6\text{H}_4\text{AsO}(\text{OH})_2$ (Arsanilic Acid) ..	217.034	34.5	Slightly (more so hot).	Slightly
Sodium <i>p</i> -amino-phenyl Arsonate $\text{NH}_2\text{C}_6\text{H}_4\text{AsO.OH.ONa.5H}_2\text{O}$..	329.106	22.8		
Ditto Ditto $+4\frac{1}{2}\text{H}_2\text{O}$..	320.098	23.4		
Ditto Ditto $+4\text{H}_2\text{O}$..	311.090	24.09	} 1 in 6 } about	} about } 1 in 125
Ditto Ditto $+3\text{H}_2\text{O}$..	293.074	25.6		
Ditto Ditto Anhydrous.	239.026	31.4		
Mercury Atoxylate $(\text{NH}_2\text{C}_6\text{H}_4\text{AsO.OH.O})_2\text{Hg}$	632.052	23.7	Insoluble	
Sodium Acetyl- <i>p</i> -Amino-Phenyl- Arsonate. $\text{CH}_3\text{CO.NH.C}_6\text{H}_4\text{AsO.OH.ONa.5H}_2\text{O}$..	371.122	20.2	1 in 10	Insoluble
Arseno-phenyl-glycin (As. $\text{C}_6\text{H}_4\text{.NH.CH}_2$ $\text{COOH})_2$	450.068	33.3		
Dimethyl-amino-phenyl-arsenic Acid. $(\text{CH}_3)_2\text{N.C}_6\text{H}_4\text{AsO.OH}$	245.066	30.6	Almost insoluble	Almost insoluble
Sodium Dimethyl-Amino-Phenyl- Arsonate. $(\text{CH}_3)_2\text{N.C}_6\text{H}_4\text{AsO.OH.ONa.5H}_2\text{O}$..	357.138	21.0	1 in 14 (more in hot).	Slightly (more if hot).
<i>p</i> -Amino-Phenyl-Arsenic- toluene-sulphonate. $\text{NH}_2\text{C}_6\text{H}_4\text{AsO.OH.OSO}_2\text{C}_7\text{H}_7$	371.152	20.2	Slightly	Slightly
Sodium Salt (anhydrous).	393.144	19.07	Extremely	Slightly
Acid Di-camphoryl-arsinic. $(\text{C}_{10}\text{H}_{15}\text{O})_2\text{AsO.OH}$	410.208	18.3	Hardly	Easily

The arsenic contents however of the substances mentioned in the preceding list do not necessarily act as a guide to the posology of the bodies.

Tolerable solubility in water is probably a desideratum for therapeutic purposes.

In the case of sodium arsanilate, one of the most popular of the arsenical bodies, most of this substance, as previously stated, passes off intact, only a portion of it being broken up. It is an open question whether the elimination by the kidneys of such large quantities of an exceedingly soluble arsenic-aniline compound is ideal therapeutics. Effects on the "nervous, excretory, and alimentary systems" have been observed with its use. "Transient albuminuria" has been recorded.

The NH_2 group is, according to one authority, an essential to arsenic in combating trypanosomes. If this be true, it is none the less strange, and effectually limits the difficulties of the task in hand.

Acid radicles. *e.g.*, acetyl groupings—introduced into the amino group in sodium *p*-amino-phenyl-arsonate lessen its toxicity. Introduction of a methyl group is stated not to reduce toxicity. Complete substitution of the NH_2 group by iodine increases toxicity. Replacement of the same by OH increases toxicity also.

A. D. Waller, of the Physiological Laboratory, London University, has examined several of the soluble substances. On the Sartorius muscle of frog it was found, for example, that a 5-per-cent. solution of di-iodo-methyl-arsonic acid, $\text{CHI}_2\text{AsO}(\text{OH})_2$ was infinitely more active than a solution of dimethyl-arsamin of the same strength. Indeed, the latter substance was comparatively non-toxic. Neither of these substances have been employed in medicine. It should be noted that both substances contain practically the same content of arsenic—namely, 20 per cent. approximately. They are, however, very different in chemical constitution. In addition the following in solution were compared :

Sodium tetra-iodo-cacodylate.

Arsamin

Arsacetin

Sodium di-iodo-methyl-arsonate.

Arsamin and sodium di-iodo-methyl-arsonate had apparently the least effect on muscle, whilst of this series arsacetin had more, and sodium tetra-iodo-cacodylate was the most potent. From these results there would seem to be some utility for the *sodium-di-iodo-methyl-arsonate* by reason of its relative non-toxicity, combined with its high content of iodine in addition to arsenic, and on account of its extreme solubility.

The latter remarks would also apply to the *sodium tetra-iodo-cacodylate* compound, but this is more toxic.

With regard to the non-toxic bodies, *sodium dimethyl-p-amino-phenyl-arsonate* seems worthy of attention, as also does *p-tolyl-arsonic acid*, which was found, as mentioned earlier, to be active on trypanosomes.

The muscle test is only applicable to soluble substances.

G. T. Morgan has determined the carbolic-acid coefficient of a number of these substances; the coefficient of the di-iodo-methyl arsonic acid to *B. coli communis* is very high—much higher than that of sodium arsanilate.

A large number of references to British and foreign literature on the subject are provided in the treatise on organic arsenic.

Ⓐ ATROPINA (*Off.*). FR. CX.

$\text{C}_{17}\text{H}_{23}\text{NO}_3 = 287.05$ (289.194 I. Wts.).

Ⓐ "*Atropine and its Salts and their preparations.*"— See Note to Gutt. Atropine Sulphatis.

Dose.— $\frac{1}{160}$ to $\frac{1}{100}$ grain (0.00032 to 0.00065 Gm.), increased to $\frac{1}{80}$, or in acute mania to $\frac{1}{4}$ grain or more. U.S. average dose, — $\frac{1}{160}$ grain. FR. CX. — *Maximum dose* in 24 hours 0.001 Gm. ($\frac{1}{4}$ grain) approx.

An alkaloid obtained from *Atropa Belladonna*. It is generally in hard white acicular prismatic crystals or crystalline masses, strongly alkaline.

C.R. 1903 says source should be this and other plants of the same natural order. Much is now made from *Scopola* rhizome.

Soluble.—1 in 500 of water, 1 in 3 of 90% alcohol, 1 in 36 of ether (FR. CX. 1 in 25), 1 in 1 of chloroform, 1 in 40 of olive oil, freely soluble in

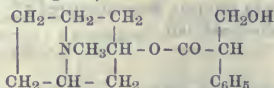
glycerin and oleic acid. Melts at 239° to 240° F. (115° to 115.5° C.) (U.S. 237° F.). Small percentage of hyoscyamine, as impurity lowers melting point—is generally given internally as sulphate.

Incompatible with caustic alkalis and mercurial salts.

The mydriatic alkaloids, Atropine and Hyoscyamine may be manufactured from *Atropa Belladonna*, *Datura Stramonium*, *Duboisia myoporoides* and *Hyoscyamus niger*, and Hyoscyne may be obtained from the last two plants. Atropine does not exist as such to any great extent in these plants, but is produced from the Hyoscyamine (its isomer) by the action of Alkali which is present in manufacture. Duboisine is nearly pure hyoscyne. Pure atropine and pure hyoscyamine are isomeric.

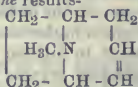
By the action of baryta water both Atropine and Hyoscyamine split up into Tropic Acid and Tropine.

Atropine (Tropine Tropate)



has virtually been synthesised. The synthetic product is physiologically identical with the natural and differs only in the fact that it is inactive to a ray of polarised light.

Tropidine may first be synthesised:—For this Suberic Acid is converted into Suberone (cycloheptanone)—a Ketone—this is reduced to cycloheptanol and this dehydrated to the hydrocarbon cycloheptene.—which being unsaturated adds 2 Br.: the resulting body treated with KOH gives Cycloheptadiene containing the group $-\text{CH}=\text{CH}-\text{CH}=\text{CH}-$ this in common with the other body containing it adds only 1 molecule Br. and simultaneously there is a change to $-\text{CHBr}-\text{CH}=\text{CH}-\text{CHBr}-$. Treating with Potash yields Cycloheptatriene (identical with Tropilidene—Ladenburg.) This adds HBr with again a change in bonds. Add Dimethylamine and distil off the free base over Barium Hydroxide, which is then reduced to Dimethylamine—Cycloheptene which can add 2 atoms Br by reason of remaining double link. The Nitrogen becomes pentavalent and there is rearrangement of the body to a bicyclic formula. Boil with Soda forming again an unsaturated body. Introduce Cl by AgCl freshly precipitated. Distil the Cl body at high temperature, Methyl Chloride passes off and **Tropidine** results—



Add HBr at double linkage and heat with 10% H_2SO_4 three hours at $200-210^{\circ}$ C. Tropine is formed which can be converted into ordinary Tropine by oxidation and subsequent reduction. This concludes the synthesis of the basic portion of Atropine.

Tropic Acid was synthesised by Ladenburg by treating Acetophenone with PCl_5 —boiling the resulting Dichloride with KCN and Alcohol, forming a Nitrile which was hydrolysed to the corresponding Acid. This boiled with Concentrated HCl, Ethyl Alcohol is split off and Atropic Acid results which combines with Hypochlorous Acid yielding a Chlor-acid which is reduced by Zinc to Tropic Acid. The condensation of the two bodies (Tropine being an Alcohol) is brought about in the usual way.—P.J., i./09,355.

Therapeutically, Hyoscyne possesses about five times the calmative power of Atropine or Hyoscyamine.

Tropine may also be combined with other acids such as salicylic or mandelic acid to form salts. These salts when treated with diluted hydrochloric acid form a class of artificial alkaloids, to which the

generic name of *tropines* is given. One of these so produced from the mandelate of tropine is **Homatropine** or oxytoluyltropine (*q.v.*).

Atropine should be neither dextro- nor lævo-rotatory, showing freedom from Hyoscyamine or Scopolamine.

Antidotes.—Stomach pump and emetics followed by stimulants, hot coffee, morphine hypodermically $\frac{1}{2}$ grain every two hours or pilocarpine nitrate $\frac{1}{2}$ grain hypodermically. Electricity, heat, and artificial respiration.

Uses.—Atropine and its salts are used for ophthalmic purposes to dilate the pupil and paralyse accommodation.

Given internally or hypodermically, they are antagonistic to opium and morphine, Calabar bean and physostigmine, jaborandi and pilocarpine, aconite and aconitine, bromal, and hydrocyanic acid. Physiologically, whilst it acts as a "stimulant" to a large part of the central nervous system, it paralyse many of the nerves. It lessens the perspiration, especially the night sweats of phthisis, the flow of milk and saliva, most of the secretions, but not the amount of the urine.

(There are, however, according to Dixon (B.M.J. ii./09,540), no nerves. the excitation of which causes a secretion of milk—an ordinary plaster acts just as well as one of Belladonna in suppressing milk secretion.)

It is also injected to relieve pain in sciatica and is given to check bed wetting, and to relieve spasm of pain of urinary calculus, cystitis, and prostatitis. Relieves bronchial spasm, also whooping cough and asthma.

Its administration tends to cure inebriety.—Owen Lankester, B.M.J. ii./05,106.

McBride's treatment for inebriety:—

First week, Atropine $\frac{1}{100}$ grain, with Strychnine $\frac{1}{60}$ grain *t.i.d.*

Second " " $\frac{1}{60}$ " " " $\frac{1}{30}$ " "

Third " " $\frac{1}{60}$ " " " $\frac{1}{30}$ " "

Fourth " " $\frac{1}{100}$ " *sine* Strychnina

together with a mixture of Cinchona Extract, Sal Volatile, and Spirit of Chloroform thrice daily.—B.M.J. i./05,132; *vide* also B.M.J. i./04,1006. 1169,1222,1223; and L. i./08,129. Injections twice a day of Atropine and Strychnine.—B.M.J. ii./09,1346.

Liquor Atropinæ Sulphatis and Liquor Strychninæ Hydrochloridi may be kept mixed in proportion of 1 to 4. Five drops to be injected twice or thrice daily for 2 to 4 weeks, then once daily for 2 or 3 weeks. Cinchona and capsicum simultaneously.—B.M.J. ii./07,951.

In the knowledge of the writers Liquor Strychninæ and Liquor Atropinæ Sulphatis up to 8 minims respectively internally and then gradually reducing together with a cinchonine tonic worked wonders.

Three alcoholics treated by the method—general health improved, but craving for alcohol remained. Dryness of the mouth caused by the Atropine objected to.—B.M.J. i./09,1007; L. i./09,1114.

For further Inebriety Treatment see p. 102.

References to use of Atropine and its Salts.

Causes sleep in acute mania in dose of $\frac{1}{2}$ to 1 grain of sulphate.—R.

Use of hypodermic injection previous to the administration of chloroform as an antidote to the cardio-inhibitory effects of chloroform has been found of value.

Eye drops of atropine 1% and cocaine hydrochloride 2%, poisoning by.—B.M.J.E. ii./04,72. *Vide* also L. i./98,99; L. i./05,714; L. ii./05,964.
Sea sickness. It has been suggested to treat by paralysing the accommodation of one eye only with one drop of atropine solution, 4 grains to the ounce, daily.—B.M.J. i./05,1090.

In iritis Atropine is indicated, in glaucoma Eserine.—Pr. xxxi.321.

Iritis is to be treated locally by dilating the pupil and keeping it dilated. Henderson uses Atropine 1% with Cocaine 0.5% Ointment for the first three days every four hours. Then the Cocaine is eliminated, Atropine being used alone three or four times a day. Hot fomentations and leeches to temple beneficial.—B.M.J. i./09,1221.

Never use Atropine in elderly people without good reason, and watch the tension all the time during use.—M.P. May 1, 07,474.

Cholera successfully treated by injection of atropine.—L. i./93,1443.

Antidote in fungus poisoning. —P.J. i./99,197.

Will abort a cold in dose of $\frac{1}{160}$ to $\frac{1}{80}$ grain (Sulphate), to be dissolved in a tumbler of water and the whole sipped in the course of an hour, to be repeated next day if necessary.—P.J. ii./08,260 ex. JI. Am. Med. Ass.

In surgical shock Atropine not advised.—L. ii./08,22.

In spasmodic asthma good results by injecting $\frac{1}{100}$ grain repeated in an hour if necessary.—L. i./09,839; B.M.J. i./09,788.

Vitali's Reaction.—On evaporating a trace of Atropine, or one of its salts in a porcelain dish with a few drops of fuming Nitric Acid a yellowish residue is produced which on moistening with Alcoholic Potash (1 in 10) produces a violet colour. Strychnine does the same on employing a 4 per cent. potash solution, but the colour is evanescent. Veratrin produces a reddish violet or orange red colour.

Ⓐ **Atropine Salicylate** $C_{17}H_{23}NO_3 \cdot C_7H_6O_3 = 424.06$ (427.242 I.Wts.) and Ⓐ **Valerianate** $(C_{17}H_{23}NO_3 \cdot C_5H_{10}O_2)_2H_2O = 794.60$ (800.564 I. Wts.). *Dose* of either $\frac{1}{60}$ grain (0.001 Gm.)

White crystalline powders,—latter is used for neuralgia and neurasthenia.

Ⓐ **Liquor Atropinæ Salicylatis.**—Atropine $\frac{1}{4}$ grain, Salicylic Acid $\frac{3}{4}$ grain, Water 1 ounce.

Ⓐ **Atropinæ Sulphas** (*Off.*). P. Helv., P. Jap.

$(C_{17}H_{23}NO_3)_2H_2SO_4 = 671.44$ (676.474 I. Wts.). FR. CX. + H_2O .

Dose.— $\frac{1}{200}$ to $\frac{1}{100}$ grain (0.00032 to 0.00065 Gm.) increased to $\frac{1}{16}$, or in cases of acute mania $\frac{1}{8}$ grain. FR. CX. has maximum dose in 24 hours $\frac{1}{32}$ grain approx.

Opaque white minute crystals, soluble 1 in 1 of water (*Off.*)—or less.—W. H. M. Melting point $183^\circ C$. (P. G. and P. Jap. $180^\circ C$).

Umney finds commercial samples melt mostly at 186° to $187^\circ C$. (367° to $369^\circ F$). U.S. $189.9^\circ C$.

Uses.—See Atropine (base).

Ⓐ **Tablets**, $\frac{1}{160}$ grain (0.0006 Gm.).

Treatment of ulcer ventriculi by injections of $\frac{1}{4}$ grain thrice daily for some weeks caused hyperacidity to disappear or diminish. Gives rest to the stomach.—M. 'c8, 153.

Ptyalism is relieved by taking Atropine Sulphate $\frac{1}{300}$ grain in water every 4 hours.—Beddoes, 64.

Ⓐ **Granules de Sulphate d'Atropine.**—FR. CX. contain 1 mgr.

Ⓢ Compound Asthma Fluid (Martindale).

This preparation is only supplied on a prescription by a qualified medical practitioner.

It contains, amongst other ingredients, a small proportion of atropine, and is found of considerable value in preventing attacks of asthma. A few "blows" from an atomiser with a fine spray will be found sufficient to ward off an attack. A special spray is made for the fluid.

It is prepared in 3 strengths designated 'A,' 'B' and 'C' respectively. We find by experience that the 'A' strength is well tolerated by all sufferers, the 'B' being double strength of 'A' in Atropine is often more effectual. The 'C,' double strength of 'B,' is used by confirmed asthmatics and affords relief.

The use of atropine in asthma was first advocated by Trousseau. May effect permanent relief.—M.P. 1907, Oct. 30, p. 482.

Ⓢ Lamellæ Atropinæ, Discs of Atropine (Off.).

Contain $\frac{1}{1000}$, also made with $\frac{1}{2000}$, and $\frac{1}{1000}$ grain of the sulphate in each, for dilating the pupil; others containing Ⓢ $\frac{1}{500}$ (R.O.H.) and Ⓢ $\frac{1}{250}$ grain paralyse the accommodation. Also prepared containing Ⓢ Atropine Sulphate $\frac{1}{1000}$ grain combined with Cocaine Hydrochloride $\frac{1}{100}$ grain, and $\frac{1}{100}$ grain of each, and Ⓢ Cocaine $\frac{1}{500}$ with Atropine $\frac{1}{5000}$. (R.O.H. has Ⓢ Atropine $\frac{1}{300}$, Cocaine $\frac{1}{100}$ grain, and Ⓢ Atropine Sulphate $\frac{1}{1000}$ grain with $\frac{1}{1000}$ grain of Morphine respectively).

Ⓢ Hypodermic Tablets contain $\frac{1}{100}$, $\frac{1}{150}$, $\frac{1}{100}$, $\frac{1}{50}$, and $\frac{1}{20}$ grain in each, and also $\frac{1}{120}$ grain combined with Morphine Sulphate $\frac{1}{2}$ grain, and Atropine Sulphate $\frac{1}{200}$ grain combined with Morphine Sulphate $\frac{1}{4}$ grain, *vide* also p. 457.

Ⓢ Injectio Atropinæ Hypodermica. B.P.C.

Atropine Sulphate 0.12 %, $\frac{1}{100}$ grain in 8 minims. Dose.—2 to 8 minims.

Ⓢ Sterules, Hypodermic contain $\frac{1}{100}$ grain in 8 minims.

Ⓢ Liquor Atropinæ Sulphatis (Off.).

Dose.— $\frac{1}{2}$ to 1 minim (0.03 to 0.06 Cc.), or more.

Atropine Sulphate 1, Salicylic Acid 0.12, Distilled Water *q.s.* to 100. The addition of salicylic acid is objected to by oculists as being too irritating, further it is much too strong, being apt to produce glaucoma.

Ⓢ Gutte Atropinæ Sulphatis, R.O.H., $\frac{1}{4}$, $\frac{1}{2}$, and 1% *.

St. Th. H. has 0.5 or 1% ; U.C.H. 0.5 or 1%. St. M.'s H. 0.5%.

Chalk's Bottles, with rubber cap on hollow stopper are convenient for eye drops and mostly employed. They are supplied in colourless and amber glass. Metal cases, sterilisable for same, are durable, and suitable for travelling.

Ophthalmic Bottle, Lang's, is intended for ophthalmic solutions and ointments. It has no ledges on which dust can accumulate. The cap of the bottle when removed rests upon three points so as to pick up the minimum of dust. A small rod or pipette stands inside.—B.M.J., 1/03, 501.

*A simple solution of Atropine is a preparation of Atropine, but a compound of several substances to which a small percentage of Atropine has been added, may more properly be regarded as a "preparation or admixture containing Atropine."—Glyn Jones, p. 110, but *v.* Preface.

Eye Rods have (i) pointed (ii) flattened or (iii) bulbous ends (Lang's) for ointments or solutions.

① **Guttæ Atropinæ cum Cocaina, R.O.H.**

Atropine Sulphate 0·5, Cocaine Hydrochloride 2, Distilled Water 100. St. Th. H. has Atropine Sulphate 1, Cocaine Hydrochloride 2%. St. M.'s H. Atropine Sulphate 0·5, Cocaine Hydrochloride 2·5, Water to 100.

Atropine eye-drops may cause poisonous symptoms in children.—L.ii./95,964.

① 'Sterules,' of Atropine Sulphate Solution, 4 grains to the ounce, are convenient in use; also of ① Atropine Sulphate Solution 2 grains to the ounce with Cocaine Hydrochloride 10 grains to the ounce.

① **Guttæ Atropinæ et Quininæ** (Liverpool Eye and Ear Infirmary). Atropine Sulphate 4 grains, Quinine Sulphate (bi sulphate) 4 grains, Distilled Water 1 ounce.—B.M.J. i./04,452.

① **Glycerinum Atropinæ.** St. Th. H. has Atropine Sulphate 25½ grains dissolved in Water 5 ounces, add Compound Tincture of Lavender 100 minims, and made up to 1 pint with Glycerin. This is more cleanly than Glycerinum Belladonnæ and does not stain. It approximates Glycerinum Belladonnæ in strength. B.P.C. and U.C.H. have the same formula.

The resinous matter in the Compound Tincture of Lavender deposits. We found the following to keep better: Atropine Sulphate 127½ grains, Water 25 ounces, Spirit of Lavender 2 minims, Spirit of Rosemary 2 minims, Cinnamon Oil 1 minim, Magenta Solution *q.s.*, Alcohol 90°/8 1 ounce, Glycerin to 100 ounces.

① **Linimentum Atropinæ.**

Atropine 1 (more or less, if ordered), Oleic Acid 15, Castor Oil 15, Oil of Lavender 1, Alcohol (90%) *q.s.* to 100. It may be stronger if desired Belladonna Liniment (*Off.*) contains 0·375% alkaloid.

In lumbago and other rheumatic affections is very serviceable used with gentle friction; it is readily absorbed.

① **Oleum Atropinæ, R.O.H.**

Atropine 1, Castor Oil *q.s.* to 100. Heat to dissolve. Forms a stable solution, *vide* Alkaloidal Oils, p. 497.

① U.S. has Atropine 2, Alcohol 2, Oleic Acid 50, Olive Oil *q.s.* to 100.

① **Pessaries of Atropine** are prepared (weight 120 grains) with gelatin mass or at times with oil of theobroma, containing generally $\frac{1}{20}$ grain of the alkaloid in each.

① S.H. has Atropine $\frac{1}{20}$ grain, Conine 1 minim, Theobroma Oil to 120 grains.

① C.H.W. has vaginal suppositories of Atropine Sulphate $\frac{1}{18}$ grain, Lead Iodide 10 grains, Theobroma Oil to 2 drachms.

① **Pilula Atropinæ**, $\frac{1}{120}$, $\frac{1}{100}$, $\frac{1}{80}$, $\frac{1}{60}$ grain in each.

Taken at night, to check night-sweating. May cause dryness of the throat.

① **Pilula Atropinæ, Arsenici et Quininæ.**

Quinine Sulphate 18 grains, Solution of Arsenic 12 minims, Solution of Atropine Sulphate 6 minims, Extract of Gentian 20 grains, and Acacia *q.s.*

to make 12 pills. For catarrhal cold, if taken in early stage, one every 3, 4, or 6 hours, "nips it in the bud."—Pr. xxxviii. 179.

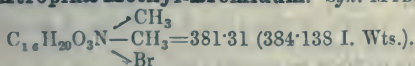
① **Unguentum Atropinæ (Off).**

Atropine 1, Oleic Acid (by weight) 4 (1 grain = 2 drops), heat gently to dissolve, and add Lard 45.

① **Unguentum Atropinæ, R.O.H. Syn. Vaselineum Atropinæ.**

Atropine 1 or 2, Soft Paraffin 100; heat till dissolved. ① **Unguentum Atropinæ cum Acido Borico**, R.O.H., has Atropine 1, Powdered Boric Acid 15, Soft Paraffin 100; and ① **Unguentum Atropinæ cum Cocaina**, R.O.H., has Atropine 1, Cocaine (alkaloid) 2, in Soft Paraffin 100. ① **Unguentum Hydrargyri Oxidi Flavi cum Atropina**, R.O.H., has Yellow Mercuric Oxide 1, and Atropine 0.5, Soft Paraffin 100. ① **Unguentum Iodoformi cum Atropina**, R.O.H., has precipitated Iodoform 15, in place of the Mercuric Oxide in last preparation.

① **Atropinæ Methyl-Bromidum. Syn. MYDRIASINE.**



Dose.— $\frac{1}{8}$ grain to $\frac{1}{32}$ grain (0.001 to 0.002 Gm.).

White crystals soluble in water 1 in 1 easily, and in alcohol 90% 1 in 8. Has been given internally for similar complaints to those for which atropine is employed. Also subcutaneously in croupous pneumonia, pleuritis sicca and appendicitis; dyspepsia with pyrosis (with sodium bicarbonate), and epilepsy (with bromide). As effect passes off rapidly it is useful in $\frac{1}{2}$ to 2% solution with cocaine hydrochloride 1% for dilating the pupil in suspected iritis for ascertaining whether adhesions exist.—M.P., Ocular Therapeutics, Aug. 1905; B.M.J.E. i./06, 72. See also M.A., 1908, 23.

For toothache, Atropine Methylbromide $\frac{1}{10}$ grain, with Aceto-Salicylic Acid 15 grains, has been given with good effect. May be combined with Veronal for sleeplessness.

For bronchitic and pneumonic affections in children the following has been advised: Atropine Methylbromide $\frac{1}{10}$ to $\frac{1}{12}$ grain, Tartarated Antimony $\frac{1}{2}$ grain, Antipyrin 6 grains, Syrup 1 ounce, Fresh Ipecacuanha. Infusion 1 in 200, to 4 ounces.

Dose.—1 teaspoonful every 2 hours.

To control irregularity of heart action may be combined with Digitalis infusion.

① **Homatropine**, $\text{C}_{16}\text{H}_{21}\text{NO}_3 = 273.14$ (275.178 I. Wts.) (v.p. 167) and its Salts, ① **Hydrobromide**, ① **Hydrochloride**, $\text{C}_{16}\text{H}_{21}\text{NO}_3 \cdot \text{HCl} = 309.33$ (311.646 I. Wts.), and ① **Salicylate**, $\text{C}_{16}\text{H}_{21}\text{NO}_3 \cdot \text{C}_7\text{H}_6\text{O}_2 = 410.15$ (413.226 I. Wts.), are in minute granular white crystals. Their solutions act as quick and decided local mydriatics, the pupil rapidly returning to its normal condition. The mydriatic action commences in $\frac{1}{4}$ to $\frac{1}{2}$ hour, and disappears in from 6 to 24 hours. The salts are freely soluble in water; Homatropine (the base) is nearly insoluble in water, but soluble in oils, or 1 in 100 of soft paraffin. *Dose of each.*— $\frac{1}{10}$ to $\frac{1}{15}$ grain (0.0008 to 0.0032 Gm.).

Action in checking night-sweating is said to be inferior to atropine and picrotoxin. Large doses may cause staggering gait, like atropine, and delirium in children. Homatropine slows the heart beats and renders them irregular in force and rhythm.

A 1% solution as eye-drops for muscular asthenopia.—L. ii./99,960; B.M.J. ii./99,765.

Ⓟ **Oleum Homatropinæ.** A 2% solution in Castor Oil, by weight, dissolved by heat.

Ⓢ **Oleum Homatropinæ cum Cocaina**, contains in addition 2% of Cocaine. R.O.H. has 10 grains of each to the ounce, practically the same strength.

These oily solutions, when dropped into the eye, are not washed out by the tears.

Homatropine Oil is recommended in preference to Atropine in estimating lesions of refraction; inconvenience of mydriasis may be partially overcome by Eserine.

Ⓢ **Homatropinæ Hydrobromidum.** (*Off.*), U.S., P. Helv., P. Svec. and P. Jap. $C_{16}H_{21}NO_3HBr=353.49$ (356.106 I. Wts.).

In minute trimetric crystals, soluble 1 in 6 of Water, 1 in 133 of Absolute Alcohol. Is the salt mostly used.

Dose.— $\frac{1}{80}$ to $\frac{1}{20}$ grain (0.0008 to 0.0032 Gm.).

Ⓢ **Guttæ Homatropinæ, R.O.H.**, St. M.'s H. and St. Th. H., 1 in 100.

Ⓢ **Guttæ Homatropinæ cum Cocaina, R.O.H.**

Homatropine Hydrobromide 1, and Cocaine Hydrochloride 2 in Water 100. St. Th. H. has $\frac{1}{2}$ these quantities; St. M.'s H. 1 and $2\frac{1}{2}\%$.

Ⓢ **Guttæ Homatropinæ, G.N.C.** Homatropine Hydrobromide and Cocaine Hydrochloride of each 9 grains, Chlorbutol 1 grain, Boiled Distilled Water to 1 ounce.

Ⓢ **Guttæ Morphinæ et Cocainæ (Aural), G.N.C.** Cocaine Hydrochloride 24 grains, Morphine Hydrochloride 4 grains, Glycerin 1 drachm, Distilled Water to $\frac{1}{2}$ ounce. *N.B.*—*A potent preparation.*

Ⓢ 'Sterules' of Homatropine Hydrobromide Solution, 4 grains to 1 ounce, are prepared, also

Ⓢ 'Sterules' of Homatropine Hydrobromide Solution 4 grains, with Cocaine Hydrochloride 10 grains to 1 ounce.

Ⓢ **Injectio Homatropinæ Hypodermica**, 1 in 120, is used. *Dose.*—1 to 6 minims (0.06 to 0.35 Cc.).

Ⓢ **Tablets, Hypodermic**, contain Homatropine Hydrobromide $\frac{1}{100}$ and $\frac{1}{200}$ grain.

(Sterile Capsules of Distilled Water, containing 1 drachm are prepared, and are useful for dissolving hypodermic tablets in the syringe for immediate use. This is enough to cleanse the syringe initially.)

Ⓢ **Lamellæ Homatropinæ** (*Off.*) R.O.H. contain $\frac{1}{100}$ grain (0.00065 Gm.) of Homatropine Hydrobromide.

Ⓢ **Lamellæ Homatropinæ et Cocainæ** (Gelatin Ophthalmic Discs) are prepared, containing of each $\frac{1}{50}$ grain (R.O.H.) for paralyzing the accommodation. They are also prepared $\frac{1}{200}$ grain of each, also Homatropine $\frac{1}{5000}$ grain with Cocaine $\frac{1}{200}$ grain, and containing $\frac{1}{5000}$ grain of each.

⑩ Ephedrine Hydrochloride.

$C_{10}H_{15}NO \cdot HCl = 200.11$ (201.598 I. Wts.).

The salt of an alkaloid from *Ephedra vulgaris*, var. *Helvetica*, in shining white crystals; very soluble in water; 5 to 10% solution has mydriatic properties.

⑪ *Eumydrine. Methyl-Atropine Nitrate.

$C_{16}H_{19}NO_3 \cdot CH_3 \cdot CH_3 \cdot HNO_3 = 363.54$ (366.228 I. Wts.).

A white, odourless powder, soluble in water, is a powerful mydriatic, and less poisonous than Atropine. 1% or 2% solution dilates the pupil after 25 minutes, the maximum is reached in 50 minutes. Dilatation persists for 12 hours. Said to be tolerated better than atropine.

*Euphthalmin. $C_{17}H_{25}NO_3 \cdot HCl = 325.24$ (327.678 I. Wts.).

n-Methyl-vinyl-diacetone-alkamine hydrochloride (a Mandelic Acid derivative of beta-eucaine).

Euphthalmin dilates the pupil by solutions of 5 to 10%, causing but little discomfort and the accommodation is but slightly disarranged. Its effects pass off more quickly than those of homatropine. 2% of cocaine hydrochloride may be added.

Guttæ Euphthalminæ, R.O.H., 2 in 100.

'Sterules' of Euphthalmin Solution, 10 grains to the ounce, and Lamellæ Euphthalminæ, R.O.H., $\frac{1}{100}$ grain in each, are prepared. Strength $\frac{1}{30}$ gr. are also made.

AURANTIUM.

Aqua Aurantii Floris (Off.). AQUA NAPHE, Ph. Ned. Dose.— $\frac{1}{2}$ to 2 drachms (1.8 to 7 Cc.) of the diluted water.

Distilled from the flowers of *Citrus Aurantium*, var. *Bigaradia*. Is a saturated solution of the oil, and must be diluted immediately before use with twice its volume of distilled water.

Oleum Aurantii Corticis, U.S., is expressed from the fresh peel of this plant. Sp. Gr. 0.842-0.846 at 25° C. O.R. in 100 mm. tube not less than + 95° at about 25° C.

Oleum Aurantii Dulcis (*Citrus Aurantium* L.).

Sp. Gr. at 15° C. 0.847-0.862. O.R. + 96° to + 98° at 20° C. (at Messina).—C.D. i./09,81; see also P.J. ii./08,622.

Terpeneless Oil of Orange is prepared, being many times more potent in flavor and is soluble in 60% spirit.

OLEUM AURANTII (P. Off.). Oil of Orange. The oil obtained by expression from the rind of the bitter orange (*Citrus Aurantium* var. *Bigaradia*), and the sweet orange (*Citrus Aurantium*). Characters and Tests.—An orange-yellow liquid having the characteristic odour of oranges and an aromatic bitter taste. Sp. Gr. 0.847 to 0.853; O.R. + 92° to + 98° (sweet + 95° to + 98°); Refractive Index, 1.472 to 1.478. Rapidly deteriorates on exposure to air and light.

Oleum Neroli. The oil obtained in the distillation of above flowers is used in perfumery. Dilution with twice its volume of absolute alcohol preserves it.

Artificial Neroli Oil is a mixture, the chief body of which is the methyl ester of Anthranillic Acid—P.J. ii./06,377—to this the fragrance of the natural oil is due.

Limits of Sp. Gr.—0.876 to 0.885. O.R. + 1° to + 10°. Esters should not exceed 20%.—P.J. ii./08,624.

Concerning all the varieties of the genus *Citrus* and uses of.—P.J. ii./06,717. See also Allen, vol. ii., part 3, 07,436 et seq.

Syrupus Aurantii Floris (Off.).

Sugar 6, Distilled Water 2, Orange Flower Water, undiluted, 1. Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.).

Cortex Aurantii (*Off.* and **Indicus, I.C. Add.**).

Dried and fresh outer peel of *Citrus Aurantium*, var. *Bigaradia*, the Bitter Orange (in India other varieties may be used if aromatic and bitter); from *fresh* peel is:—

Tinctura Aurantii (*Off.*). 1 in 4 Alcohol (90%).

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Boa says that 90% Alcohol is too strong—it takes out the whole essential oil content, terpene, citral, etc. About 10% only of Essential Oil of Orange Peel is flavoring and is soluble in comparatively dilute alcohol, therefore make the Tincture using equal volumes of 90% alcohol and water.—P.J. i./09,294. 70% suggested.—P.J. ii./09,142.

U.S. 1 in 5 of Alcohol 6 and Water 4.

Mixtures containing Salts of Iron will become dark in colour with all preparations of orange peel.

Syrupus Aurantii (*Off.*).

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Tincture of Orange 1, Syrup 7.

U.S. orders to triturate Magnesium Carbonate 10, with Tincture of Sweet Orange Peel 50, add Water 400, filter and wash with Water to 450. Dissolve in the filtrate Citric Acid 5, and Sugar 820 without heat Water to 1,000.

Infusum Gentianæ Compositum Concentratum. *Dose.*—30 to 60 minims.

Gentian and Orange Peel in No. 10 pdr. each 2, Lemon Tincture 2, Orange Tincture 1, Alcohol 90% 3·5, Diluted Chloroform Water to 20 by (a) p. 397. 1=8 of B.P. Infusion.

Preparations of Sweet Orange, Tincture, Syrup, Acid Syrup and Aromatic Syrup. Those of Sweet Orange keep indefinitely.—C.D. i./o,323.

AURINARIA.

Ear cones or aural bougies are made either with Gelatin or Cacao butter basis, and are medicated:—

Aurinarium Acidi Borici 1 gr.

„ Acidi Carbolici $\frac{1}{10}$ gr.

Aurinarium Chinosol $\frac{1}{2}$ gr.

(11) „ Cocainæ Hydrochloridi $\frac{1}{10}$, $\frac{1}{5}$ gr.

*Aurinarium Unguenti Hydrargyri Nitratis $\frac{1}{3}$ gr.

*Aurinarium Iodoform. $\frac{1}{2}$ gr.

(12) * „ Morphinæ Hydrochloridi $\frac{1}{10}$, $\frac{1}{5}$ gr., atque cum Cocaina $\frac{1}{10}$ gr.

(13) *Aurinarium Morphinæ $\frac{1}{10}$, Cocainæ $\frac{1}{10}$, Acidi Borici 1 gr.

(14) *Aurinarium Morphinæ $\frac{1}{10}$ gr., Ext. Bellad $\frac{1}{5}$ gr.

(15) *Aurinarium Opii, $\frac{1}{5}$, (16) $\frac{1}{2}$ gr.

* „ Plumbi Acetatis $\frac{1}{2}$ gr., atque cum Acid. Borico 1 gr.

(17) *Aurinarium Plumbi Acetatis et Opii $\frac{1}{5}$ gr.

*Aurinarium Zinci Sulphatis $\frac{1}{2}$ gr.

*Aurinarium Zinci Sulphocarbolicis $\frac{1}{2}$ gr.

They should be retained with a pledget of cotton wool.

*These Aurinaria, unless ordered to the contrary, are preferred with cacao butter basis. The others are prepared with Gelatin. Cacao butter basis with wax is more suitable for export to the tropics.

A U R U M.

An = 195.70 (197.2 I. Wts.).

Physical Study of Gold. Beilby, Presidential Address Chemical Section, British Association.—P.J. ii./05, 324.

For dental fillings the metal is employed in "cohesive" and "non-cohesive" form.

Auri Bromidum. $\text{AuBr}_3 = 433.75$ (436.96 I. Wts.).

Dose.— $\frac{1}{10}$ to $\frac{1}{10}$ grain (0.001 to 0.0065 Gm.), increased to $\frac{1}{2}$ grain, well diluted.

A brown, dry powder, soluble in water 1 in 75.

Uses.—In epilepsy, hysteria and migraine, is well tolerated. In nervous dyspepsia, amenorrhœa, and chronic Bright's disease. Epileptics who have taken it sometimes remain for years free from attacks.

Useful in alcoholic neurasthenia: the 'Gold Cure' combined with 'Daturine' and Strychnine treatment has proved of value.

⑩ **Liquor Auri et Arsenii Bromidi.**

Auric Bromide $1\frac{1}{2}$ grains, Oxybromide of Arsenium 3 grains (or Clemens' Solution [*q.v.*] 192 minims), Distilled Water to 1 ounce. *Dose.*—5 to 10 minims (0.3 to 0.6 Cc.). Another formula.—P.J. ii./96, 111.

Liquor Auri et Hydrargyri Bromidi.

Auric Bromide, Mercuric Bromide, of each $1\frac{1}{2}$ grains, Distilled Water to 1 ounce. *Dose.*—5 to 10 minims (0.3 to 0.6 Cc.) has been used in neurasthenia, epilepsy, syphilis, and acne.

GOLD CHLORIDE, VARIETIES OF, IN COMMERCE.

Auri Tri-Chloridum (Purum), $\text{AuCl}_3 = 301.27$ (303.58 I. Wts.).

Contains about 65% Au. and is official in Fr.Cx. and the Portuguese Pharmacopœia. This salt is employed in France, but very little in use in this country, and is not now manufactured here.

Auri Chloridum Fuscum. A brown variety of the above, as distinct from the yellow crystals, is also sold. It contains $x\text{H}_2\text{O}$.

Auri Tri-Chloridum Acidum. *Syn.* **Aurochloric Acid.**

$\text{AuCl}_3 \cdot \text{HCl} \cdot 4\text{H}_2\text{O} = 408.98$ (412.112 I. Wts.).

Dose.— $\frac{1}{8}$ to $\frac{1}{8}$ grain (0.001 to 0.004 Gm.), increased to $\frac{1}{2}$ grain. In yellow crystals; contains about 50% of gold. Is easily soluble in water and alcohol.

This salt is difficult to handle, very deliquescent, and not obtainable in a general way in commerce. Has been given as an alternative for phthisis and lupus.

Auri et Sodii Chloridum. Gold and Sodium Chloride,

$\text{AuCl}_3 \cdot \text{NaCl} \cdot 2\text{H}_2\text{O} = 395.10$ (398.072 I. Wts.). (Fr.Cx.)

Dose.— $\frac{1}{10}$ to $\frac{1}{10}$ grain (0.0022 to 0.0054 Gm.), increased to $\frac{1}{2}$ grain in a pill with kaolin ointment.

This is the ordinary **Commercial "Chloride of Gold,"** *e.g.*, the "Stalco" Brand, as largely used in photography. An orange-yellow crystalline, deliquescent powder, soluble 1 in 2 of water, only partially soluble in alcohol. The Fr.Cx. preparation contains a *molecule of each* salt combined, yielding approximately 50% of metallic gold. The U.S. preparation is a mixture of *equal parts by weight* of the two salts; it and

that of P.G.III. yield 30% of gold. This 30% product is not largely used in this country. It is sometimes used as a caustic, and given internally for syphilis. Combined with strychnine it is useful in neuroses.

Commercial Chloride of Gold and Sodium consists of **Auri et Sodii Chloridum** (50% Au) mixed with an equal weight of sodium chloride. It contains, therefore, 25% Au approximately.

Lupus successfully treated by hypodermic injection of chloride of gold with cyanide of potassium; doses from $\frac{1}{1000}$ to $\frac{1}{100}$ grain of each.—B.M.J.E. i./91,166.

① **Auri Cyanidum.** $\text{Au}(\text{CN})_3 + 3\text{H}_2\text{O} = 326.89$ (329.278 I. Wts.). Auric Cyanide. *Dose.*— $\frac{1}{80}$ to $\frac{1}{12}$ grain (0.001 to 0.005 Gm.). Colourless hygroscopic powder. Has been given to consumptives and for lupus.

BARII SULPHIDUM.

$\text{BaS} = 168.22$ (169.44 I. Wts.).

Dose.— $\frac{1}{4}$ to 1 grain in pills coated so as to be more likely to dissolve in the intestines than in the stomach.

A greyish yellow powder, soluble in water, given as an alternative in syphilitic affections.

Barium Sulphide Depilatory.

Barium Sulphide, in fine powder 1 to 3 parts.

Wheat Starch Powder ... 3 parts.

When required for use, make into a cream with water, spread it on the part and let it remain five or ten minutes, then remove with a blunt knife. N.B.—It temporarily reddens the skin.

Another formula is Barium Sulphide 5, Powdered Soap 1, French Chalk 7, Starch Powder 7, Benzaldehyde to 24.

One part of this is mixed with 3 of water, applied to the skin and washed off after 5 minutes.

A slightly varied form of this in hypertrichosis applied from time to time will keep the growth under. To avoid possible dermatitis should not be applied for more than five minutes, and then washed off.—L. i./09,966.

Causticum Barii, St. J. H. Barium Sulphide, Zinc Oxide, of each $2\frac{1}{2}$, Starch 3.

BELLADONNA.

Deadly Nightshade (Off.).

① “*Belladonna and all preparations or admixtures (except Belladonna Plasters) containing 0.1 or more per cent. of Belladonna Alkalds.*”

All parts of the plant *Atropa Belladonna* (*Solanaceæ*) yield the alkaloids atropine and hyoscyamine. The root contains from 0.3 to 0.8% of total alkaloids. The leaves contain 0.2 to 0.7%, principally Hyoscyamine.

Methods of assay of leaves, root, and extract.—P.J. ii./00,195; i./03,268; vide also C.D. ii./06,839.

Farr and Wright have found a minimum of 0.14 and a maximum of 1.32% (exceptional) total alkaloids in the leaves, an average of 0.547%—rather more than is generally found in the root.—P.J. i./05,393; C.D. i./05,425.

Content ranged from 0.19 to 0.66% in root.—Southall's Lab. Report, 1907.

MacEwan and Foirester supplied figures indicating variability of the alkaloidal content—0.10 to 0.65%—the most frequent value being 0.451, and the mean 0.339%. Galenical preparations of Belladonna differ in action from the alkaloids contained. Alkaloid determination does not suffice. Thoms. It may be, recalled, found in two Belladonna Extracts (P.G.) each containing 1.72% alkaloids 3.5 and 8.1% Tannin, 1.8% of other organic bases (in each); Permanganate numbers 81 and 256; and 15.7 and 11.5% volatile matter,—showing that alkaloidal determination is not finality in evaluation.

There is much divergence regarding pharmacopœial requirements, and analyses are necessary with the view of ascertaining if the drug is harvested at the proper season.

A few seasons ago could hardly be had with more than 0.3% alkaloids, whilst recently content as much as 0.55%.—Umney, P.J. ii./08,409.

Roots of our own growing gave the following:—Second year's growth, 0.605%; fourth year's, 0.51%. Three years is believed to give about the best yield.

Cultivation of Belladonna in America.—Two crops of leaves are obtained—one at end of July and the second in October. If the roots are not required for use they should be taken up in October and buried in a shed to preserve from frost, to be divided into five or six rootlets in the spring for propagation. This procedure is better than growing from seed. An acre yields six to eight thousand pounds of herb.—Am.Jl.Ph., 1909,811; P.J. i./09,150.

Antidotes.—See Atropine. Poisoning by belladonna is well treated by pilocarpine.—B.M.J. ii./93,12.

Ⓐ **Belladonnæ Folia, U.S., and P. Helv.** contain not less than 0.3% mydriatic alkaloids. **Dose.**—1 grain.

P. Austr. To yield 15% alcoholic extractive.

Those of Fr.Cx. have no standard. Maximum single dose 2 grains, maximum during 24 hours 7½ grains approximately.

In new B.P. a standard will also have to be given, e.g. 0.3 to 0.4%. F.I. requires leaves only.—C.R. 1908 confirms.

Belladonna Fruit, either ripe or unripe, contains 0.1 to 0.13% Alkaloids.—P.J. ii./09,473.

Ⓐ **Belladonnæ Radix, U.S.** 0.45% mydriatic alkaloids.

Dose.—½ grain (0.045 Gm.). **P. Austr.** Ash 6%.

U.S. Assay.—The powdered leaves, or root (10 Gm.) are shaken with chloroform, ether and ammonia, and percolated into a volume of N.sulphuric acid. Then acid solution combined with that obtained by a further washing of the percolate with an additional quantity of sulphuric acid is made distinctly alkaline and shaken out with chloroform. The chloroform is evaporated, and the residue dissolved in ether. The alkaloidal residue from this is dissolved in 3 Cc. of N 10 sulphuric acid, and back-titrated with N/50 potash, using Cochineal or iodeosin as indicator. The factor 0.0237 is provided for arriving at the percentage of mydriatic alkaloids.

Notes.—Take 20 Gm. Percolate until exhausted as indicated by Wagner's reagent, specially constructed vessel recommended Am. Jl. Ph. 1905,463; 1906,455.

Cesar and Lorentz's method is described C.D. 1/08,21.

Warm the separator in a jet of steam if in difficulty.—C.D. ii/08,493.

Uses.—Externally relieves the pain of rheumatism, neuralgia, chordee and local inflammations, as of the breast. In leucorrhœa, vaginal injection of Tincture 3, Sodium Bicarbonate 1, and Water 100 useful.—R.

Internally relieves spasm, palpitation, menstrual pain, headache, whooping cough, checks profuse perspiration, and incontinence of urine. In acute sore throat. Acts on the eye as a mydriatic.

Though used "to allay the sense of griping" in the intestines Dixon says there is no evidence that it does.—B.M.J. ii/09,540.

Relieves the dyspnœa of asthma.—M.A. 1906,132.

Heart failure in diphtheria treated with.—L. i./06,282.

The internal and local use of Belladonna may produce a skin rash. Ringer says: "A scarlet rash often breaks out on the skin, a rash said to be like that of scarlet fever." Similarly, Lauder Brunton says: "Locally applied it can be absorbed from the skin and produce its general symptoms. After full doses (*i.e.* internally) a red rash appears like that of scarlatina."

May produce congestion of the throat.—B.M.J. ii./09,542.

In petit mal may be useful.—L. i./09,908.

① Chloroformum Belladonnæ, B.P.C. (now 1 in 1, was 1 in 1½).

Moisten Belladonna Root in No. 60 powder 100 with solution of ammonia 25, and set aside 24 hours, transfer to a percolator and percolate with a menstruum of 1 of absolute alcohol and 7 of chloroform until 100 of percolate is obtained.—P.J. ii./07,68,107.

① Collodium Belladonnæ. — Syn. Emplastrum Belladonnæ Fluidum, B.P.C.

Shake Liquid Extract of Belladonna (*Off.*) 50 with Canada Turpentine 4, castor oil 2 and ether 40, allow to stand 12 hours. Decant filter, dissolve camphor 1½, and pyroxilin 2½ in the mixture and add ether *q.s.* to 100. (In 1901 was prepared from alcoholic extract of leaf.)

① Collodium Atropinæ, B.P.C., 1908.—Atropine base 1, acetone 30, and make volume 100 with Acetone Collodion. Allays the irritation of chilblains.

① Emplastrum Belladonnæ (*Off.*).

Liquid Extract of Belladonna 4, evaporate to weigh 1 (or less), and add Resin Plaster, previously melted, 5 (or *q.s.* to 6). Contains 0.5% of the alkaloids of Belladonna root.

Poisonous symptoms from the B.P. 1885 plaster.—B.M.J. i./99,849,952; *vide also* B.M.J. i./03,1141.

Applied to the back for lumbago.—L. i./05,714.

Many cases of virulent skin irritation, erythema and toxic symptoms have been noted as due to the use of this official plaster, especially when applied to the breast. This plaster is only half the strength of that of the B.P. 1885, but it is even now too strong to be used with safety.

① Emplastrum Belladonnæ Dilutum.

Equal parts of the official plaster and resin plaster. This is preferable to the above.—P.J. ii./03,869,903.

A porous Belladonna plaster over the lumbar region produced toxic symptoms.—B.M.J. ii./08,1660.

Two strips of Belladonna plaster applied to the back followed by another and subsequent rubbing, on account of the itching, caused "poisoning."—B.M.J. ii./09,1282.

Dixon says Atropine has no action on mammary secretion as the latter is not under nervous control (action solely on nerve endings).—B.M.J. ii./09,329, 540.

A good method of estimation.—P.J. ii./99,147.

① Belladonna Plasters, spread, plain and porous, 7 inches wide, yard rolls; also on red felt, porous, same size.

① Emplastrum Belladonnæ Extensum.

Belladonna plaster in rubber combination spread on calico in porous sheets 7 in. by 5 in. and in yard rolls 7 in. wide, porous and non-porous (*American*).

Similar plasters are also prepared with belladonna and aconite combined.

① Plaster mulls are spread containing 10 grammes of Belladonna Extract in ½ square metre.

Ⓔ **Emplastrum Belladonnæ Viride, B.P.C.**

Mix Green Extract of Belladonna 25 with sufficient hot water to make a thin paste, add alcohol 50, and allow to clear, decant the clear liquid and repeat. Distil off the alcohol and mix the residue with resin plaster *q.s.* to 100. Contains 0.25% of Alkaloids, and is only half the strength of the B.P. Emplastrum Belladonnæ.

Ⓕ **Emplastrum Belladonnæ U.S.** Contains not less than 0.38 nor more than 0.42% alkaloids, and is prepared with Extractum Belladonnæ Foliorum (1.4% alkaloids) 300, Emplastrum Adhæsivum 700. Assayed.

FR.CX. has Belladonna Extract (FR.CX. *q.v.*) 1, Elemi 1, Diachylon Plaster (FR.CX.) 2.

Ⓖ **Extractum Belladonnæ Viride (Off.).**

Dose.—"½ to 1 grain" (0.016 to 0.065 Gm.), increased to 2 grains or more.

A green extract prepared from the expressed juice of leaves and young branches (3 to 3½ ounces are procurable from a pound of leaves); it contains from 0.5 to 2.0% (average 1) of alkaloids, and might be standardised to contain 1%. We adopt this. For methods, *see* P.J. i./94,740; ii./97,517; ii./98,165.

Microscopical identification of constituents.—P.J. ii./08,834.

Ⓖ **Extractum Belladonnæ Alcoholicum (Off.).**

Dose.—¼ to 1 grain (0.016 to 0.065 Gm.).

A brownish powder; prepared by concentrating the liquid extract of belladonna by evaporation and mixing with milk sugar, so that 20 of liquid extract yield 15 of product in powder. It contains 1% of the alkaloids of belladonna, and is only about one-third strength of the preparation in B.P. 1885.

In the official process of assay, the fatty matter should be first removed by shaking the sample (acidified) with chloroform.—P.J. i./99,432. Modes of assay.—P.J. i./03,269.

Ether preferred to chloroform as the immiscible solvent, and a little tragacanth may be added to assist separation.—P.J. ii./00,195; Y.B.P. 1901,40.

Ⓖ **Extractum Belladonnæ F.I.** to be a "solid" extract (containing about 10% of water) prepared by means of alcohol 70% from the leaf.—FR.CX., P. DAN. and P. HUNG. agree with F.I. The FR.CX. follows the F.I. method of making and gives a method of standardising, but does not set up a standard. It states *max. single dose* ½ grain. *Max. in 24 hours* 1½ grains approx. C.R. 1903 states: Standardised to 1% might well take the place of both the present official extracts.

Would differ in appearance from the present official extracts.

Ⓖ **Extractum Belladonnæ cum Dextrino Exsiccatum, P. Hung.** Belladonna (leaf) Extract F.I. 1, Dilute Alcohol 2. Evaporate with Dextrin *q.s.* to 2. Contains 1% Alkaloids. To be employed in Hungary for Solutions, Pills, Powders and Suppositories, employing double the quantity prescribed, but for Ointments and Plasters the F.I. preparation is to be used.

Ⓖ **Extractum Belladonnæ Foliorum, U.S.,** made with 2 parts alcohol and 1 water as solvent. Contains 1.4% mydriatic alkaloids.

Ⓖ **Extractum Belladonnæ, P. Austr.** is alcoholic from the leaves and contains 2% alkaloids; Ⓖ **Ph. Ned.** is the same but contains not less than 1.15% alkaloids. Ⓖ **P. Belg.** contains 1.5% alkaloids.

The average yield was found by Farr and Wright to be 1%. The stronger the alcohol used the better the extraction—using 90% alcohol, 4% alkaloids were obtained against 2.15% only when employing 50% alcohol.

For powdered extract, powdered leaves recommended as diluent; should be well dried first, and must contain sufficient alkalioid to permit of their being used in the proportion of 2 of diluent to 1 of extract. This keeps well.—P.J. i./05,398; C.D. i./05,425. The use of dried exhausted marc would greatly simplify.—Deane.

Ⓔ Extractum Belladonnæ Liquidum (Off.).

Dose.— $\frac{1}{3}$ to 1 minim (0.02 to 0.06 Cc.).

Belladonna root in No. 20 powder, 8 parts, is percolated in 4 successive portions with 30 parts of a mixture of Alcohol 7, Distilled Water 1; collecting $12\frac{1}{2}$ parts of the final percolate. This is diluted with the menstruum, adjusting the strength so that the liquid extract contains 0.75% of alkaloids.

Should be reduced to 70% alcohol (if root were retained).—P.J. ii./09, 142.

To prevent emulsification in assay process remove the fat as much as possible, either by the B.P. method or by Alcock's process—preliminary removal of fatty matter with ether and the precipitation of resinous matter with chloroform—P.J. ii./05, 124. Note on manufacture.—Dott P.J., July 28, 1906, p. 99.

Ⓕ Fluidextractum Belladonnæ Radicis, U.S.

Average dose.—1 minim (0.05 Cc.). Hydroalcoholic percolate; contains 0.4 Gm. mydriatic alkaloids in 100 Cc. Assay on lines of belladonna root, v.p. 177.

More than one agitation of the chloroformic solution of the alkaloids with acid seems necessary in the U.S.P. process of estimation and two portions of water for washing the separator necessary.—Naylor, P.J., 1./07, 394; Am. Jl. Ph. 06, 456.

Ⓖ Glycerinum Belladonnæ, B.P.C.

Green Extract of Belladonna, 1 ounce; Boiling Distilled Water, 1 drachm. Rub in a warm mortar to a smooth paste, and add Glycerin, *q.s.*, to 2 ounces (fluid).

To check pain and inflammation, is often painted on boils, abscesses and carbuncles, and covered with a poultice, also applied on lint to the breasts to disperse milk. G.H. is one-third weaker. R.O.H. orders $3\frac{1}{2}$ oz. of glycerin to the ounce of extract.

Marked intolerance to,—40 minims applied in cellulitis of foot produced all the symptoms of belladonna poisoning.—L. i./06, 596.

Suggested addition of 6 grains of Tragacanth to the ounce to thicken.—P.J. ii./06, 401.

Ⓖ Linimentum Belladonnæ (Off.).

Camphor 1, Alcohol (90%) 6. Dissolve and add Liquid Extract of Belladonna 10, Distilled Water 2, Alcohol (90%) *q.s.* to 20. A useful topical sedative for neuralgia and rheumatism. Contains 0.375% of alkaloids.

U.S. has Camphor 5, Fluidextract of Root to 100.

Poisoning by the Methylated Liniment. Strychnine hypodermically, strong tea, and making the patient vomit, brought her round.—B.M.J. ii./07, 1155. For older refs. *vide* Edn. XII., p. 173.

Ⓖ Linimentum Belladonnæ Compositum.

Liniment of Belladonna 7, Chloroform of Belladonna 1.

Sprinkled on impermeable piline relieves lumbago.

Ⓖ St. M.'s H. has Belladonna Liniment 1, Compound Camphor Liniment 1.

Ⓖ Linimentum Belladonnæ cum Chloroformo, St. M.'s H.

Chloroform Liniment 1, Soap Liniment 1, Belladonna Liniment 2.

Ⓖ B.P.C. Chloroform 1, Belladonna Liniment 7.

Ⓖ Pilula Quininæ cum Belladonna, R.O.H.

Green Extract of Belladonna $\frac{1}{3}$ grain, Quinine Sulphate 1 grain, Confection of Roses *q.s.*

Ⓔ **Pulvis Hydrargyri cum Creta, et Belladonnæ, R.O.H**

Dose.—5 grains (0.32 Gm.).

Mercury with chalk 2 parts, Belladonna Leaves, in powder, 1 part
Sugar, in powder, 2 parts.

Ⓕ **Succus Belladonnæ (Off.).**

Dose.—5 to 15 minims (0.3 to 0.9 Cc.). Expressed juice of leaves and branches with one-third of 90% alcohol added.

Alkaloidal strength about 0.05%.

Hay fever is relieved by one minim every hour.

Ⓖ **Suppositoria Belladonnæ (Off.).**

Contain Alcoholic Extract of Belladonna $1\frac{1}{2}$ grains (0.1 Gm.), with Oil of Theobroma *q.s.*

Ⓖ **Pessaries** (60 grains weight) may also be made containing the same or double the quantity of extract. *Vide also Ovules.*

Unilateral convulsions produced by, together with usual dryness of throat, dilated pupils (special idiosyncrasy).—B.M.J. i./o6,1019.

Ⓖ **Suppositoria Belladonnæ $\frac{1}{2}$ grain, et Morphinae Hydrochloridi $\frac{1}{4}$ grain.**

These possess a useful sedative effect, and are valuable in irritated and painful conditions of the rectum and prostate and for chordee.

Ⓖ **Tinctura Belladonnæ (Off.).**

Dose.—5 to 15 minims (0.3 to 0.9 Cc.).

Liquid Extract of Belladonna 1, Alcohol (60 per cent.) *q.s.* to 15. Is about double the alkaloidal strength of that in B.P. 1885.

Uses.—Relieves the spasm of asthma and bronchitic cough; also bladder spasm set up by calculi and prostatic irritation. Full doses are useful for incontinence of urine.

Flavoring.—Syl Myristicæ, Syl Rosæ; Syrupus Aurantii.

Tablets are prepared equivalent to Ⓔ 2 and Ⓔ 5 minims weighing 1 and 2 grains respectively.

Ⓖ **U.S.** has 1 of Standard Leaves (0.3% alkaloids) in 10 of diluted alcohol, assayed to 0.03%.

F.I. requires 10% —FR. Cx. and P. HUNG. C.R. states 16% from leaf of good quality would be approximately same alkaloidal strength as at present. To be standardised as at present (0.05%)—would be totally different in appearance from the present tincture. FR. Cx. has max. dose during 24 hours, 70 minims approx.

† C.R. 1908 recommends a tincture on these lines—standardised.

Appendicitis has been treated by full doses (10 to 15 minims) with sodium salicylate.

Exophthalmic goitre satisfactorily treated with belladonna, liquor arsenicalis, bromide, and digitalis.—B.M.J. i./o6,914.

In enuresis valuable, especially with potassium citrate.—B.M.J. i./o6,903.

Broncho-pneumonia sometimes well treated in early stages with 4 to 5 minim doses or $\frac{1}{4}$ grain of extract every 3 or 4 hours according to age of child and severity of case—combine with diuretics and diaphoretics.—M.P. Jan. 16, '09, 601.

⑩ **Mistura Belladonnæ Xanthoxyli et Hyoscyami.** *Syn.* Towns' Specific.

Dose—6 to 8 minims (0.35 to 0.5 Cc.) Belladonna Leaf Tincture (U.S. 1890)2, Fluidextract of Xanthoxylum 1, Fluidextract of Hyoscyamus 1.

Arguing on a 0.3% leaf (as now official in U.S.), this is equivalent to a dose of a little less than 3 to 4 minims B.P. Tincture. If a leaf with content of 0.5% alkaloids were used the dose would be equivalent to $4\frac{1}{2}$ to 6 minims (*Off.*)

Stated to be a specific for use in morphiism, cocainism and alcoholism.

⑪ **Linimentum Belladonnæ Æthereum.**

Prepared with Ether, 1 in $1\frac{1}{2}$, with Camphor $\frac{1}{8}$. Recommended in place of (*Off.*) Liniment for quicker absorption.—L. ii./90,67; P.J. 1890,84.

N.B.—Name altered. Previously called *Ethereal Tincture*.

⑫ **Unguentum Belladonnæ** (*Off.*).

Liquid Extract of Belladonna 8, evaporate to 1, and add Benzoated Lard 9. Contains 0.6% alkaloids.

⑬ **U.S.** Extract of Belladonna Leaves 2, Alcohol 1 (48.9% volume), Hydrous Wool Fat 4, Benzoated Lard 13.

To lessen excessive secretion in nasal catarrh, this ointment has been employed diluted 5 to 10 times with soft Petroleum and a small proportion of Tannin or Gallic Acid added.

⑭ **Onguent Populæum** (Fr. Cx.): Poplar-buds (dry) 8, dry belladonna 1, hyoscyamus 1, black nightshade 1, poppy leaves 1, and lard 40. Macerate the powdered leaves 24 hours in a closed vessel in alcohol 95%, add the lard and warm on water bath 3 hours with stirring, then add the crushed poplar buds and warm 10 hours on water bath. Press, allow to cool, separate the deposit.

BISMUTHUM.

Bi = 207.30 (208.0 I. Wts.).

The absorbent action of the preparations of bismuth taken internally is increased by combination with antiseptic organic compounds. These combinations have been much recommended in those disorders of the digestive tract in which several infectious diseases make their early manifestations. Thus the salicylate, and naphthol, phenol, pyrogallol and bromophenol compounds have been brought into use. These check the fermentative processes forming ptomaines, yet, it is said, do not interfere with intestinal digestion. Bismuth compounds are in general *incompatible* with potassium iodide, the insoluble brown bismuth tri-iodide being formed.

Bismuthi Benzoas, Bismuth Oxybenzoate. $C_6H_5 - CO.O$ (BiO) (?) = 343.31 (345.04 I. Wts.).

Dose.—5 to 20 grains (0.3 to 1.2 Gm.) thrice daily.

A white powder insoluble in water. Fr. Cx. requires 64 to 65% Bismuth Oxide. Antiseptic, internally in gastro-intestinal diseases, externally to chancreoid, indolent and sloughing ulcers.

Bismuthi Carbonas.

$(Bi_2O_2CO_3)_2.H_2O = 1029.70$ (1034.106 I. Wts.).

Syn. Bismuth Oxycarbonate (*Off.*). Bismuthi Subcarbonas, U.S. *Dose.*—5 to 20 grains (0.32 to 1.3 Gm.).

Suspended in an ounce of water by means of a drachm of mucilage of tragacanth or about 6 grains of compound powder of tragacanth.

Prescribers should indicate suspending agent required.

The following forms an agreeable dose:—

Mistura Bismuthi. *Dose.*—1 ounce.

Bismuth Oxycarbonate 10 grains, Sodium Bicarbonate 10 grains, Mucilage of Tragacanth 1 drachm, Compound Tincture of Cardamoms 30 minims, Spirit of Chloroform 10 minims, Cinnamon Water to 1 ounce.

St. M.'s H. has Bismuth Subnitrate 20 grains, Tragacanth Mucilage 1 drachm, Peppermint Water to 1 ounce.

Tablets of Bismuth Carbonate, 5 grains, to be crushed and swallowed with a little water.

For X-ray diagnosis of conditions of œsophagus and stomach large doses (even 1 to 2 ounces) are frequently ordered. For several reasons Bismuth Oxychloride is preferable, *q.v.*

Bismuth Subcarbonate is the best salt as a gastric sedative, preferable to the subnitrate or salicylate. The subnitrate is found to have distinct germicidal action on *B. coli*, hence best as intestinal antiseptic. For astringent effect preferred with catechu to the suballate.—*L. i./05,432.*

Lienteric diarrhœa well treated by a bismuth and bromide mixture, a well fitting cummerband and shortening of carbohydrate food to accompany.—*B. M. J. ii./09,749.*

Estimation of Nitrates in bismuth salts. Simmons.—*C. D. ii./08,198.*

A convenient and efficient mode of prescribing freshly precipitated Bismuth Carbonate is in the form of Glycerinum Bismuthi Effervescens, q.v.

Ⓢ ***Sedeff.** *Dose.*—1 to 2 drachms in water. Contains opium, bismuth and digestive ferments. A palatable granular effervescent preparation, suggested for use in sickness and derangement of digestive functions.

Ⓢ **Pastillus Bismuthi Carbonatis** (3 grains) cum Morphine Acetate ($\frac{1}{10}$ grain), *v.p.* 342.

Ⓢ **Collapsubes** (with rectal tube attachment) of Bismuth 20%, Morphine $\frac{1}{2}\%$, and Cocaine 3% Ointment with soft paraffin basis, are useful as an astringent in hæmorrhoids and for allaying irritation.

Ⓢ **Pulvis Bismuthi Opiatus.** *Gt. Orm. H.*

Bismuth Carbonate 15 grains, Calomel $\frac{1}{4}$ grain, Compound Ipecacuanha Powder $\frac{1}{4}$ grain.

Liquor Bismuthi et Ammonii Citratis. *Syn. Liquor Bismuthi (Off.).*

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Contains 5 grains of citrate = 3 grains of oxide of bismuth in 1 drachm; is apt to become fungoid.

The precipitate by B.P. method of making should be washed rapidly without unnecessary exposure. Sterile materials and utensils should be used. The potassium citrate must be pure, and the solution of ammonia must be quite free from tarry matter. Test for the latter by adding 2 to 3 Gm. of copper sulphate to the ammonia solution until it smells very slightly of ammonia; tar constituents will colour it.—*C. D. i./05,718.*

If the quantity of potassium carbonate in the official formula be increased by 1, the washings from the precipitate are almost neutral, and the loss of bismuth is considerably less. It is even better to work with the crystalline bismuth nitrate, using necessarily increased quantity of alkali.

Experiments to determine the best method of preparing Liquor Bismuthi.

A preliminary attempt in 1908 to solve the question of the difficulty of keeping Liquor Bismuthi was made by preparing three separate batches,—

1. B.P. 1908 preparation.

2. B.P. 1885

3. Freshly sterilising a batch which had become fungoid.

All three kept good and clear in stoppered bottles for four or five months.

Further experiments were put on in August, 1909, as follows :—

At time of going to press results were as follows :—

- | | |
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| <p>1. B.P. 1885 preparation. (A 7 pint batch divided into two stoppered bottles and one corked Winchester).</p> <p>1a. Ditto. Sterilising after making.</p> <p>1b. Ditto made with Chloroform Water 1 in 400.</p> <p>2. Process given Pharm. Form. 1908. p. 670.</p> <p>3. B.P. 1908 Preparation.</p> <p>4. The method of C.D. i./08, 454. (Given in E.P. xiii. p. 192.)</p> | <p>1. Kept good in small stoppered bottles (full), but corked Winchester (full) had become fungoid.</p> <p>1a. Very slight deposit.</p> <p>1b. Perfectly bright.</p> <p>2. Deposited white precipitate.</p> <p>3. Good.</p> <p>4. Deposited slightly.</p> |
|--|---|

Our conclusion is, therefore, that the 1885 method is good if precautions are taken. It is important that the Bismuth Citrate should be pure. Chloroform is a good preservative and the 1898 B.P. method is satisfactory, but is, of course, a longer process.

Flavoring.—Syl Lavandulæ, Syl Amygdalæ Amaræ; Syrupus Aromaticus.

Evaporated to a syrupy consistence and spread on glass and dried, it produces soluble—

Bismuthi et Ammonii Citras, U.S.

Dose.—2 to 5 grains (0.13 to 0.32 Gm.).

In shining pearly or translucent scales. 1 Gm. yields not less than 0.46 or more than 0.48 Gm. Bi_2O_3 .

***Lac Bismuthi, Symes.** *Dose.*—1 to 2 drachms.

A preparation of bismuth hydroxide. May be prescribed with hydrocyanic acid, alkalis, &c.

(P) Liquor Bismuth Sedativa, Schacht. Syn.*Bisedia.

Dose.—1 drachm (3.5 Cc.).

Containing bismuth and pepsin with $\frac{1}{4}$ grain morphine hydrochloride, 2 minims of hydrocyanic acid, and 5 minims of tincture of nux vomica.

Bismuthi Citras, U.S. $\text{BiC}_6\text{H}_5\text{O}_7 = 394.92$ (397.04 I. Wts.), (394.52 U.S. Wts.).

Dose.—2 to 5 grains (0.13 to 0.32 Gm.).

A white crystalline powder, yielding not less than 56 or more than 58% pure Bismuth Oxide (U.S.). Insoluble in water and alcohol 90%, but soluble in solution of ammonia. It is astringent and stomachic.

Elixir Bismuthi. *Dose.*—1 drachm (3.5 Cc.).

Bismuth Citrate 1, Distilled Water 6, Solution of Ammonia $\frac{3}{4}$ or more if needed to dissolve the bismuth. Dissolve, filter and add Simple Elixir *q.s.* to 30.

Liquor Bismuthi Concentratus, B.P.C.

Dose.—15 to 30 minims.

Bismuth Subnitrate, 7, dissolve with heat in Nitric Acid and Water of each 5, then add Citric Acid 5, dissolved in Water 7, then gradually Sodium Bicarbonate 8, mixed with Water 7. Wash the precipitate till free from nitrates, collect and dissolve it in Solution of Ammonia 6 or *q.s.*, Solution of Ammonium Citrate 12, add Distilled Water *q.s.* to 50. Filter.

Ⓟ **Mistura Bismuthi cum Pepsina.** (Martindale.)

Dose.—1 to 2 drachms (3.5 to 7 Cc.) diluted.

Contains Bismuth Citrate 2 ounces, Pepsin (soluble) 320 grains, Morphine 5 grains, Strychnine $1\frac{1}{2}$ grains. Dilute Hydrocyanic Acid 320 minims, Chloroform 30 minims, Saccharin Elixir 480 minims, Rosein Acetate *q.s.* to color. Water to one pint. If made *secundum artem* this mixture will not deposit.

Flavoring.—Glyl Cinnamomi, Syl Lavandulæ; Syrupus Aurantii.

Bismuth and Liquid Pepsin preparations said to be quite valueless as to pepsin action; insoluble bismuth salts, however, quite compatible.—C.D. i. 08, 133. See also P.J.ii./06, 88.

Tabellæ Bismuthi et Pepsinæ.

Bismuth Carbonate 3 grains, Pepsin 3 grains, in chocolate basis. Also Compressed Tablets.

Bismuthi Iodo-Resorcin-Sulphonas. *Syn.* ★ANUSOL. In Suppositories for hæmorrhoids.

These contain neither Sulphonic Acid nor Iodine but free Bismuth Sulphide and Resorcin.—Apoth. Zeitung 1908, 23, 863 per P.J.ii./08, 766.

Bismuthi et Cinchonidinæ Iodidum (short name — 'Bisciniod' — Martindale). $\text{C}_{19}\text{H}_{22}\text{N}_2\text{O} \cdot \text{HI} + \text{BiI}_3 = 1003.95$ (1010.884 I. Wts.).

Dose.— $\frac{1}{4}$ to 1 grain (0.01 to 0.065 Gm.).

Yellowish red powder insoluble in ordinary solvents.

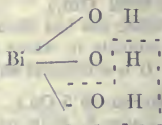
Manufactured by double decomposition of a soluble Cinchonidine salt with Bismuth and Potassium Iodide Solutions. It contains about 20% Bismuth, 40% each Iodine and Cinchonidine.

This substance, containing digestive febrifuge and antiseptic constituents, should certainly find utility in therapeutics.

Bismuthum Hydroxydatum, Hydrated Bismuth Oxide. Fr.Cx.

$\text{BiO.OH} = 240.06$ (241.008 I. Wts.), i.e., 1 molecule Bismuth Oxide containing the elements of $\frac{1}{2}$ molecule water, (373%).—Fr.Cx. Using theoretically 1

molecule of Bi_2O_3 and 1 molecule of water, one obtains 2 molecules of the above Hydrated Oxide. The Tri-hydrate $\text{Bi}(\text{OH})_3$ is precipitated, which on drying at 100°C decomposes into the monohydrate:—



Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

An amorphous white insoluble powder, but soluble in Sulphuric Acid and Hydrochloric Acid in presence of water and in fixed alkalis in presence of Glycerin. Permanent in the air.

Shake Glycerin 150 Gm. with Bismuth Nitrate (cryst) 100 Gm. add Water 100 in small portions, shaking constantly to prevent formation of the Subnitrate. When dissolved filter if not clear, and pour the liquid, a little at a time, into a mixture of water 150 and 10% Potash Solution 850 Gm. When reaction complete add drop by drop Dilute Sulphuric Acid 100 Gm. (10% approx.—Fr. Cx.) mixed with its weight of water to neutralise, then render the mixture slightly alkaline. Wash the precipitate by decanting until a sample of the wash liquor leaves nothing on evaporation. Collect and dry at 100°C .

Employed in making Basic Bismuth Salicylate.

In an experimental lot we obtained 45 Gm. of product from above quantities. The theoretical amount is 50% approximately.

This preparation might form a useful substitute for the carbonate which is not thought to be invariably of service.

Bismuthi Nitratis Crystallisatum, Fr. Cx. $\text{Bi}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O} = 481.44$ (484.11 I. Wts.).

Dose.—5 to 10 grains (0.3 to 0.65 Gm.).

In colourless deliquescent crystals, which if dissolved in a small quantity of water give a solution with an acid reaction, this on further dilution throws out basic bismuth subnitrate, is practically insoluble in Alcohol 90%, but soluble in cold Glycerin. *c.f.* Glycerinum Bismuthi Nitratis. It is astringent and antiseptic, and useful for the diarrhoea of phthisis.

Bismuthi Oxidum, $\text{Bi}_2\text{O}_3 = 462.24$ (464 I. Wts.) (*Off.*).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

Is prepared by boiling bismuth subnitrate in solution of soda, washing and drying the deposited yellowish bismuth oxide. May with advantage be precipitated with acid from an alkaline solution containing glycerin.

Anderson's Ointment.

Bismuth Oxide 1, Oleic Acid 8, White Wax 3, White Soft Paraffin 9. In pruritus.

Bismuthi Oxychloridum, $\text{BiOCl} = 258.37$ (259.46 I. Wts.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

A non-irritant cosmetic powder; pearl white or '*blanc de perle*.' Given internally it produces a coating on the irritated parts of the stomach or bowels. As insufflation to the larynx $\frac{1}{4}$ to $\frac{1}{2}$ gr.

An Oxybromide is also made, with similar internal use.

Mucilago Bismuthi. For "X" Ray Diagnosis.

Bismuth Oxychloride $1\frac{1}{2}$ to 2 or 3 ounces or less made into a thick paste with Acacia Mucilage for a dose, for determining condition of the oesophagus and for examining shape, position and motor function of the stomach.

Bismuth in Bread and Milk in proportion of $1\frac{1}{2}$ ounces of Bismuth Oxychloride to $\frac{1}{2}$ pint of bread and milk to form a thick paste—not a liquid—is also employed.

Bismuth Carbonate is sometimes used, but the Oxychloride would have the advantage of not being attacked by either the acid stomach juices or the alkaline intestinal secretion; furthermore there would be no distension from Carbonic Acid evolved.

In examining conditions of the œsophagus it is not necessary to take radiographs, screening is all that is required, with the patient standing. A diaphragm is used to outline the œsophagus—the best view, as a rule, is obtained by keeping the left side close to the screen and turning the right slightly away. Mouthfuls of the Bismuth (Carbonate) Mucilage are then watched in their passage down the œsophagus, or the Bismuth Bread and Milk, mentioned above, is used for observing strictures and foreign bodies acting as obstructions.—B.M.J. ii./08,711,715.

Meals of the Bismuth, Bread and Milk alone are more suitable than the Mucilage for Examining the Functions and Shape of the Stomach.

Bismuth Oxychloride $1\frac{1}{2}$ ounces with breakfast in an investigation on abdominal auscultation.—B.M.J. ii./08,1602.

Bismuth Carbonate 1 ounce with Bread and Milk, 8 ounces *per os* for stomach examination.—B.M.J. ii./09,73.

Bismuth Carbonate 2 to 4 ounces in Milk-Sugar and Water or Corn-flour.—B.M.J. ii./09,1469.

In tuberculous joints injections into sinuses useful for diagnosis and treatment.—B.M.J. ii./09,331.

Bismuth Oxychloride 2 ounces in porridge in stomach examinations not likely to stick and confuse results.—L. ii./08,735.

Dangerous and untoward effects from—

Two deaths of infants have been reported from the use of the Subnitrate.—B.M.J. ii./08,715.

See also Bismuth Carbonate and "X" Ray diagnosis, page 582.

Pessaries or Suppositories may be made with Oil of Theobroma, containing 10 grains (0.65 Gm.).

Unguentum Bismuthi Oxychloridi.

Bismuth Oxychloride 1, Vaseline 15.

Is useful for anointing the speculum previous to vaginal examinations.

The Oxyiodide has been applied to ulcerating sores and injected in suspension, 1 in 100 of water for gonorrhœa; also as an ointment for rectal affections. Internally for ulcer of the stomach.

Bismuthi Salicylas, Bismuth Salicylate, Bismuth Oxy-salicylate, $C_6H_4.OH.CO.O.BiO = 359.19$ (361.04 I. Wts.) (*Off.*).

P.G. iv., U.S., P. Austr., P. Jap., P. Helv. (with method of making.)

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

A white powder, insoluble in water, alcohol, and glycerin, yields on incineration about 64% of Bismuth Oxide. (U.S. not less than 62 nor more than 66%). Has been used with advantage in some forms of diarrhœa, typhoid fever, and gastric catarrh, and as a substitute for iodoform.

Suggested test for new B.P.—5 Gm. treated with 30 Cc. of purified ether to yield not more than 0.003 Gm. Salicylic Acid.

Preparation of this Bismuth Salt by hydrolytic dissociation of the neutral salt, using at the outset a Concentrated Solution in Nitric Acid of Metallic Bismuth or the Subnitrate, and precipitating with Ammonium Salicylate Solution.—For details consult Am. Jl. Ph., Dec., '08, 584.

Rectified Benzol as extractive. If allowed to percolate through the sample and the liquid be dropped into dilute Ferric Chloride Solution, this will detect the smallest quantity of free Acid by violet colouration at junction of the two liquids.—P.J. ii./'08, 404. Alcohol decomposes, and Ether and Chloroform are unsuitable.—P.J. i./'09, 3. Harrison found Ether best for extracting. A true Bismuth Salicylate and a loose combination of base and acid are on the market.—P.J. ii./'09 131, 156; C.D. ii/'09, 184.

C.R. 1908 advises dry Ether. 5 Gm. should not yield more than 0.005 Gm.

Tablets, 5 grains (0.32 Gm.). *Dose.*—1 to 4.

Suppositories of Bismuth Salicylate, 10 grains.

A useful astringent in dysentery.

Bismuthum Subsaliicylicum, Basic (Fr.Cx.)

$C_6H_4.OH.CO.O.Bi. \begin{smallmatrix} OH \\ OH \end{smallmatrix} = 377.07$ (379.056 I. Wts.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

An amorphous anhydrous insoluble white powder neutral to Litmus, incompatible with Acids. To prepare, warm without boiling Hydrated Bismuth Oxide 158 or as much as corresponds to 150 Gm. Bi_2O_3 with Salicylic Acid 100 previously mixed with water 1000. The mixture should be finally slightly acid. After cooling collect and wash rapidly, and dry at not exceeding $80^\circ C$. In an experimental quantity which we prepared we found a distinct proportion of free Salicylic Acid.

Bismuthi et Cerii Salicylas.

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

For sickness, diarrhoea, dysentery, and ulceration of the bowels.

Lac Bismuthi et Cerii is sold as a specialty.

Dose.—One to two drachms.

Bismuth Sulphocarbolate or Sulphophenate.

Dose.—4 to 8 grains (0.26 to 0.52 Gm.) in cachets.

A red-tinted powder slightly soluble in water, used in intestinal affections.

***Thioform**, a basic dithio-salicylate of bismuth, is a brownish insoluble powder; has been used as a desiccant antiseptic in eye cases.

Bismuthi Subnitrates, BISMUTH OXYNITRATE, MAGISTERIUM BISMUTHI,
Ph. Ned., $BiONO_3.H_2O = 302.64$ (304.026 I. Wts.). (*Off.*).—P. Helv.

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

P. Jap. gives usual method of making—i.e. Bismuth 1, Nitric Acid (1.2 Sp. Gr.) 5, solve and allow to crystallise, then take the crystals 1, water 4, and add boiling water 21. Pour off, wash with water 25, and dry at $30^\circ C$.

Yields not less than 80% Bi_2O_3 (U.S.), and P. Jap. 79-82%.

C.R. 1908—Should yield between 79 and 82% oxide.

Incompatible with alkaline carbonates, also decomposes Potassium Iodide, and incompatible with Tannin and Sulphur.

Best suspended in aqueous vehicle by Compound Tragacanth Powder, 1 drachm to 8 ounces, or by Acacia Mucilage freshly made with powdered gum.

The 'light' commercial variety is stated to have the composition $\text{Bi}_2\text{O}_3 \cdot 2\text{HNO}_3 = 587.4$ (590.036 I. Wts.), is more generally preferred, and should be in the next B.P.—C.D.i./o8,453.

Uses.—As a dusting powder in ophthalmic practice, and in gastric ulcer and dysentery. Suspended is injected for gonorrhœa.

Injectio Bismuthi Subnitratis.—BECK'S BISMUTH PASTE. For 'X' Ray Examination of fistulæ. (*cf.* also Bismuth Oxychloride).

(a) FOR DIAGNOSIS AND EARLY TREATMENT.—Bismuth Subnitrate 1, Vaselin 2. Mix while boiling.

(b) FOR LATE TREATMENT.—Bismuth Subnitrate 6, White Wax 1, Soft Paraffin 1, Vaselin 12 (*sic*). Mix while boiling. Sometimes 1% Formalin is added.

It is generally believed that Paraffin is not absorbed in the tissues. This applies only to hard Paraffin,—that soft Paraffin is absorbed was proved by Kirchner and Eckstein of Berlin, in 1905 and 1906.

Water is to be carefully excluded from the pastes during boiling; the glass syringe must be sterilised dry, and the plunger dipped in sterile oil instead of water, before charging.—Beck, 'Fistulous tracts, tuberculous sinuses and abscess cavities.'—Jl. Am. Med. Assoc. 14/3/08, p. 868, *et seq.*

By 'X' Ray examination sinuses so injected can be localised. When employed for diagnostic purposes with subsequent immediate operation there is no danger, but large quantities should not be left *in situ*.—B.M.J.E. i./10,4.

Fistula treated by injection of 100 Cc. of (a). The Carbonate would be preferable in view of well known toxic effects of Subnitrate.—B.M.J.E. ii./09,44.

For examination of fistulæ this Salt is not only suitable in oily suspension, but such injections have a marked healing power, *e.g.* (b) formula above.—M./o8,158.

Three ounces of 33% Bismuth Subnitrate in Vaselin injected at the knee, after 4 ounces further caused obvious poisonous effects. Caution necessary when using for diagnostic purposes.—B.M.J. ii./o8,1604.

Tablets, 5 to 10 grains (0.32 to 0.64 Gm.).

Dragendorff's Test for Alkaloids.—Bismuth Subnitrate 8, Nitric Acid, Sp. Gr. 1.18, 20; add this solution gradually to a concentrated solution of Potassium Iodide 227. Cool, decant from Potassium Nitrate formed and dilute to 100 with water. The solution precipitates most alkaloids.

Trochisci Bismuthi Compositi (*Off.*). (Rose basis.)

Bismuth Oxycarbonate 2 grains, Heavy Magnesium Carbonate 2 grains
Precipitated Calcium Carbonate 4 grains.

Ⓟ **Pulvis Bismuthi Compositus** (Ferrier's Snuff). (*Syn.*

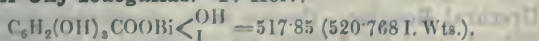
INSUFFLATIO BISMUTHI ET MORPHINÆ.)

Morphine Hydrochloride 1, Powdered Acacia 60, Bismuth Oxynitrate 180.

From 1 to 3 drachms to be used as snuff in 24 hours for catarrh. For acute coryza, add powdered cubebs.

Ⓛ **L. H. calls Ferrier's Snuff Pulvis Bismuthi cum Morphina**, and has **Pulvis Bismuthi Compositus** as an Antidyspeptic Powder (*Dose* 1 drachm) of Bismuth Oxycarbonate, Heavy Magnesium Carbonate, Sodium Bicarbonate of each 1.

Bismuthi Oxy-Iodogallas. P. Helv.



Syn. ★AIROL, AIROFORM, AIROGEN.

A light greyish-green powder, odourless, non-irritant. Is an iodoform substitute ointment for ulcers, boils, whitlows, chancre, and for tetterigo. Also as dusting powder, *e.g.*, for gonorrhœal ophthalmia.

Bismuthi Subgallas. $C_6H_2(OH)_3CO.O.(BiO), H_2O$ or $Bi(OH)_2C_7H_5O_5$
 $= 408.83$ (411.056 I. Wts.). *Syn.* ★DERMATOL; BISMUTHUM
 SUB-GALLICUM, P.G.IV. 52% Bi_2O_3 ; U.S. 52-57%; P. AUSTR.
 53-55% Bi_2O_3 . P. JAP. and P. HELV. GALLATE DE BISMUTH.
 FR.CX. 56.45% Bi_2O_3 (with directions for making).

Average dose (U.S.)—4 grains (0.26 Gm.).

An odourless, yellow, insoluble, non-irritant antiseptic dusting powder, employed alone or with starch.

Incompatible with alkaline sulphur compounds.

Given internally for diarrhœa in doses of 30 to 90 grains daily. Emulsion of Dermatol 2, Gum Acacia 2, Water 25, has been used in gonorrhœa, with good results.

In ulcerative colitis an emulsion to adhere to the mucosæ. — B.M.J. i./09, 770. W.S. Handley finds this non-irritant as an antiseptic dusting powder. May be used freely in situations (*e.g.* the rectum after pile operations) where absorption may occur. Promotes healing.

Collapsubes, with catheter attachment, of Dermatol Ointment, 10%, with paraffin basis, are useful in gonorrhœa: this ointment is also good for burns and eczema.

Bismuthi Tannas. *Dose.*—10 to 30 grains (0.65 to 2 Gm.).

A yellow powder insoluble in water, is astringent, and useful in diarrhœa and dysentery. F.N. 1908 gives method of making, as also P. HUNG.

★**Bismutose.** *Dose.*—15 to 30 grains for children, adults by the teaspoonful. A compound containing about 20% of bismuth with 60% of albumen; useful in gastric ailments.

Naphthol-Bismuth. BASIC BISMUTH BETA-NAPHTHOLATE *Syn.*

★ORPHOL. $Bi_2O_2(OH)C_{10}H_7O = 605.22$ (608.064 I. Wts.).

Dose.—10 to 30 grains (0.65 to 2 Gm.).

A useful antiseptic to the stomach and intestines, astringent.

Phenol-Bismuth.

$Bi(OH)_2C_6H_5O = 333.40$ (335.056 I. Wts.).

Dose.—10 to 30 grains (0.65 to 2 Gm.).

A greyish powder, insoluble containing about 20% of phenol, combined with bismuth oxide. Acts slowly on the digestive tract and does not cause carboluria. Has a similar action to last preparation.

Pyrogallol - Bismuth, $C_6H_3<\begin{smallmatrix} (OH)_3 \\ O.BiO \end{smallmatrix}$ or

$C_6H_3(OH)O_2BiOH = 347.28$ (349.040 I. Wts.) (*vide* also p. 182)
 has internal action similar to Salol.

Dose.—2 to 8 grains (0.13 to 0.52 Gm.).

BOUGIES.

Urethral Bougies. These are, *firstly*, of gelatin basis in *two* lengths, namely, 2½ inches and 4 inches, and are directed to be dipped in warm water prior to insertion. For various contents, *see* Index. (U.S. orders 7 Cm. = 2¾ inches, weighing about 2 Gm., and 14 Cm. = 5½ inches, weighing about 4 Gm. respectively.) *Secondly*, of Cacao Butter of *any* length up to 6 inches if desired, and of six sizes, with the following diameters:—No.1,

$\frac{1}{8}$ inch; No. 2, $\frac{5}{32}$ inch; No. 3, $\frac{3}{16}$ inch; No. 4, $\frac{7}{32}$ inch; No. 5, $\frac{1}{4}$ inch; No. 6, $\frac{5}{16}$ inch. These are for the treatment of gonorrhœa in its various stages. Those of Cotarnine (*q.v.*) are used to check bleeding.

The U.S. Urethral Bougies made with Oil of Theobroma are 7 Cm. and 14 Cm. long and weigh about 1 and 2 Gm. respectively.

Nasal Bougies are termed Buginaria. These are of elastic gelatin basis $\frac{3}{8}$ inches in length and are medicated with Boric Acid, Carbolic Acid Copper Sulphate and Zinc Sulphate. For strengths, *see* Index.

BROMUM, U.S., P. HELV.

Br=79.35 (79.36 U.S.) (79.92 I. Wts.).

A dark brown liquid, Sp. Gr. 2.99, with penetrating odour. Soluble 1 in 30 of water. Is not used as such medicinally.

Glass Capsules, 1, 2.2, and 4 Cc. and *Liquor Bromi*, v.p. 636.

The following medicinal inorganic Bromides contain the halogen in these proportions:—Ammonium Bromide (NH_4Br =97.29 B.P. Wts.) 81.66%. Calcium Bromide U.S. (CaBr_2 =198.41 B.P. Wts.) 81%. Lithium Bromide U.S. (LiBr =86.32 B.P. Wts.) 91.92%, Potassium Bromide (KBr =118.18 B.P. Wts.) 67.2%, Rubidium Bromide (RbBr =164.16 U.S. Wts.) 48.3%, Sodium Bromide, B.P. anhydrous (NaBr =102.23 B.P. Wts.) 77.6%, Strontium Bromide U.S. ($\text{SrBr}_2 + 6\text{H}_2\text{O}$ =352.94 U.S. Wts.) 44.97% (if exsiccated about 64.6%), Zinc Bromide U.S. (ZnBr_2 =223.62 U.S. Wts.) 70.9%.

Magnesii Bromidum ($\text{MgBr}_2 + 6\text{H}_2\text{O}$ =290.16 B.P. Wts.) contains 54.9% of Bromine, given in *doses* of 10 to 20 grains (0.65 to 1.3 Gm.) for hysteria and epilepsy as a nervine sedative. Soluble 1 in 0.6 of water and 1 in 2 of alcohol 90%.

Manganesii Bromidum ($\text{MnBr}_2 + 4\text{H}_2\text{O}$ =284.74 B.P. Wts.) contains 55.7% of Bromine, and is given in *doses* of 1 to 3 grs. (0.06 to 0.5 Gm.) as a nervine tonic. It is soluble 1 in less than 1 of water and alcohol. Both of these may contain less water of crystallisation.

Calcii Bromidum. CaBr_2 . U.S.= (198.52. U.S. Wts.) 97% pure.

Dose.—10 to 20 grains (0.65 to 1.3 Gm.)

A white crystalline powder soluble 1 in 0.3 of water and about 1, in 0.6 of alcohol 90%. U.S. 'very soluble.' Has been given in epilepsy with good results.

Flavoring.—Syl or Gyl Menthae Piperitæ, Syl Limonis (bold dose); Syrupus Aromaticus.

Bromal Hydras. Bromal Hydrate.

$\text{CBr}_3 \cdot \text{COH} \cdot \text{H}_2\text{O}$ =296.63 (298.784 I. Wts.).

Dose.—2 to 5 grains (0.13 to 0.32 Gm.) at bedtime.

In large colourless crystals, which melt on the hand, soluble in water 1 to 2 $\frac{1}{2}$. Applied externally it irritates the skin. It has been tried in epilepsy, chorea and insomnia.

Bromalbacid.

Dose.—15 to 30 grains (1.0 to 2.0 Gm.). per diem.

A brownish powder containing 6% of bromine; a nervine sedative.

Manufacture.—Schmidt gives method of making these halogenised Alumin bodies.

***Bromalin**—*Syn.* BROMETHYLFORMINE, HEXAMETHYLENTETRAMIN-BROMETHYLATE. $(\text{CH}_2)_6\text{N}_4\cdot\text{C}_2\text{H}_5\text{Br}=247\cdot39$ (249·096 I. Wts.).

Dose.—5 to 30 grains (0·32 to 2 Gm.) in cachet or mixture.

In crystalline powder or scales, soluble 1 in 0·6 of water, and about 1 in 25 of alcohol 90%. A nerve sedative, in neurasthenia and epilepsy.

Brominoleum, Brominol (33%).—*Syn.* BROMIPIN.

Dose.—10 to 60 grains (0·65 to 4·0 Gm.) approximately equivalent in content of Bromine to 5 to 30 grains Potassium Bromide.

An additive compound of Bromine with Sesame Oil* (v.p. 736.) containing 33 $\frac{1}{3}$ % of the halogen in form of a thick yellow odourless oil, Sp. Gr. 1·31. Gradually liberates bromine to the system.

Uses.—In epilepsy and all forms of nerve troubles, also in headache and sea-sickness. May also be rubbed into the skin if diluted with an equal weight of Lanolin Ointment.

It may be taken internally shaken up with an equal volume of syrup, in beer, wine or milk, or emulsified as follows: Brominol 33% 2 ounces, Gum Acacia 1 ounce, Chloroform 18 drops, rub together and add quickly with vigorous agitation Water q.s. to 6 ounces. *Dose.*—2 drachms equal 20 grains Potassium Bromide.

A weaker **Brominol** containing 10% of Bromine is also prepared. Sp. Gr. 1·008. A dose of $\frac{1}{4}$ ounce of this equals approximately 20 grains of Potassium Bromide.

Capsules contain 2 Gm. of 33% Brominol in each equivalent to (1 Gm.) 15 grains Potassium Bromide.

Ⓟ **Mistura Brominol cum Nuce Vomica.** Brominol 30 grains, Gum Acacia 30 grains, Tincture of Nux Vomica 6 minims, Spirit of Chloroform 15 minims, Water to half an ounce. For one average dose.

Rectal injections in epilepsy of 3 to 4 tablespoonsful of the 10% compound (= 4·5 to 6 Gm. Bromine) very beneficial.—M. '08, 167.

Neurasthenia with sleeplessness, loss of appetite, &c., well treated by 2 Gm. doses (in Capsules) thrice daily. Gave great improvement.—M. '08, 167.

The urine from patients under Brominol treatment contains an appreciable quantity of Bromine in combination, and the fæces contain traces.—W.H.M.

M. '08, on the other hand, quotes a German experimenter as having been unable to detect it in the urine after four to ten days' treatment. This, as is well known, differs from results obtainable with alkaline Bromides. He draws as conclusion that the slow absorption is a desideratum.

Bromipin Tablets are prepared, each equivalent to 9 grains of Potassium Bromide.

Said to be of value in tinnitus.—B.M.J. ii./09, 1131.

***Bromocoll.**—*Syn.* DI-BROMO-TANNIN GELATIN.

Dose.—8 grains (0·5 Gm.), increased to 130 grains (9·0 Gm.) for epileptics three times daily, in cachet.

* In view of a probable Imperial Pharmacopœia in the future, it has been suggested that this oil, or arachis oil, or purified cotton seed oil q.v. may supplant olive oil. It has been employed for making ophthalmic solutions of alkaloidal bases washed with half its volume of strong alcohol to free from fatty acids. The oil is separated and filtered if necessary. It is then sterilised at 120°C. for half an hour.—M.P. Aug. 1905. **Oleum Sesami** is official in P. Austr. with Saponification No. 187-193, Iodine No. 102-111. Three London commercial samples examined by us gave 86·24, 96·85, and 109·81. Ane n a l s i o n of Sesame Oil is recommended for administratio in iabetes.—C.D.i./10, 68.

A yellowish powder containing 20% Bromine, 30% Gelatin and 10% Water. A substitute for Alkaline Bromides, also as a dusting powder for wounds. Being almost insoluble in dilute acids, is said to be absorbed in the intestines only. It is stated to produce no constipation; acne has, however, appeared. For epilepsy.—*L.i./03,245; P.J.ii./08,166.*

Subcutaneously injected safe, intravenously with danger.—*M./06,66.*

Bromocoll Resorbin 20%. This ointment is advocated in urticaria, eczema, itching piles and various irritations of the skin.

Bromoform, P.G. iv., U.S., P. Helv, Fr. Cx.Ph. Ital. $\text{CHBr}_3 = 250.96$ (252.768 I. Wts.).

Dose.— $\frac{1}{4}$ to 2 minims (0.03 to 0.12 Cc.) or more. P.G. and CODEX maximum single dose 0.5 Gm.; max. during 24 hours $1\frac{1}{2}$ Gm. (=8 minims approx.). Children may receive as many drops as years old—up to 6.

A limpid, colourless, sweet liquid, with an agreeable odour; Sp. Gr. 2.829 to 2.833, B.pt. 148°C . Soluble in alcohol 90% in all proportions, slightly in water. Is decomposed by light. Schmidt states should be preserved by addition of 0.5 to 1% alcohol. Is a powerful sedative, useful in insane cases.

Capsules contain $\frac{1}{4}$ minim (0.03 Cc.) dissolved in oil.

Aqua Bromoformi. Well shaken, 1 minim is dissolved in 2 ounces of water. *Dose.*—1 to 4 ounces. (30 to 115 Cc.)

For sea-sickness half doses occasionally.

Emulsio Bromoformi. *Dose.*—2 to 4 drachms. (7 to 15 Cc.)

Bromoform $\frac{1}{2}$ (fluid) drachm, tincture of senega $\frac{1}{2}$ ounce, shake well and gradually add water *q.s.* to 6 ounces, syrup of orange $\frac{1}{2}$ ounce. Makes a good emulsion.

Soluté Officiel de Bromoforme, Fr. Cx.

Maximum single dose 8 minims; *maximum during 24 hours* 4 drachms approximately.

Bromoform 1, Glycerin 3, Alcohol 90% 6, all by weight.

In whooping cough diminishes number, duration, and severity of attacks, and mucous secretion is more easily got rid of.

Poisonous effects may arise.—*L. ii./98,1816; i./99,119; B.M.J. i./01, 1202.*

Should be dispensed in Solution 1 drop to 1 ounce of water, with a few drops of Alcohol. From 1 to 6 drachms as dose.—*L. i./09,34.*

Ⓓ★ **Rami Syrup.** *Dose*—Adult, 3 to 5 tablepoonsful *pro die*; Children, 2 to 5 teaspsonsful, according to age, during 24 hours.

Contains "per dose," Alcoolature d'Aconit 3 drops, Codeine 0.01 Gm., Bromoform 3 drops, Tolu 0.05 Gm.

Brometone. TRI-BROM-TERTIARY BUTYL ALCOHOL.

$\text{C}_4\text{H}_7\text{OBr}_3 = 308.57$ (310.816 I. Wts.).

Dose.—5 grains (0.32 Gm.). Repeated 2 or 3 times during 24 hours. Large doses may produce dizziness, loss of appetite, and mental heaviness.—*H.*

White crystals melting at 167°C . containing about 77% bromine. *Soluble* in alcohol, slightly in cold water.

Uses.—Hypnotic, analgesic, antiseptic. Useful in sea-sickness.

Capsules of Brometone, 5 grains in each.

In epilepsy in some cases of value and has some hypnotic power.—L. ii./o8,1223.

***Bromoglidine Tablets** 8 grains (0.5 Gm). Contain 10% Bromine. For use in epilepsy, hysteria, neuralgia and neurasthenia.

The Bromine is excreted in the urine, extremely slowly. (Iodine, on the other hand, is not stored up in the organism even when given in large quantity).—B.M.J.E. i./o9,28; c.f. Glidine and Iodoglidine.

BUCHU. (*Off.*).

The dried leaves of *Barosma betulina* (*Rutaceæ*) contain volatile oil and mucilage. Carminative and diuretic. Buchu has antiseptic action in irritability of bladder and for gonorrhœa. The infusion (1 in 20 boiling water) is representative of the activity of the drug. *Dose.*—1 to 2 ounces.

Flavoring.—Syl Aurantii Floris, Syl Lavandulæ; Syrupus Aromaticus.

Tincture 1 in alcohol 60% 5. *Dose.*—½ to 1 drachm.

Fluidextractum Buchu, U.S.

Average dose.—30 minims. 1 = 1 hydro-alcoholic percolate.

BUTYL-CHLORAL HYDRAS. (*Off.*).

Syn. CROTON-CHLORAL HYDRATE (formerly so-called), TRICHLOR-BUTYLIDENE GLYCOL.

$\text{CH}_3\cdot\text{CHCl}\cdot\text{CCl}_2\cdot\text{CH}(\text{OH})_2=191.97(193.436 \text{ I. Wts.})$.

Dose.—5 to 20 grains (0.32 to 1.3 Gm.), in pills or cachets.

Antidotes.—Stomach tube, emetic, coffee, caffeine atropine.

This body is produced by the addition of water to liquid Butyl Chloral which is the final product of the action of Chlorine on Aldehyde.

In pearly-white crystalline scales, having a pungent odour resembling that of Chloral Hydrate, and an acrid, nauseous taste. **Soluble** 1 in 43 of cold water (C.R. 1908 advises 1 in 40); freely in alcohol, 1 in 1 of glycerin, and olive oil 1 in 20.

Incompatible with alcohol. Butyl-Chloral Alcoholate will be formed, and in case of some mixtures will be precipitated.

Flavoring.—Syl Menthæ Piperitæ; Extractum Glycyrrhizæ Liquidum, Syrupus Zingiberis.

In combination with Gelseminine, is useful in neuralgia, *v. infra.*

Menthol 2, with Butyl-Chloral Hydrate 1 part, liquefy, *v.p.* 450. Combines with Antipyrine, *v.p.* 253.

May be administered in mixtures with syrup or as—

Mistura Butyl-Chloral, T.H.

Butyl-Chloral Hydrate 4 grains, Glycerin 15 minims, Water to 1 ounce. This is useful as an anodyne in neuralgic affections of the throat, frequently repeated.

In combination with antipyrine, cannabis, or gelsemium, Butyl-Chloral is useful in migraine; neuralgia of nerves other than the cranial rarely benefitted.

Pilula Butyl-Chloral.

Butyl-Chloral Hydrate 3 grains (0.2 Gm.) or more, Glycerin of Tragacanth or Mucilage of Acacia *q.s.* to make one pill. *Dose*.—1 every 2 hours, or hourly.

(P) Pilula Butyl-Chloral cum Gelseminina.—NEURALGIC PILLS.

Gelseminine Hydrochloride $\frac{1}{200}$ grain (0.00032 Gm.) is added to each of the above. (P) Tablets are also prepared.

For facial neuralgia two at the outset followed by one hourly until six have been taken.

Chloretone; Trichlor-Tertiary-Butyl-Alcohol. $\text{CCl}_3(\text{CH}_3)_2\text{C.OH}$
= 176.09 (177.436 I. Wts.). (Merck gives $\frac{1}{2}$ H_2O .)

Dose.—5 to 24 grains (0.3 to 1.5 Gm.) in cachet, capsule, or tablet followed by a draught of water or milk, or suspended in a mixture.

White crystals, with camphoraceous taste, melting at 80°C . **Soluble** 1 in 200 of water, 1 in 10 of glycerin, 3 in 2 of alcohol 90%, 1 in 50 of Liquid Paraffin, 1 in 12 of Olive Oil and Oleic Acid. Is a hypnotic, local anæsthetic and antiseptic. Acts particularly on the stomach.—L. i./oo, 106. In chorea 5 grain doses.—L. i./o7, 879.

Solutions in liquid paraffin 1 to 2% have been used for inflammation of the middle ear.

Chloretone Inhalant.—Liquid Paraffin Solution for use in rhinitis, bronchitis, nasal catarrh and 'sore throats.'

Chloretone suggested as a douche 0.4% in warm water for vaginal pruritus, also useful in post-operative vomiting.

For piles, 5 grains in a 30 grain suppository; for a dusting powder for wounds and scalds use Chloretone 23, with Zinc Oxide 120, and French Chalk 90 parts. 10% may be added to Linimentum Calcis for burns.

Capsules 5 grains check sea-sickness.

Post-operative vomiting prevented by its use. Value proved by 15 grains in a cachet where time permitted, to every adult operated on $1\frac{1}{2}$ hours beforehand. Spinal Injection of Cocaine in Chloretone Saturated Solution has to our knowledge (Bickle, Adelaide) been conducted without vomiting occurring. See also Ther. Gaz. U.S.A., Oct. 1902.

Tetanus treated by enema of 60 grains in hot Olive Oil—1,500 units of serum then given. Spasms however recurred, further enema given and the serum repeated. Convulsions ceased entirely.—B.M.J. i./o9, 1025.

In sea sickness and chorea useful. Also to prevent post-anæsthetic vomiting; not as local anæsthetic and of little value as hypnotic.—L. ii./o8, 1223.

For chorea 5 grain doses, in $\frac{1}{2}$ ounce of petroleum emulsion every 4, 6 or 8 hours to be later reduced after 2, 3 or 4 days when movements subsided—regarded as specific. L. ii./o8, 725.

Dentalone is chloretone dissolved in essential oils. Dental analgesic and antiseptic. In toothache the following drops have been found useful Chloretone 2, Camphor 2, Cinnamon Tincture 0.5, Cajuput Oil 5.—M. 1908, 109.

CAFFEINA.

Caffeine (*Off.*), Ph. Ned. Fr. Cx. *Syn.* THEINE, GUARANINE. $C_8H_{10}N_4O_2, H_2O=210.68$ (210.64 U.S.) (212.136 l. Wts.).

Dose.—1 to 5 grains (0.065 to 0.32 Gm.) or more—as much as 18 grains being recommended—given in solution, or in pills with glycerin of tragacanth.

A crystalline alkaloid (subliming at $178^\circ C.$, M. Pt. $236.8^\circ C.$, U.S.) usually obtained from the dried leaves of *Camellia Thea*, or dried coffee-seeds—*Coffea arabica*; also contained * in Guarana (*q.v.*) and in Maté—the leaves of *Ilex paraguayensis*—also kola nuts—the seeds of *Cola acuminata*, growing in Western Africa; it is identical with Theine and Guaranine. Caffeine and Theobromine (*v.p.* 664) can be prepared from Xanthine† (the latter being di- and Caffeine tri-methyl-xanthine). **Soluble** 1 in 80 of water, about 1 in 40 in alcohol, less in ether; acids render it more soluble in water, but it is a feeble base, and on concentrating the solution of the salts they are apt to split up, and the caffeine crystallises out by itself. Is rendered soluble in less water by the addition of an equal quantity of Antipyrin. See also Caffeine-Sodio-Salicylate, *etc.* p 199.

Caffeine and Theobromine fail to precipitate with Mayer's Reagent, distinguishing them from the majority of alkaloids. Caffeine has a bliter, not agreeable taste. Tea contains on an average 4 to $4\frac{1}{2}\%$ of Caffeine; raw coffee about 1.2% and when roasted about 1.3%. For manufacture, tea dust with the strongest yield of alkaloid is extracted.

Antidotes.—Stomach-pump and emetics. Poisoning by 60 grains of citrate caused burning in throat, giddiness, violent vomiting, purging and diuresis, tremors of extremities, pain in stomach and bowels and great thirst. Recovery: under nitroglycerin.—L.i./83,680. Poisoning by 200 grains; recovery under $\frac{1}{2}$ grain apomorphine.—L.i./89,219.

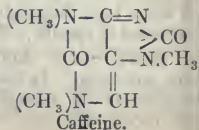
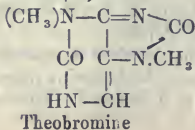
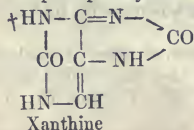
Uses.—It stimulates the heart and raises arterial tension. It is given for hemicrania. Locally, to the eye, it dilates the pupil. Caffeine and its allies are much used as diuretics; they act as direct stimulants to the water-secreting apparatus of the kidneys; of great value in renal dropsy. They are Purin derivatives, *v.p.* 883.

Useful in cardiac disease, especially where dropsy is a marked symptom. Is apt to induce insomnia. Large doses are required. It is better borne than digitalis. It is sometimes given with it.

A stomachic tonic, lessens tissue change, and waste, given in cases of diarrhoea, phthisis, and neuralgia. It is useful in pneumonia as a cardiac stimulant, pulse improves and temperature falls; and in typhoid.

Muscular labour is facilitated by increasing activity of cerebro-spinal centres; it keeps off fatigue.

* *Coffea Humblotiana* is remarkable as being free from caffeine, but contains bitter principle *Cafamarine*.—L. li./o6,1159.



Bronchial asthma of adults is relieved by 5 grain doses of Citrate.

In cardiac failure of granular kidney.—L. ii./08,519.

Cardiac failure in pneumonia best treated by Caffeine and Nux Vomica for prolonged use.—West. Pr., Apl./08,435.

Chronic nephritis and general dropsy disappeared under Caffeine Citrate. In 16 days $4\frac{1}{2}$ stone in weight lost. The profuse diuresis could not be absolutely attributed to the Caffeine however.—B.M.J. ii./09,537.

The good effect of drugs of this type in renal dropsy has been ascribed to salt elimination by the urine. It is well known that there is Chloride retention in parenchymatous nephritis, but it is not proved that in all cases the relation of cause and effect is the same.—B.M.J. ii./09,538.

Chlorosis.—Haldane and Lorrain Smith showed that in chlorosis, though the percentage of hæmoglobin in the blood is so much diminished, the total amount of hæmoglobin in the body is fully up to the normal. Anæmia is only relative; it is due to excess of plasma, not to deficiency of hæmoglobin—*ergo* diminish the fluid of the blood and prevent reaccumulation. Caffeine or Theocin in conjunction with Digitalis should be used. Magnesium Sulphate is useful for the bowels, and Zinc Sulphate has been tried by emesis. Intake of liquids must be limited, and as little salt must be taken as possible.—B.M.J. ii./09,1668.

Neuralgic Powders.—Caffeine 1 grain, Quinine Hydrochloride 5 grains, Antipyrine 10 grains.

For Migraine.—Caffeine 1, Quinine Hydrochloride 2, Salipyrin 10 grains; or—Caffeine 2, Citric Acid 1, Antipyrine 15 grains; or—Caffeine 1, Phenacetin 8, Salipyrin 8 grains.—M.P., July 21/09,67.

ESTIMATION OF CAFFEINE IN PRESENCE OF ACETANILIDE, *e.g.*, in headache powders; extract from a sulphuric acid solution with chloroform. Precipitate with iodine and decompose the periodide with sodium sulphite, and extract the base again with chloroform.—C.D. ii./04,469.

Kola.

Dose.—10 to 20 grains (0.65 to 1.3 Gm.). Seeds of *Cola vera* contain about $2\frac{1}{2}\%$ Caffeine, also in *C. acuminata* (not so much) (*Sterculiaceæ*).

Description of, and uses.—B.M.J. i./90,969.

Uriney finds between 1.1 and 1.3% Alkaloids.—C.D. ii./09,580.

Extractum Kolæ Liquidum. B.P.C.

Dose.—10 to 20 minims. Kola nuts in 40 powder exhausted with 60% alcohol; 1=1.

Extractum Colæ Fluidum, P. Austr., is glycono-hydro-alcoholic containing 1% caffeine.

Fr. Cx. extracts with 60% Alcohol and standardises to 1.25% Caffeine. The administration of Kola, Coca and Arsenic flavoured with a little Lixir of Orange forms a useful tonic and pick-me-up.

Flavoring.—Syl Lavandulæ, Syl Sassafras; Syrupus Aurantii, Lixir Simplex (not very good).

Tinctura Kolæ.

Dose.—20 to 60 minims (1.2 to 3.5 Co.).

Kola nuts in powder 1, macerate one week in 60% alcohol *q.s.* to 6.

Vinum Kolæ.

Kola in coarse powder 1, in Sherry 25, macerate for 7 days, filter and flavour with Essence of Vanilla.

Celerina is said to contain Kola, Coca, Celery and Viburnum.

Elixir Caffeinæ, U.S.N.F. Each drachm contains 1 grain of Caffeine. Rub Caffeine 17·5 with dilute Hydrobromic Acid 4, and about 125 of Aromatic Elixir until dissolved. Then add Syrup of Coffee 250 and finally Aromatic Elixir to 1,000.

The Caffeine will not dissolve. 625 Cc. of Elixir are required.—*Am. Jl. Ph.*, July/o8,337.

Personally, we find it best to use Aromatic Elixir alone, no Syrup of Coffee—but even by this method the Caffeine soon commenced to crystallise out.

Syrupus Coffeæ, U.S.N.F. Pour boiling water 500 on coffee, roasted and ground small 250; cover well and boil for five minutes. Cool, strain and make up to volume 500. Dissolve sugar 750 without heat and strain.

ⓅSyrupus Kolæ Compositus.

Dose.—1 to 2 drachms (3·5 to 7 Cc.) twice daily.

Iron, Quinine and Strychnine Citrate 3, Citric Acid 0·3, Sodium Glycerophosphate 5, Liquid Extract of Kola 50, Alcohol 90°/o 25, Syrup of Orange to 100. Finished product to be slightly acid. In anorexia, and as a general 'tonic.'—*Ph. Notes.*

ⓅElixir Antineuralgicum.

Dose.—1 to 2 drachms (3·5 to 7 Cc.).

Antipyrin 50, Caffeine 30, Cocaine Hydrochloride 1, Cochineal Tincture 6, Elixir of Orange 25, Alcohol (75%) to 1,000. A preparation on these lines is in use on the Continent (in Austria) for headache.—*Ph. Notes.*

Maté, *Ilex paraguayensis* (Ilicaceæ) or Paraguay tea, contains one-fourth as much caffeine as tea, and is less astringent. Removes fatigue and induces sleep.

Caffeinæ Citras. $C_8H_{10}N_4O_2 \cdot C_3H_4(OH)(COOH)_3 = 383·42$ (386·184 I. Wts.). (*Off.*). CAFFEINA CITRATA, U.S. (No formula.)

Dose.—2 to 10 grains (0·13 to 0·65 Gm.).

Dissolve caffeine 1 and citric acid 1 in distilled water 2, evaporate to dryness on a water bath, stirring constantly towards the end and powder.

The use of water is unnecessary.—*P.J. i./o4,8.*

Soluble.—1 in 32 water, 1 in 25 alcohol (90%).

The alkaloid is loosely combined with the acid, which latter may be volumetrically determined with standard Alkali, using Phenolphthalein as indicator.—*Ph.*

Incompatible with Potassium Iodide and Spiritus Ætheris Nitrosi, iodine being liberated. But the following in our experiments does not darken:—Potassium Iodide 5 grains, Caffeine base $2\frac{1}{2}$ grains, Spiritus Ætheris Nitrosi (neutralised with Ammonium Carbonate) 30 minims, water to 1 ounce.

Also incompatible with Sodium Salicylate. A little Sal Volatile or Sodium Hydroxide will prevent the Salicylic Acid being thrown out—or use half the quantity of Caffeine Citrate as Caffeine Base.—*P.J. i./o7,529.*

Flavoring, Glyl or Syl Vanillæ, Glyl Sassafras, Glyl or Syl Lavandulæ; Syrupus Aurantii Floris.

Uses.—See Caffeine.

In tricuspid incompetence with Sodium Benzoate.—M.P. ii./04, 515.

Caffeinæ Citras Effervescens (*Off.*). U.S. CITRATED CAFFEINE (was 2% in 1890). Contains 4% of the Citrate, or about $2\frac{1}{2}$ grains in a drachm. *Dose.*—1 to 2 drachms (4 to 8 Gm.).

'Vescettes' of Caffeine Citrate.

Each equivalent to 60 grains of the above, and containing about $2\frac{1}{2}$ grains of caffeine citrate.

Effervescent Caffeine (*Base*), 3 grains in 1 drachm.

Dose.—1 to 2 drachms (4 to 8 Gm.).

This, though somewhat bitter, forms a palatable mode of giving a moderately large dose. For migraine, the preparation is invaluable.

'Vescettes' of Caffeine (*Base*), contain 3 grains.

To be crushed and taken in water, preferably warm, during effervescence.

Effervescent Caffeine Citrate, with Potassium Bromide, has in addition 5 grains of the latter salt to the drachm. For headache.

Tabellæ Caffeinæ Citratis contain 1 grain in chocolate basis, are agreeable to the taste.

Tablets, 2 grains (0.13 Gm.).

Tablets, of Caffeine 1 grain (0.065 Gm.), with Phenazone 3 grains (0.2 Gm.).

Tablets, Caffeine 1 grain with Phenacetin 4 grains. *Dose*—1 to 5.

Caffeine Hydrobromide, $C_8H_{10}N_4O_2$, HBr , $2H_2O=308.91$ (311.08 I. Wts.). *Soluble* 1 in 50 approx. **Hydrochloride** $C_8H_{10}N_4O_2$, HCl , $2H_2O=264.75$ (266.62 I. Wts.), and **Hydriodide** (unstable).

Dose of each— $\frac{1}{2}$ to 5 grains (0.032 to 0.32 Gm.) or more. In transparent crystals.

Tablets contain 2 grains each of the Hydrobromide.

Effervescent Caffeine Hydrobromide is prepared, containing 4%, or about $2\frac{1}{2}$ grains, in a drachm.

Dose.—1 to 2 drachms (4 to 8 Gm.).

Caffeinæ Salicylas. $C_8H_{10}N_4O_2 \cdot C_6H_4OH \cdot COOH=329.81$ (332.168 I. Wts.).

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

White crystalline powder soluble in water.

Caffeine is very soluble in aqueous solutions of benzoate, cinnamate, and salicylate of sodium. These dissolve it in chemically equivalent quantities:—

Caffeinæ Sodio-Salicylas (*Coffeino - Natrium - salicylicum*, P.G.iv.).

Dose.—1 to 4 grains (0.065 to 0.26 Gm.) hypodermically. Maximum dose 1 Gm. (P.G.).

A white amorphous powder, containing 62.5% of caffeine, and soluble 1 in 2 of water. This salt and the corresponding cinnamate and benzoate act like digitalis, but more rapidly; the benzoate, **Coffeinum Natrio-Benzolicum**, P. AUSTR. contains at least 40% caffeine.

P. Jap. evaporates to dryness Caffeine 50, Sodium Salicylate 60, Water 200.

Injectio Caffeinæ Hypodermica.

Caffeine 20 grains, Sodium Salicylate $17\frac{1}{2}$ grains, Distilled Water to 1 drachm. *Dose*.—1 to 6 minims, contains 1 grain in 3 minims. Unirritating—recommended for alcoholic and morphine intoxication, also for hemicrania. Recommended in rheumatism.—M.A. 1906, 428.

The addition of camphor as preservative for this injection is suggested. Thus to 3 Cc. of pure sterile glycerin add a solution of caffeine and sodium salicylate of each 0.25 Gm. in water 1 Cc.; then add spirit of camphor (10%) 1 Gm. or 1.25 Cc.; 5 Cc. contain caffeine 0.25 Gm. and camphor 0.1 Gm.—C.D. i./06, 163.

Hypodermic Tablets contain Caffeine Sodio-Salicylate $\frac{1}{2}$ grain (0.032 Gm.). **Sterules**, Hypodermic contain 1 grain (0.065 Gm.).

Iritis of rheumatic origin well treated by injection into the median cephalic vein of Caffeine 0.05 Gm. with Sodium Salicylate 0.5 Gm.—Semaine Médicale, 1906, No. 13, p. 147.

Soluté de Caffeine pour injection hypodermique of the Fr. Cx. is in 2 formulæ. The No. 1 containing 25% Caffeine with Sodium Benzoate, and the other No. 2, containing 40% Caffeine with Sodium Salicylate.

Caffeinæ Tri-iodidum, Caffeine Di-iodo-hydriodide.

$C_8H_{10}N_4O_2HI, I_2 + 1\frac{1}{2} H_2O = 598.32 (602.91 \text{ I. Wts.})$.

Dose.—2 to 4 grains (0.13 to 0.26 Gm.).

In prismatic black iridescent crystals, rich in iodine.

Has been used with success in rheumatism and gout.

Eupnine. *Dose*.—1 to 4 drachms before meals. A specialty containing caffeine and iodine. In asthma, emphysema, and arteriosclerosis.

Caffeinæ Valerianas. $C_8H_{10}N_4O_2 \cdot C_5H_{10}O_2 = 294.11 (226.2 \text{ I. Wts.})$. *Dose*.— $\frac{1}{2}$ to 3 grains (0.032 to 0.2 Gm.). In irregular crystals or powder, of somewhat variable constitution. It controls hysterical symptoms, and is useful in pertussis.

Caffeine-Chloral.

Small white granular crystals, freely soluble in water, with the taste of chloral. Is analgesic and laxative, and in hypodermic injections of 3 to 8 grains useful in constipation, painful gastric distension, sciatica, and rheumatism.

Iodo-Caffeine.—*Syn.* SODIUM-CAFFEINE IODIDE.

Dose.—2 to 10 grains (0.13 to 0.65 Gm.).

A white powder, slightly soluble in cold, freely in water at 100° F. Contains 65% of caffeine. Is a good diuretic, especially to prolong diastole in cases of enfeebled heart. Is useful in cardiac dropsy, and pleurisy with effusion. Said not to disorder digestion.

***Migrainine.**—*Syn.* ANTIPYRIN COFFEINO-CITRICUM, P. Austr. and P. Helv. (Said to be a definite compound.) *Dose*.—8 to 15 grains (0.52 to 1 Gm.).

Contains 9% of caffeine, 1% citric acid, and 90 of antipyrine; is of crystalline appearance, easily soluble in water, with a slightly acid reaction. **Incompatibles** as Antipyrin *q.v.* Is serviceable in headache, but apt to cause sleeplessness.

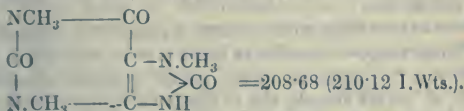
Amer. Med. Association found Antipyrin 90–93%, Caffeine 8.53%, Citric Acid 0.51%, Moisture 0.7%. Objection was raised to the statement in the printed matter that it was a new compound.—P.J. ii./09, 21.

Migralgin. *Dose.*—8 to 15 grains (0.52 to 1 Gm.).

Phenazone 88, Caffeine 9, Salicylic Acid 3: the ingredients are fused together. Tablets of 15 grains. Has been used with success by sufferers from headache.

To relieve attacks developing often of quick influence.—B.M.J. i/09, 1403.

Hydroxy-Caffeine. 1-3-7-Trimethyl-Uric Acid.



Dose.—1 to 5 grains or more (?).

Prepared by acting on chloro-caffeine with alcoholic potash, and then treating the ethoxy caffeine so formed with boiling hydrochloric acid.

Fine needle crystals melting about 345°. Readily soluble in warm water. In large dose powerful non-toxic diuretic. Solutions for use are made thus Hydroxy-Caffeine 1, Sodium Benzoate 1, Water to 20.—F.N. 1909.

CALCIUM.

$\text{Ca} = 39.71 \text{ (40.09 I. Wts.)}.$

Calcium Metal is made electrolytically.—Na. Dec. 22, 1904, p. 80.

The method consists in electrolysing fused calcium chloride with an iron cathode which only just touches the surface of the salt and can be moved outwards so as to produce ingots of the metal. Its density is 1.548, M.Pt. 810° C. Can be drawn out into a very fine wire, being tenacious. Is only slightly acted upon by water, but combines with hydrogen and with nitrogen.

For Chemical Uses, see P.J. i./05, 721.

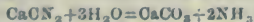
Calcium Carbide. $\text{CaC}_2 = 63.53 \text{ (64.09 I. Wts.)}.$

(Requires special storing.)

Blackish crystalline masses, resembling small pieces of coal. Evolves acetylene when brought into contact with water. May be used as a test for, and in the preparation of, absolute alcohol.—P.J. i./98, 139.

Carcinoma of the uterus, piece of carbide applied with success to dried ulcerated surface with a tampon over it, checks bleeding, fetor and discharge.—Münch. Med. Woch., 1900, No. 24.

When nitrogen is passed over calcium carbide heated to 1000° C. the cyanamide is also formed. $\text{CaC}_2 + \text{N}_2 = \text{CaCN}_2 + \text{C}$. The nitrogen of same interacts with water under pressure, thus:—



The nitrogen must first be freed from oxygen. This is effected by fractional distillation of liquid air. **Calcium Cyanamide**, $\text{CaCN}_2 = 79.5 \text{ (80.11 I. Wts.)}.$ formed can be utilised as manure and for other purposes.

The above method of fixing atmospheric nitrogen is the Frank-Caro process.

Another—the production of Calcium Nitrate is that of Birkeland-Eyde.

A third is the production of nitrous fumes by passing air through an iron tube in which an alternating current arc of 5 metre length is maintained under a pressure of 4,200 volts.—Schoenherr and Heszberger. The gas obtained is mixed with limestone, forming Calcium Nitrate, the 'Air Saltpetre'.—Na., Nov. 25/07, p. 114.

Calcii Chloridum. (*Off.*). $\text{CaCl}_2 \cdot 2\text{H}_2\text{O} = 145.85 \text{ (147.042 I. Wts.)}$
 $(\text{CaCl}_2 \text{ U.S.} = 110.16 \text{ U.S. Wts.}).$ P. Hung. has + $6\text{H}_2\text{O}$.

Dose.—5 to 15 grains (0.32 to 1 Gm.) in aqueous solution, or pills made with syrup; these must be kept in bottles.

In fused white agglutinated, very deliquescent masses.

Soluble (the fused salt) in water 1 in $1\frac{1}{2}$, in alcohol 90% 1 in 3. The anhydrous salt might be official in the next B.P. The crystalline (+ 2H₂O) is unobtainable by the official description. C.R. 1908 proposes to limit lead to 20 per million.

Incompatible with carbonates, phosphates, sulphates and tartrates.

Flavoring.—Prescribe as Elixir *q. v.* or with Elixir Adjvans.

Uses.—In tubercular disease, chorea, glandular affections, to stop the growth of uterine fibroids, and to check the vomiting due to sarcinæ.

To check profuse menstruation it has been found well to give doses of 10 to 15 grains daily for a week before the period; but not if there be kidney disease.

For intra-dental fissure 15% solution on pledget of wool found useful.

Acute lobar pneumonia has been treated with 5 to 15 grain doses every 4 hours.

To check intestinal hæmorrhages 30 grains daily may be given internally, and accompanied by rectal injections containing 60 grains to two pints of water; opium may be given in addition. In typhoid deserving of trial 10 grain doses.—B.M.J. ii./04,1453. Calcium chloride increases the coagulability of the blood, and so acts as a hæmostatic (Sir A. E. Wright).—B.M.J. ii./91,1306; L. ii./05,1096,1164; ii./06,436. Coagulability of the blood is—

Increased by—
Carbonic Acid,
Calcium Chloride or Lactate,
Milk,
Magnesium Carbonate or
Lactate.—L. i./08,96,
Phosphoric Acid and Soluble
Phosphates,
Strontium Carbonate or Lac-
tate, Thymus Glands.
L. i./06,645,739.

Diminished by—
Oxygen,
Alcohol,
Restriction of Food,
Diminution of Lime Salts,
Large quantities of Fluid,
Citric Acid,
Rhubarb,
Acid Fruit Juices,
Acid Wines,
Tobacco Smoking.

Dixon found that Calcium Chloride or the lactate have little effect on coagulation when taken *per os*, but injected under the skin the time of coagulation was reduced in 15 minutes from $3\frac{1}{2}$ minutes before injection to $1\frac{3}{4}$ minutes after.—B.M.J., ii./09, 540.

For hæmoptysis give a rectal injection (high up) of 30 grains, with morphine hypodermically and ice to the affected part of the chest.—B.M.J. ii./04,1635.

Mayo Robson gives this drug to obviate hæmorrhage at operations on the bile ducts, 30 grain doses by the mouth, and after operation in 60 grain doses three times a day by the rectum.—L. i./02,1024; ii./03,358.

Since using large doses no hæmorrhage.—B.M.J. ii./09,940,942.

Bleeding piles treated by injection every morning of 4 to 6 drachms of a 10% solution.—C.D. ii./05,1052.

Pneumonia with complications treated with Calcium Chloride, Perchloride of Iron and a dose of an Anti-streptococcic Serum successful.—M.P. May 22/07,558.

Sir Lauder Brunton points out that the heart failure accompanying post-influenzal pneumonia may be averted by extended use of Calcium Chloride. Usual dosage is 5 to 10 grains every four hours.—B.M.J. i./07,616. Preferably as Elixir *q.v.*

With regard to danger of the Chloride clotting the blood J. Barr refers to Blair Bell's Calcimeter, *i.e.*, Apparatus for estimating the proportion of Lime Salts in the blood, urine and other fluids. Such estimation may show lime in excess and suggest the use of Citric Acid.—B.M.J. i./07,717. The method consists in counting the Calcium Oxalate crystals formed by mixing a known volume with Oxalic Acid Solution, the counting being conducted on an ordinary Thoma-Zeiss hæmacytometer plate.—B.M.J. i./07,921. He takes as his standard that 1 crystal per square is equivalent to a 1 in 6,000 solution of CaO.

Some observations seem to indicate that pregnancy is terminated when the fœtus ceases to absorb or receive Calcium Salts from the mother's blood and a large accumulation occurs in her system.

Apparatus revised for coagulability determinations. In the puerperal state the coagulation time immediately after delivery is below normal. Determination of the time might prove useful after delivery to indicate risk of thrombosis or embolism if the time be low, or of post-partum hæmorrhage if high. Treatment as above could then be employed.—L. i./08,99.

Further determinations by the method which is said to be from chemical standpoint an excellent one clinically. Some connexion between thyroid gland secretion and Calcium metabolism, also intimate connexion between pituitary extract and Calcium metabolism—under the influence of the extract there is an increase of Calcium. Adrenal Extract causes Calcium retention. The ovaries influence Calcium metabolism (osteomalacia has been cured by oophorectomy and Calcium retention occurs after the menopause). The ductless glands more than probably preserve a balance in the Calcium metabolism—one acting anabolically, another katabolically. Subsequent papers to indicate more fully the connexion existing between these glands and the functions of the female genital apparatus.—B.M.J. i./09,517.

In most cases of exophthalmic goitre (thyroid secretion in excess) the Calcium index was low, hence administration of Calcium salts may be advantageous.

Further work on the subject of menstruation gave *inter alia* the conclusion that menstruation is a periodic function only in so far as the Calcium metabolism is in harmony with this periodicity, and that the function is dependent on Calcium metabolism in all its ramifications.—B.M.J. i./09,592.

Ammonium Oxalate prevents coagulation of the blood by precipitating Calcium, the presence of which is thought to be essential to coagulation.—P.J. ii./06,657.

It is possible to determine the necessary dose of the Salt by ascertaining the amount of Calcium already present in the blood.—L. ii./08,889.

On the coagulability of the blood.—B.M.J. i./10,507.

Sir Lauder Brunton uses Calcium Chloride as being a soluble Calcium Salt, and as such a cardiac nutrient in pneumonia.—B.M.J. i./07,778.

Calcium Iodide also useful.—B.M.J. i./07,840.

In pneumonia Calcium Salts have a marked effect in increasing secretion and in toning up the vessels. Estimation by Bell's method necessary.—L. i./08,565.

In hæmorrhage of the digestive tract best treatment.—M.P. i./07,399. For children five grain doses many times daily.

Hæmophilia best treated by the lactates, chlorides and carbonates of the alkaline earths if duly assimilated.—L. i./o8,97.

In gastrostaxis, 10 grains thrice daily.—L. ii./o6,1193.

In obstructive jaundice, to prevent hæmorrhage 30 grains thrice daily *per os*, and 20 to 50 grains simultaneously *per rectum*.—L. ii./o9,338.

Epistaxis successfully treated, 10 grains thrice daily.—B.M.J. i./o6,198.

In chilblains very serviceable. 15 to 20 grains every 2 hours, for 3 doses only.—B.M.J. i./o6,1020. 10 to 20 grains thrice daily, should not be given more than 2 days consecutively without interval.—B.M.J. ii./o6,138,1527.

Calcium salts effectually relieve headaches (and remove chilblains) due to deficient coagulability of the blood. Experiments showed that on giving Potassium Citrate headache and chilblains returned.—L. i./o6,143.

Viperine Snake Poisoning. A number of 15 grain doses (every two hours) with ergot and adrenalin brought patient round.—I.M.G., Nov., 1907,418. Or 10 Cc. of 1 in 70 solution have been advised, injected near the bite.

In purpura of children successful.—B.M.J. i./o7,199.

For Calcium Salts in milk and therefore effect in heart disease (Brunton)—*vide* p. 479.

In tetany, laryngismus stridulus and infantile convulsions, marked calming influence of small doses.—M.A., 1908,12.

Tetany of infants ('spasmophilia') is aggravated by addition of to the milk. Cows' milk contains five times as much Calcium Chloride as human. Tetany is viewed as a form of Calcium poisoning.—Pr. Oct./o7,556.

In the Nauheim baths the increased specific gravity has a primary effect of raising the peripheral resistance of the body, which is afterwards followed by reaction, and the effervescence stimulates, but the Calcium Chloride in the water has no effect,—it is not absorbed,—otherwise it might work great mischief.—Barr. B.M.J. ii./o9,509.

Consumption and bronchitis are notably absent amongst workers in lime kilns and those who drink hard water.—B.M.J. ii./o8,1493.

Thrombosis or embolism, tendency to, should be stopped by decalcifying agents such as Phosphoric and Citric Acids and their soluble salts.—Barr. B.M.J. i./o9,994.

Decalcified dietary in arterial atheroma.—The amount of 'lime' necessary to man decreases with age. An adult should not take more than 1 Gm. a day,—he eliminates about 0.9 Gm. *pro die*.—elimination ought to be proportional to intake. Cows' milk, cheese, eggs, onions contain 0.2%, being rich in lime. Moderately rich (0.1 to 0.2%) are peas, beans, cauliflower; poor in lime (less than 0.1%) are bread, meat, fish (most kinds), potatoes, apples, pears, plums, etc. Large amounts of milk, bread, beef tea, and green vegetables must not be taken by atheromatous subjects.

Sodium Bicarbonate is recommended for atheromatous subjects,—it removes lime from the soft tissues without doing harm elsewhere.—M.P. Sept. 22nd, o9, p. 312.

Liquor Calcii Chloridi, B.P. 1885, was 1 to 5 of distilled water.

Dose, 15 to 50 minims (0.9 to 3 Cc.).

Elixir Calcii Chloridi. *Dose*.—1 to 2 drachms, best given 1 hour after a meal.

Calcium chloride 60 grains, Orange Syrup $\frac{1}{2}$ ounce and Syrup of Tolu $\frac{1}{2}$ ounce.

Calcium chloride requires a strong flavouring to cover its acrid taste Elixir of Saccharine also useful.—B.M.J. i./07,616.

Hydrocoralline millepores treated well by citrate.—B.M.J. i./09,659.

Angio-neurotic œdema treated with 10 grain doses thrice daily, increasing to 20 grains. The swellings which appeared continuously in different parts of the body disappeared completely.—L. ii./09,295.

Calcii Peroxidum. $\text{CaO}_2 = 71.47$ (72.09 I. Wts.). *Syn.* GORIT.

Dose.—3 to 9 grains (0.2 to 0.6 Gm.) daily.

A useful intestinal antiseptic for infants. It explodes if mixed with Glycerin or Formalin.

Under the name "**Calox**" is contained in a dentifrice. Description of a patent for using Calcium Peroxide as dentifrice.—P.J.i./07,605.

Magnesium Peroxide 5 to 10% added to a prepared or precipitated chalk powder is even better as a dentifrice.—P.J. i./07,284.

Calcii Phosphas (*Off.*), U.S. $\text{Ca}_3(\text{PO}_4)_2 = 307.77$ (307.98 U.S. Wts.), (310.27 I. Wts.). 'NEUTRAL' or 'TRIBASIC' CALCIUM PHOSPHATE.

Dose.—5 to 15 grains (0.32 to 1.0 Gm.).

White powder made by precipitation of a hydrochloric acid solution of bone ash with ammonia. Insoluble in water; soluble in dilute hydrochloric and nitric acids. Is a constituent in Pulvis Antimonialis (*Off.*).

Dibasic Calcium Phosphate. $\text{CaHPO}_4, 2\text{H}_2\text{O}$ is formed by interaction of sodium phosphate and calcium chloride (*vide infra*).

Commercially the acid salt is a much purer compound, and it might be better to omit the calcium ortho-phosphate altogether, and employ only the dicalcium phosphate in medicine.—C.D.ii./08,797.

Uses.—To supply lime to growing bones and to assist in general nutrition. Is also given to pregnant women for the same purpose. Is an ingredient in Chemical Food, Syrupus Ferri Phosphatis Compositus, *q.v.*

Calcii Chlorhydrophosphorici Sirupus, P. Belg. Calcium Phosphate 15.6, Hydrochloric Acid about 8 or *q.s.*, Sugar 630, Spirit Limonis (Oleum Limonis 1, Alcohol 80% 99) 7, Water 340. *Dose.*—10 to 30 Cc.

Calcii Chlorhydrophosphoricum Solutum, P. Belg. Calcium Phosphate 25, Hydrochloric Acid 15, Water to 1,000. *Dose.*—10 to 30 Cc.

P. Helv. Calcium Carbonate 10, Hydrochloric Acid (Helv.) 15, Dilute Phosphoric Acid (Helv.) 98, Water to 172. *Dose.*—5 to 10 Cc. diluted.

Calcii Phosphas Mono-acidus. FR. CX. *Syn.* DIBASIC CALCIUM PHOSPHATE, CALCIUM MONO-HYDROGEN PHOSPHATE.

$\text{Ca}_2\text{H}_2(\text{PO}_4)_2, 4\text{H}_2\text{O}$ or $\text{CaHPO}_4, 2\text{H}_2\text{O} = 170.79$ (172.13 I. Wts.).

Dose.—10 to 30 grains (0.65 to 2 Gm.). Prepared by decomposing Calcium chloride with Dibasic Sodium Phosphate,

Colorless crystals with slight acid reaction. Used in making Liquor Calcis Lactophosphatis *q.v.*

Calcii Phosphas Di-acidus. FR. CX. *Syn.* MONOBASIC CALCIUM PHOSPHATE, OR ACID CALCIUM PHOSPHATE.

$\text{CaH}_4(\text{PO}_4)_2, 2\text{H}_2\text{O} = 268.11$ (270.15 I. Wts.).

Dose.—5 to 20 grains. (1.32 to 1.3 Gm.).

Deliquescent crystals, insoluble in alcohol.

Mix Calcium Mono acid Phosphate 154 Gm. with Phosphoric Acid (50%) 200 Gm. to a paste, and leave to stand 1 hour at about 50°C.; add

water sufficient to make clear and boil $\frac{1}{2}$ hour. Evaporate to Sp. Gr. 1.04 (taken on the warm liquor) and leave to crystallise.—*FR. CX.* We have employed this Salt for time past in making *Syrupus Tann-Iodo-phosphoratus* and *Vinum Tann-Iodo-phosphoratum*. *q.v.*

Calcii Saccharas.

Dose.—8 to 30 grains (0.52 to 2 Gm.).

In colourless tufts, soluble in water. An antacid for dyspepsia, specially for children; also as an antidote to carbolic acid poisoning in 10 times above doses.

Calcium Monosaccharate is $C_{12}H_{22}O_{11}CaO = 395.19$ (398.266 I. Wts.), and the **Di-Calcium Saccharate** $C_{12}H_{22}O_{11}2CaO = 450.78$ (454.356 I. Wts.), but the article in commerce is mostly the trisaccharate.

The **Tri-Calcium Saccharate** $C_{12}H_{22}O_{11}3CaO, 3H_2O = 560.01$ (564.494 I. Wts.), is generated when mono- and bi-calcium saccharate solutions are boiled. — *Vide* Lippmann, "Chemie des Zuckers," 1895, p. 765.

Liquor Calcis Saccharatus. (Off.)

Dose.—20 to 60 minims (1.2 to 3.5 Cc.).

Calcium Hydroxide (free from iron, preferably prepared from marble) 1, Distilled Water 19. Mix, and add Syrup (by weight) 3 (= Refined Sugar 2). Contains 1.77% Calcium Oxide, or 8.16 grains in 1 ounce.

Calcii Hydras. (Off.) $Ca(OH)_2 = 73.47$ (74.106 I. Wts.). Should be recently made by action of water on calcium oxide. Is employed in preparation of liquid extract of ipecacuanha. Has slight caustic action.

Is more soluble in cold water than in hot.

Liquor Calcis (Off.) is given to infants with milk.

Warts (*verrua plana*) on back of the hand cured in a week by $\frac{1}{2}$ pint a day, —B.M.J. i./10, 81.

Linimentum Calcis (Off.).

Solution of Lime 1, Olive Oil 1; or with Linseed Oil 1, is known as

Carron Oil—St. Bart's H.; Mid. H.

Eucalyptus Oil 1 to 2% is often added as antiseptic.

Mistura Cretæ, Chalk Mixture (Off.).

Dose.— $\frac{1}{2}$ to 1 ounce (15 to 30 Cc.).

Chalk 50, Tragacanth 7, Sugar 100, Cinnamon Water *q.s.* to 1,600.

The powders are generally kept mixed in a dry condition, and 40 grains of this may be added to an ounce of cinnamon water as required.

Calcii Sulphas. $CaSO_4, 2H_2O = 170.81$ (172.192 I. Wts.). *Syn.*

CALCIUM SULPHATE.

Dose.—20 to 30 grains daily (1.3 to 2.0 Gm.).

A heavy white powder soluble in water 1 in 390.

For phosphaturia is considered as specific; it may be well given with an equal weight of Heavy Magnesium Carbonate.

Dried Calcium Sulphate, $2CaSO_4, H_2O = 287.98$ (290.336 I. Wts.), so long as it remains dry, is used to make Plaster of Paris splints. Two pounds require about one pint of water; this sets rapidly and firmly. U.S. has a powder about 95% $CaSO_4$ and 5% water.

Moistening with 5% Dextrin Solution makes a strong dressing but

sets slowly. Sodium Chloride 1% added hastens setting but 2% retards.—B.M.J. ii./o6,800.

As a disinfectant preventing pus formation.—Pres. 1910, p. 4.

Plaster of Paris Bandages, 2, 2½ and 3 inches wide (6 yards). In sealed tins.

Crinoline Bandages for above and for silicating, *see* p. 351,639.

Calx Chlorinata (*Off.*). A dull white powder having 33% (30% U.S.₃ P. Austr. 25%) available Chlorine. Solutions of 0.25 to 0.5% are applied to burns and ulcers—they heal rapidly.

25,000 gallons of water can be sterilised for less than 1d. by aid of Calx Chlorinata:—L. ii./o8,1846.

Unguentum Calcis Chlorinatæ.

Chilblains can be cured with 10% Chlorinated Lime in Paraffin Ointment.

Calx Sulphurata (*Off.*), U.S. *Syn.* CALCI SULPHIDUM; CANTON'S PHOSPHORUS. Contains not much less than 50% CaS=71.53 (72.16 I.Wts.) (at least 55% U.S.)

Some forms of it after being heated shine in the dark and are used to make luminous paint.

Dose.—¼ to 1 grain (0.016 to 0.065 Gm.) in pill.

Is prepared by reducing Calcium Sulphate by charcoal. A greyish powder with sulphuretted odour sparingly soluble in water, with decomposition. It thus represents the properties of Harrogate, Barèges, Gilsland, and similar springs. Largely used for boils, carbuncles, acne, scrofulous sores especially in glands of the neck.

Pilula Calcis Sulphuratæ, $\frac{1}{12}$, $\frac{1}{10}$, $\frac{1}{8}$, $\frac{1}{6}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, and 1 grain.

Tablets contain ¼, ½ and 1 grain. Keep in bottles.

In strumous ophthalmia, as well as in periostitis and alveolar abscesses has been found of service. For boils; give 1 grain thrice a day, increased to 8 grains daily.

Lotio Calcii Sulphurati, U.C.H. 1904.

Slaked Lime 4, Sublimed Sulphur 4, Distilled Water 35. Boil together, evaporate, and filter, to produce 20 of solution. Diluted with an equal quantity of warm water is a remedy for itch, which it will cure in half an hour. It resembles in composition **Vleminckx' Solution**. (Calcium Sulfuratum Solutum.—P. Helv.)

For eczematous itching baths of Vleminckx' Solution 1 tablespoonful to every 7 gallons of water.—B.M.J.E. ii./o9,67.

Sulphurated Lime Depilatory.

Milk of lime charged with sulphuretted hydrogen.

Syrupus Sulphatum (H. P. Symonds).

Dose.—½ an ounce (15 Cc.) contains appropriate doses of the sulphates of Balarine, Quinine, Iron, Potassium and Sodium. Is useful for boils, &c. Taken twice or thrice daily.

Pilula Sulphatum.

The salts of half-an-ounce of this syrup in two pills.

CAMPHORA (*Off.*) and in majority of other Pharmacopœias $C_{10}H_{16}O=150.98$ (152.128 I. Wts.).*Dose.*—2 to 5 grains (0.13 to 0.32 Gm.).

Camphor is a white crystalline substance obtained from *Cinnamomum camphora* (*Lauraceæ*) in Formosa and Japan. It is sold in bells, and in $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, 1 and 4 ounce cubes, also as **Flowers of Camphor**. The latter is a very convenient form for making pharmaceutical preparations.*

Artificial Camphor has been manufactured by acting on turpentine with various acids.

The possibility of competing with ordinary Japanese camphor depends on the market value of turpentine. Pinene ($C_{10}H_{16}$) is obtained by fractional distillation of oil of turpentine previously freed from resin. The pinene saturated with dry hydrochloric acid is the old-fashioned artificial camphor. The subsequent processes consist of splitting off the hydrochloric acid to obtain camphene, which is isomorphous with pinene. This substance, dissolved in glacial acetic acid, with a little sulphuric acid, yields bornyl acetate, and this saponified becomes borneol, which is identical with Borneo camphor. After oxidation synthetic camphor results, and this corresponds exactly with the Japanese and Chinese camphor, except in optical properties.—Houseman.

The synthetic is optically inactive, therefore is strictly not official, which is dextro rotary. M. Pt. 165° C. A plea for its inclusion in the next B.P.—P. ii./c9, 534. A number of Patents for making.—Am. Jl. Ph., Aug. 07, 349.

Melting Point 175°C., Boiling Point 204°C.—P. Jap.

Pb. Ital. gives Natural Camphoras official and tests to distinguish from artificial.

C.R. 1908 proposes also to exclude the artificial by requiring M. Pt 175° C. and + OR.

Soluble in water, 1 in 700, in alcohol 90% 1 in 14 (more soluble in absolute alcohol), in ether 12 in 7 barely, chloroform 4 in 1 scarcely, volatile and fixed oils (olive 1 in 3), in glacial acetic acid 2 in 1.

Camphor, when mixed in certain proportions with many crystalline substances, causes mutual liquefaction of the two—e.g., camphor 4, phenol 12, and water 1 (see *Acidum Carbolicum*); camphor 1, and chloral hydrate 1 (see *Chloral Hydras*); camphor 2 and menthol 3 (see *Menthol*); camphor 1 and thymol 1 (see *Thymol*); camphor 2 and β -naphthol 1 (see *Naphthol*); camphor 2 and salol 3 (see *Salol*); camphor and butyl-chloral hydrate liquefy when heated, but solidify on cooling; so will camphor 84 and salicylic acid 65 (see *Camphora Salicylata*). Camphor is powdered by rubbing with a few drops of alcohol.

Flavoring.—*Extractum Glycyrrhizæ Liquidum*.

Uses.—Sedative, anti-spasmodic, carminative, expectorant, diaphoretic, anaphrodisiac, antiseptic, given internally to abort colds in the head, to relieve hiccough, diarrhœa, chordee, and lumbago. Is injected for patients *in extremis*.

Meningitis caused by camphor liniment well treated by caffeine injection—L. ii./05, 1472; P.J. ii./05, 723. Camphor habit.—B.M.J. ii./98, 84.

Whooping Cough treated by camphor.—Med. Rec. July 22, 1905.

* **ESSENTIAL OIL OF CAMPHOR** is of a pale straw-colour or darker, with fragrant odour, Sp. Gr. 0.898 to 0.920; consists principally of a terpene, with about 1 in 4, or less of camphor in solution, the heavy variety is preferred for rubbing in rheumatism. The heavy Oils according to Bennett range from 0.975 to 1.025. 50 to 75% Saffrole. Light fractions practically devoid of same.—P.J.ii./08, 622.

Besides the official preparations, **Camphor Water*** (Camphor Julep or Mixture) 1 in 1,000, **Liniment†** 1 to 4 Olive Oil (U.S. orders same strength in camphor to be prepared with Cotton Seed Oil‡.—*Oleum Gossypii Seminis* expressed from *Gossypium herbaceum* and other species—*Malvaceae*), **Ammoniated Liniment** 12½%, with Lavender Oil 0·625%, and strong solution of Ammonia 25%, Alcohol 90% *q.s.*, Spirit 10% (and U.S.), and Compound Tincture 0·34%, the following are in use:—

Aqua Camphoræ Concentrata.

Camphor 1, Alcohol (90%) 3. Dissolve, add Quillaia Tincture 1½, Water to 24. For dilution 1 drachm to 6 ounces.—B.M.J. i./o6,318 (danger, 480). This procedure is not the method generally used.—*c.f.* Ph. Form.

Aqua Sedativa. Eau Sedative. LOTION AMMONIACALE CAMPHRÉE (Fr. Cx).

Spirit of Camphor 10, Sodium Chloride 60, Solution of Ammonia 60. Distilled Water, 1,000, all by weight. P. BELG. and P. HELV. have similar. As a compress for migraine and rheumatism, and to contusions.

Camphor Ball.

Spermaceti 4, White Wax 12, Oil of Almonds 5; melt in a water bath, and add Flowers of Camphor 4. Dissolve, and when nearly cold pour into boxes or mould in gallipots. Useful for chapped skin.

Camphorated Chalk.

Flowers of Camphor 1, Precipitated Calcium Carbonate 7. Mix, and sift for use as a dentifrice.

Camphorated Carbolic Acid, r.p. 19.

Ceratum Camphoræ, U.S.

Camphor Liniment (1 to 4 cotton seed oil) 10, White Wax 35, White Petrolatum 15, Benzoated Lard 40.

Elixir Camphoræ. Dose.—½ to 1 drachm (1·8 to 3·5 Cc.).

Spirit of Camphor 10, Syrup 5, Distilled Water 1. Contains 1 in 16. It mixes and diffuses well in water.

Æther Camphoratus, P. Helv. Camphor 1, Æther 9. Dissolve, P. Dan. has 15% in Spiritus Ætheris.

Oleum Camphoratum, P.G. iv. 1 to 9 of Olive Oil. Oleum Camphoratum Forte, P.G. iv. = Linimentum Camphoræ (Off.), q.v.

The B.P. might with advantage add tests for the oil after volatilising the camphor. See *Oleum Olivæ*.

Sterules, Hypodermic contain Camphor 1½ and 3 grains in Sterile

* *Aqua Camphoræ (Off.)*.—*Dose*.—½ to 2 ounces (15 to 60 Cc.). Camphor flowers 1, Alcohol (90%) *q.s.* to 3, Distilled Water to 1,000. Camphor is rendered more soluble in water by the presence of carbonic acid, acid carbonate and carbonate of magnesium, sugar, and myrrh, and less soluble by bromide of potassium, liquor potassæ, sulphate of magnesium, alkaline carbonates, and many other salts.—P.J. 1895, 619.

† In preparing this, 'English-refined' flowers should be rubbed through a sieve, and dropped into the oil at 70° to 80° F. Foreign flowers give muddy solution.

Examination of camphorated oil for camphor substitutes.—P.J. 1./09, 3.

‡ For Rickets Emulsion of Cotton Seed Oil with Oleic Acid as good as Cod Liver Oil.—B.M.J. 1./07, 20.

Olive Oil; also Sterules (Hypodermic) Camphor 3 grains with Guaiacoi 2 grains, employed in phthisis.

In acute pneumonia for sudden emergency.—West, Pr. April '08, 435.

Sterules of Camphor $\frac{1}{2}$ grain, with Ether 17 minims.

Injections of this are frequently practised on the Continent for patients in *extremis*. Gastric hæmorrhage is stated to have been arrested by the injection. Not suited when there is insufficient active carbohydrate metabolism. Under normal conditions 0.2 Gm. (3 grains) is considered lethal dose per kilo, (of animal) weight.—*c.f.* M.P. Jan. 30/07, p. 126.

2, 3 or 5 drachms of 25% camphor in oil in the space of one or two hours without any symptoms of poisoning. Occasionally 1 drachm doses of Ether between.—M.P. May 15/07, 539.

In anthrax injections of camphor are given.—B.M.J.E.i./09, 40.

Pneumonia treated with injections of 12 Cc. of a 20% solution in oil.—Pres. 1910, p. 19.

Pilula Camphoræ.

The most suitable excipient to form camphor into pills is about $\frac{1}{3}$ its weight of powdered curd soap and a few drops of alcohol, or a little lard in a warm mortar.

Tablets, Camphor and Quinine. Contain Camphor $\frac{1}{4}$ grain, with Quinine Acid Sulphate 1 grain. To check catarrh, and as a general tonic.

Spiritus Camphoræ Fortior.

Syn. RUBINI'S SOLUTION OF CAMPHOR.

Flowers of Camphor 1, Absolute Alcohol (by weight) 1. *Dose* for diarrhœa.—2 to 5 drops on sugar every 5, 10, or 15 minutes, according to the severity of the symptoms.

Trochisci Camphoræ contain 2 grains in each.

Wool, absorbent, camphorated (33%) 1 lb. rolls.

***Oxaphor**, said to be a 50% alcoholic solution of 'oxycamphor,' a product related to camphor with sedative properties on the respiratory nerves. Does not affect the heart and blood pressure. Used in asthma, phthisis, and organic heart disease. *Dose*.—30 to 60 minims (*i.e.* 15 to 30 grains of oxycamphor). Maximum per diem, 120 minims, preferably on an empty stomach.

Camphoid, a substitute for Collodion.

A solution, 1 in 40, of pyroxylin, in equal parts by weight of camphor and absolute alcohol. May be used as a vehicle for the application to the skin of such drugs as iodoform, phenol, salicylic acid, resorcin, iodine, chrysarobin, and ichthyol. Iodoform dissolves in it to the extent of 1 in 10. The preparation dries in a few minutes, leaving a film, which is not easily washed off.

Celluloid is supplied in sheets $\frac{1}{16}$ inch thick, and being light, rigid and washable, is useful in surgery for splinting; it is rendered plastic by rolling up and macerating in hot spirit for a few minutes; it may then be wrapped round the limb with a layer of wool outside and quickly sets. N.B.—Very inflammable.

Acidum Camphoricum, P.G.IV. U.S. PH. NED. P. HELV. P. JAP.

$C_8H_{14}(COOH)_2=198.62$ (200.128 I. Wts.).

Dose.—10 to 20 grains (0.65 to 1.3 Gm.) in cachets.

Formed on oxidation of camphor with nitric acid (test for free nitric acid with ferrous sulphate, U.S.) odourless crystals, M.Pt. 187° C. Dextrorotatory. U.S.

Soluble in water about 1 in 200, in alcohol 90% about 1 in 1 $\frac{1}{2}$, and in fatty oils about 1 in 10.

Uses.—With success in night sweats of phthisis, also in cystitis by intravesical injections of 2% aqueous solution with 11% alcohol (M. OI, 28), and as an intestinal disinfectant. Further in solution as a local astringent for nose and throat, also for diarrhœa. In skin affections saturated solution in dilute alcohol locally useful.

Camphora Monobromata, $C_{10}H_{15}BrO = 229.33$ (231.04 l. Wts.).

P. Helv. directs—gradually combine Camphor 15, Bromine 16 in a mortar. Also official in U.S., and P. Jap.

Dose.—2 to 10 grains (0.12 to 0.65 Gm.) in pills, with $\frac{1}{2}$ of its weight of curd soap and proof spirit q.s.

In colourless prisms, soluble in ether, alcohol, and fixed oils, insoluble in water. Should be soluble in sulphuric acid—nearly colourless solution. M. Pt. $76^{\circ}C$.—P. Jap. It is used as a hypnotic, and of value in epileptic vertigo, cases of petit mal, chorea, hysteria, delirium tremens, whooping-cough and asthma.

For erections in gonorrhœa six grain cachets thrice daily.—Pr. Apl. '09, 543.

Perles are prepared containing 2 grains (0.13 Gm.).

Tablets contain 1 grain (0.065 Gm.)

Elixir Camphoræ Monobromatæ.

Monobromated Camphor 1, Spirit of Cinnamon (1 in 10) 10; dissolve and add Red Elixir (v.p. 308) 60, Syrup q.s. to 100. **Dose.**— $\frac{1}{2}$ an ounce (15 Cc.).

Combined with belladonna, useful in enuresis where potassium bromide is unsuitable.

Camphora Salicylata. **Dose.**—1 to 5 grains (0.065 to 0.32 Gm.), in pill, with suet or lard.

Camphor 56, Salicylic Acid 44, combined. Soluble in about 1 in 20 oils and alcohol. As ointment in skin affection.

Trochisci Camphoræ Salicylatæ Compositi. Camphor Salicylate 2 grains, Sodium Sulphate 4 grains. One thrice daily an hour before food. To ward off a cold.

CANNABIS INDICA (Off.), U.S.

The dried flowering or fruiting tops of the female plant of *Cannabis sativa* (Urticaceæ), grown in India (not deprived of resin). The masses obtained in European commerce are called Guaza. Ganja differs slightly and is more active. Bhang or Hashish consist of the leaves, small stalks and fruits, but c.f. Ghosh, 303-305.

The therapeutic value of the drug is contained in the resin. It appears to contain no peculiar alkaloid. The constituent Cannabinol becomes oxidised on exposure to the air. For use in medicine it should be as fresh as possible.—P.J. i./02, 363. It is a powerful drug.

N.B.—A high export duty is imposed on *Cannabis*. It is sometimes even more toxic than formerly. The official dose of Extract has proved toxic.

Recently has been imported from East Africa to avoid the Indian duty. It is not so effective as the Indian. The extractive is about the same, but it contains

less resin. The physiological test is the only safe one. Foreign cigarettes frequently adulterated with Indian hemp, in the paper and the gum,—needs verification.—Holmes, P. ii./09,132.

C. R. 1908 advises 'should yield not less than 11% extract to 90% alcohol.'

Antidotes.—Stomach pump, emetics, stimulant draughts, artificial respiration, coffee. No death from cannabis is on record.—H.

Flavoring.—*Vide* Tinctura.

Uses.—For chordee and asthma, also as an aphrodisiac, and is successful in migraine. Is a narcotic and anodyne, but may give peculiar dreams and even delirium.

It is useful in dysmenorrhœa, especially with Gelsemium; with Nux Vomica in incipient delirium tremens, nausea, and paroxysmal colic, supraorbital neuralgia, cough of phthisis and for whooping-cough. It is of great use combined with strychnine, with chloral in chorea in mental worry and restlessness. Should be given in small and frequent doses.

It is the remedy for menorrhagia.—B.M.J. i./83, 1002.

In delivery, may in some cases hasten the contraction of the uterus, acting quickly without anæsthetic effect.—U.S.D., 282.

In all obscure forms of pruritus the Tincture is of value—suspended in mucilage and given after meals well diluted.—B.M.J. ii./09,452.

In gonorrhœa (urethritis acuta anterior) Cannabis internally with Hyoscyamus useful before patient is in condition for injections.—Pr. Apl. '09, 544.

A pharmacological study of *C. americana*, i.e., *C. sativa* grown in America—it is quite as active as that imported. Determination of physiological activity by internal administration to selected dogs is reliable when the standard dose, 0.010 gr. kilo body weight, is tested in comparison with the same quantity of a preparation of known strength.—Am. Jl. Ph., Jan. '08, 20.

Physiological Examination.

"Intelligent fox-terriers" required for the experiments. It was found that activity was small in the case of some extracts yielding 34% insoluble residue in 90% alcohol, whilst every extract with insoluble residue not exceeding 2% was active.—Martin, C. D. ii./09,213.

Charas is an intoxicating resinous substance secreted in the upper leaves and flowering spikes. Enzymes decompose Cannabis. Recommendation to import alcoholic extract in small sealed bottles.—Production, Adulteration, Valuation, etc.—P. J. ii./08,80,347,405.

Extractum Cannabis Indicæ (Off.), U.S.

Dose.— $\frac{1}{4}$ to 1 grain (0.016 to 0.065 Gm.), in pill with lycopodium. An alcoholic extract, of which 1 dissolved in alcohol 20 (90%), forms—

Tinctura Cannabis Indicæ (Off.). (U.S., 1 in 10 'alcohol' U.S.)

Dose.—5 to 15 minims (0.3 to 0.9 Cc.), in some mucilaginous fluid.

Flavoring.—Glyl Lavandulæ, Glyl Amygdalæ Amaræ, Glyl Pini, Syl Vanillæ; Syrupus Anraantii, Syrupus Zingiberis.

Tablets equal 5 minims.

Tetanus after child birth, two cases cured by 15 minims of Tincture every 3 or 4 hours.—L. i./06,1608.

Fluidextractum Cannabis, U.S. 1=1 alcoholic percolate. **Dose.**—1 minim (0.05 Cc.).

Pilula Extracti Cannabis Indicæ, contain $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$ and 1 grain.

Cannabin Tannas, Cannabin Tannate.

Dose.—2 to 10 grains (0.13 to 0.65 Gm.) taken an hour before bedtime, in a pill or in sal volatile and water.

A brownish powder, soluble in alkaline water and alcohol, and is said to be a useful hypnotic, and is specially valuable in nervous sleeplessness and in acute mania, also for dysmenorrhœa and menorrhagia.

Pilula Cannabin Tannatis, 2, 3 and 4 grains.

Cannabinon. *Dose*.— $\frac{1}{4}$ to 1 grain (0.016 to 0.065 Gm.). A purified resin of treacle consistence.

For dispensing purposes, a dilution is made of 1 to 9 of milk sugar. 10 kilograms of cannabis extract yielded 2.2 kilograms of this resin.

Ⓟ CANTHARIS (Off.) U.S.

Ⓟ *Cantharides and its poisonous derivatives.*

Ⓟ *Cantharides, Tincture and all vesicating liquid preparations and admixtures of (and N.B. last clause of Part II. of Schedule).*

Syn. LYTTA; SPANISH OR BLISTERING FLY.—P. Jap. has *Epicauta Gorhami* with 1% Cantharidin.

Dose.— $\frac{1}{16}$ to $\frac{1}{2}$ grain (0.004 to 0.032 Gm.) in pill. Better given as tincture. FR. CX. Max, single dose $\frac{3}{4}$ grain. Max, in 24 hours, 2 grains.

Antidotes.—Emetics, stomach pump, white of egg (no fats); sedatives.

Of this, the dried insect—*Cantharis vesicatoria*—there are the following preparations official:—Ⓟ *Acetum*, 1 in 10 (of 50% Acetic Acid); Ⓟ *Emplastrum*,* about 1 in 3; Ⓟ *Tinctura*, 1 in 80; Ⓟ† *Unguentum*, 1 to 10 of Benzoated Lard; Ⓟ *Liquor Epispasticus*, 1 in 2 (v.p. 215); and Ⓟ† *Emplastrum Calefaciens*, about 1 in 24.

For *Tinctura Cantharidis*, C.U.D. proposed 1 in 10 strength, prepared with Alcohol 70%—the strength in most foreign Pharmacopœias.—Confirmed by F.I. FR. CX. has this. The Cantharidin content could be standardised.—B.M.J. i./02, 29. Instead of 1 in 66.7 (weight) dose 'might' require adjustment. Throws doubt on whether the Cantharidin which might exceed 0.8% would be held in solution by the alcohol.—C.R.

Methods of determination—should contain Cantharidin not less than 0.4%.—Y.B.P. 02, 51. 0.5% might be made official in next B.P.—as minimum, J. O. Umney C.D. ii./09, 579. P.G. has 0.8%. FR. CX. 0.4%. This was suggested by White Cross Congress.

Four samples of Russian and one of Spanish yielded 0.67 to 0.81% Cantharidin.—P.J. ii./04, 475.

Assay process (Greenish and Self): Powdered Cantharis is mixed with HCl and extracted in a Soxhlet apparatus with benzene—this latter is distilled off and the distillate shaken with successive quantities of 1% KOH to remove traces of Cantharidin which distil over. It is acidified with HCl and added to the original fat and Cantharidin in the flask. This is then boiled on a reflux condenser, the aqueous liquid separated and boiling continued with more water. The mixed aqueous liquids are treated with HCl and shaken with chloroform, which is distilled off and the residue washed with successive portions of a mixture of absolute alcohol and petroleum spirit saturated with Cantharidin. Resulting Cantharidin is dried @ 60 to 65° C.—P.J. i./07, 322, 324, *et. seq.*

C.R. 1908 proposes test to ensure 0.8% cantharidin.

Uses.—Externally vesicant, irritant and powerful counter-irritant. Used in pleurisy, pericarditis, meningitis, neuritis, applied above the stomach to stop vomiting and in rheumatoid arthritis, v.p. 215.

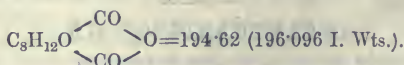
* The powder should be coarse.—Naylor, Birmingham Conf., July, '06.

† See Note p. 216.

Internally is said to have aphrodisiac properties. Has been given in lupus and in chronic gout. Caution, avoid irritation of the kidneys. Hæmaturia is checked by five-minim doses of tincture of cantharides. It is of service in incontinence.

④ **Mylabris phalerata** and *sp.* are official in I.C. Add. *q.v.* for making external applications in India. These contain about 1 to 2%, or more than double the amount that Cantharides do of the neutral principle—

④ **Cantharidin**, P. Helv. (M. Pt. 210° C.)



Lactone of Cantharidic Acid, in flat glistening rectangular prisms, which melt at 218° C., and volatilize in very irritating white fumes. **Soluble** 1 in 56 (P.J. i./07,332) of chloroform, 1 in 38 of acetone, and about 1 in 150 of acetic ether. Soluble also in ether, benzene, glacial acetic acid, 1 in 1,000 of absolute alcohol. Greenish thinks solubility in almond oil to be about 1 in 1,000 (P.J. i./07,325), and about 1 in 350 or 400 of 'water' (P.J. i./07,332). In 75% acetone, 1 in 200, 50% 1 in 620, 25% 1 in 4,500; 10% acetic acid 1 in 700.—P.J. i./07,325.

Uses.—Solutions of Cantharidin, as well as other preparations of cantharides, are employed for stimulating the growth of the hair, in alopecia, and preventing its falling off, as in the following preparation:—

⑤ **Acetum Cantharidis** (*Off.*) (*vide ante*). Might be replaced by a solution of Cantharidin 1 in 2,000 of a mixture of Glacial Acetic Acid 1 with Acetic Acid 19.—P.J. i./98,255. C.R. 1908 also advises.

⑤ **Linimentum Crinale** (Squire).

Cantharidin 1 grain, Acetic Ether 6 drachms; dissolve with gentle heat, and add Alcohol 90% 6 ounces, Castor Oil 2 ounces, Oil Lavender 15 minims.

It is better to dilute this with an equal quantity of spirit, and the head should be washed after applying it a few times, to prevent the cantharidin accumulating.

⑤ **Collodium Vesicans** (*Off.*).

Blistering Liquid 40, Pyroxylin 1.

Dissolve. It evaporates quickly, and its action is confined to the part on which it is painted.

⑤ **Collodium Cantharidatum** U.S.

Cantharides in No. 60 powder 60, Flexible Collodion 83, Chloroform to 100.

⑤ **Acetone Cantharidal Collodion** is suggested:—

Mix Glacial Acetic 5 Cc. with Acetone 55 Cc. and moisten Cantharides powdered 60 Gm. with same. Macerate twenty-four hours, percolate and displace with Acetone to exhaustion. Distil to reduce to 95 Gm. and dissolve Pyroxylin 4 Gm. and Camphor 1 Gm. in the liquor (cold). By regulating the percolation the drug will be exhausted when 95 Gm. of percolate have been secured.—Am. Jl. Ph., July '08,341.

⑤ **Collodium Cantharidini**, B.P.C.—Cantharidin 0.35, Acetone Collodion to 100.

Ⓟ **Emplastrum Cantharidis** (*Off.*).

Cantharides 7, Yellow Beeswax 4, Lard 4, Resin 4, Soap Plaster 1.

To the melted resin add the soap plaster, then the wax and lard, liquefy, and as the mixture cools, sprinkle in the cantharides.

Cantharidin 1 in 1,000 to replace.—P.J. i./98,255. See also C.R. 1908—1 in 500.

Ⓟ ***Emplâtre Mouches de Milan** in France is similar.

Rheumatoid arthritis can be well treated by pronounced and prolonged irritation of the spine by means of blisters, *e.g.*, size 4 × 1½ inches—one on each side of the spine, the upper edges opposite the tenth dorsal vertebra. The procedure influences the lumbar enlargement of the spinal cord. The blistered surface may be kept discharging with savin and resin ointments.—L. ii./07,895.

The theory is that changes in the joints and muscular wasting characteristic of rheumatoid arthritis are due to active and destructive lesions in the spinal cord, and especially the cervical and lumbar enlargements. Others view the disease as due to cerebro-spinal toxæmia.

Ⓟ **Emplastrum Vesicans**, U.C.H.

Cantharidin 1, Chloroform *q.s.*; heat to dissolve and add to Yellow Wax, and Wool Fat, in equal proportions, previously melted together, 499.

Ⓟ **Linimentum Cantharidis Compositum**, W.H., has Liquor Epispasticus 60, Glacial Acetic Acid 20, Rosemary Oil 3, Castor Oil 90, Alcohol 90 % to 480.

Ⓟ **Liquor Epispasticus**, Blistering Liquid (*Off.*).

Cantharides in powder 1, percolated with Acetic Ether *q.s.* to 2.

Cantharidin 1 in 300 would be equivalent.—P.J. i./98,255. Ⓟ **Emplastrum Cantharidis Liquidum** has a similar use, to be painted on with a brush. It dries rapidly forming a pellicle on the skin. Effect more certain than with a plaster.

The size of a blistering plaster is usually 1 inch square—rarely more than 2 inches square. For applying behind the ear the shape should resemble that of the space formed when the tip of the forefinger comfortably touches the tip of the thumb.—Marshall.

Effects of painting the side with the Liquor to the size of a surface measuring 7 by 2½ inches—in error. Blood, albumin, kidney cells passed in the urine.—L.ii./08,800.

Ⓟ **Tinctura Cantharidis** (*Off.*) 1 in 80. U.S. 1 in 10 Alcohol (94.9 vol. %). *Dose.*—5 to 15 minims (0.3 to 0.9 Cc.).

Might be replaced by a solution of Cantharidin 1 in 10,000 of Chloroform 1 in Alcohol 100.—P.J. i./98,255.

Fr. Cx. 1 in 10, Alcohol 70%. Max. single dose 9 minims and max. during 24 hours 25 minims approx.

Doses *per os* of 8 minims (½ Cc.) of a 1 per 5,000 solution of Cantharidin in Tincture of Orange well diluted with water have been found reliable in lupus, and in conjunction with mercury have proved beneficial in syphilis.—B.M.J. ii./02,1231.

Ⓟ ***Unguentum Cantharidis** (*Off.*).

Cantharides, bruised, 1, Benzoated Lard 10, digested at 120° F. for twelve hours, strained, and pressed.

Cantharidin 1 in 3,000 of wax and oil basis might replace.—P.J. i./98, 255.

One part diluted further with two of soft paraffin forms a useful Pomade for stimulating growth of the hair.

Erasmus Wilson's **Unguentum Stimulans** is described as consisting of 1 in 5 of plain lard.

Ceratum Cantharidis, U.S. Cantharides in No. 60. powder 32, heated with liquid paraffin 15, and yellow wax 18, resin 18 and lard 17, mixed (*s.a.*).

Unguentum Cantharidum, P.G. iv. Cantharides 2, Olive Oil 2, Lard 2. Heat 10 hours in steambath, add Yellow Wax 1, Turpentine (oleo-resin) 2, Euphorbium in powder 1. For veterinary use.

Unguentum Cantharidin cum Hydrargyro Compositum is sold as 'Pomade Max.'

Unguentum Hydrargyri Oxidi Rubri et Cantharidis, W. H. Blistering Liquid 15 minims, Red Mercuric Oxide Ointment 1 ounce.

Potassii Cantharidas. Fr. Cx. (+ 1H₂O).

$C_8H_{12}O(COOK)_2 \cdot 2H_2O = 323.92$ (326.328 l. Wts.).

Dose.— $\frac{1}{400}$ to $\frac{1}{200}$ grain (0.00016 to 0.00032 Gm.) hypodermically in very dilute solution. In minute white needles, soluble 1 in 25 of water. Has properties representative of Cantharidin, *q.v.*

CAOUTCHOUC. (*Off.*).

India Rubber. *Syn.* ELASTICA, U.S.

The prepared milk-juice of *Hevea brasiliensis* (*Euphorbiaceæ*) and other species; known in commerce as Pure Para Rubber.

v. Allen, vol. ii., part 3, '07, p. 279 for analysis.

For latest information on Rubber from cultural, etc., aspect, consult works advised by the "India Rubber Journal," London.

Rubber substitutes.—See *Nature*, Mar. 17, 1910, p. 71.

Liquor Caoutchouc (*Off.*).

Caoutchouc 1, Benzol 10, Carbon Bisulphide 10.

In making this liquor it saves time to treat the rubber with the carbon disulphide alone for an hour or two to form a jelly, then the benzol may be added and the preparation be ready in 24 hours. May be mixed with:—

Salicylic Acid 5%, Pyrogallic Acid 10%, Boric Acid 5 and 10%, Aluminium Acetate 1%, Ichthyol 5 and 10%, β Naphthol 5 and 10%, Capsicin 1%, Chrysarobin 10 and 20%, Dermatol 5%, Epicarin 10%—whilst 'sticky' dust with a little Tale—thus used the 'patch' is hardly noticeable.

Bandages of rubber are (i.) webbed with strands of rubber (see also p. 351) for Elastic Circular Stocking and Indiarubber Webbing), (ii.) Statham's porous, (iii.) Martin's (solid) perforated and non-perforated.

Bed Sheets, rubber, are made with funnel and eyelet holes for attaching.

Bladder Irrigators consist of glass douche can with 5 foot rubber tubing with stop-cock and rubber catheter; some have two-way metal pipe.

Bladder Syringes are of 4 or 5 ounce capacity, with glass or brass barrel. Herring's is of rubber with bayonet catch nozzle.

* *Note.*—A point of interpretation for lawyers enters where the preparation is made on the lines of the Official Ointment.—P.J. ii./09, 160. Otherwise, though the Schedule specifies 'Cantharides, Tincture and all vesicating liquid preparations or admixtures of'—all these preparations are brought into Part II. by the last clause of it.

Bougies are of solid elastic gum—

With bulbous end = à Boule, in sizes 1 to 16.

" " silk web " " 1 to 16.

Conical, pointed in shape " " 1 to 12.

Cylindrical, not tapered, various textures and materials—Sizes 1 to 16.

(Esophageal Bougies are bulbous, conical and cylindrical, of elastic gum.—
Sizes 10 to 24.

Catheters.—Elastic gum, black and webbed, or silk web—

Bulbous (à Boule), sizes 1 to 16.

Condé (bent at end).—Sizes 5 to 12.

Cylindrical.—Sizes 1 to 15, with or without wire Stilettes, and sizes 5 to 12
with hollow or solid ends.

Conical (simply pointed, i.e., tapered), with wire Stilette.—Sizes 1 to 12.

Jacques' India Rubber, with solid or hollow ends.—Sizes 3 to 18.

Belfast linen Catheters are also prepared.

French scale of size for Catheters, Bougies and Sounds adopted in America.
B.M. J.ii.106,1259.

Catheter Cases for pocket, with compartment for lubricant or antiseptic,
e.g., Paraform.

Catheter Jars are made for hanging Catheters in an atmosphere rendered
antiseptic with paraform.

Catheter Steriliser, Herring's, for sterilising elastic gum Catheters.

Web Catheters may be sterilised by boiling in nearly saturated solutions of

Ammonium Sulphate or Sodium Chloride, washing afterwards in sterile water.

Catheter Washers are made for affixing to water tap.

Catheters, Female, are of elastic gum, with Stilette, solid end, glass, straight
or curved (Queen Charlotte's Hospital), metal, or soft rubber.

Cuppers are of rubber or glass, or glass with rubber ball.

Dental Rubber, manufactured of pure para rubber and coloured. This is
supplied in various shades of colour, e.g., white, pink, red, orange, black.

The varieties in commerce are designated 'Samson,' 'Doherty,' 'Gold Dust,'

Ash's 'Whalebone,' and Jamieson's 'Horn.' The rubber is hardened by vul-

canisation, and used to form a frame to carry artificial teeth. In vul-

canising most rubber, especially Ash's, raise the temperature gradually until

315° F. or 100 lbs. pressure is obtained. Maintain this temperature or

pressure 75 minutes to complete vulcanising process.

Drainage Tubing is of various dimensions, and is supplied in 5% Phenol
solution in glass tubes.

Elastic Hosiery comprise stockings, socks, knee caps, leggings, thigh pieces,
knee hose, thigh hose, anklets, elbow pieces, cuffs, mitts. Measurements
should be made from the limb first thing in the morning.

Eye Douches. Bowman's consists of rubber ball, with tubing and mount.

The Moorfields' Pattern, Douche Can with tubing.

The "Undine" is a glass flask with pointed spout.

Gutta Percha Tissue in $\frac{1}{4}$ yard, $\frac{1}{2}$ yard, 1 yard pieces, and as required,
is prepared from Gutta Percha, the dried milky juice of *Palaquium oblongi-*
folium and other varieties of *P.* (*N.O. Sapotaceæ*). Contains about 80%
gutta similar to that of caoutchouc. Chemical examination of constituents of
Gutta Percha.—Pharm. Central, 1905, 654.

Ice or Hot Water Bags for the ear, eye, head (helmet shaped), abdomen,
spine, throat (collar shape).

Jaconet, white and pink.

Macintosh or Waterproof Sheeting, 44 inches wide (see also Pega-
moid) is supplied:—

1. Double texture and double width.

2. Having rubber on both sides.

Nasal Douches or Irrigators are—

1. Of rubber tubing, with stop-cock for use as a *siphon*.

2. In the form of a *spray bottle* for spraying into the nostrils.

3. *Boat shape*, of glass, with aperture for covering with the finger, and thereby
controlling the flow of liquid. This latter form is useful where a small
quantity of solution is employed, as in a simple catarrh.

Woakes' pattern has a rubber nozzle, and is similar.

4. *Syringe form*, consisting of rubber bulb or glass tube with piston, with
shaped vulcanite or rubber nasal plugs.

Oiled Calico. Calico treated with boiled oil, and thus rendered waterproof.

Oiled Silk is supplied (a) green, (b) in the non-adhesive (French) form of yellow colour, and (c) a further variety is brown in colour.

Oiled Silk Dextrinized is prepared from the best English Oiled Silk by treating the latter with a solution of Carbolized Dextrine.

Oiled Silk Protective. This consists of oiled silk coated on both sides with copal varnish, and when dry, brushed over with Dextrin 1, Starch 2, Carbolic Lotion (1 in 20) 16.

Ovariectomy Aprons. Should be spread of lenticular shape, and the opening is preferred nearer one edge of the apron than the other, so that the free portion may be spread over the operator.

Pessaries are ball shape, butterfly, circular, oval, cradle, and ring form.

Plasters, spread:—

India Rubber, Adhesive, 7 inches wide, 1 yard and 5 yard rolls.

India Rubber Adhesive, Porous, 1 yard rolls.

" " (Mead's) Tapes, $\frac{1}{4}$, $\frac{3}{4}$, 1, 1 $\frac{1}{2}$, 2, 2 $\frac{1}{2}$ and 3 inch, in both 5 and 10 yard lengths.

Stomach Tubes.—That known as Van Valsah's, with bevelled "Velvet Eyes," is considered one of the best. For passing the tube a special Lubricant Glycerin Jelly is supplied in Collapsibles, or a Glyco-Gelatin Pastil of Menthol $\frac{1}{12}$, and Cocaine $\frac{1}{10}$ is useful. (*Vide Examination of Stomach Contents.*)

Sutures (*vide* Catgut, &c.).

Syringes—

1. Vulcanite and glass with rubber nozzle, "Glycerin" Injection.

2. India-rubber ball with soft rubber nozzle in one piece (ear and nose).

3. Rubber ball with bent glass nozzle (ear and nose).

4. Ball with conical vulcanite nozzle (Injection "Bottle").

5. Ear: Barrel shaped of glass or brass.

6. Enema, for rectal injection and vaginal douching.

Urethral, rubber ball, $\frac{1}{2}$ ounce size, with bone pipe or elastic gum, short or long (Golding Bird's is a special form). Squire's is rubber, flattened in shape. See also Hypodermic Syringes.

Intra-laryngeal, new, with three apertures to ensure full distribution of fluid.—L. f./05, 97.

Transfusion apparatus with improved canula complete in steriliser. The canula can be left *in situ* for further injection if necessary.—B. M. J. i./05, 25.

CAPSICI FRUCTUS (*Off.*). U.S.

Dose— $\frac{1}{2}$ to 1 grain (0.032 to 0.065 Gm.), in a pill.

The dried ripe fruit of *Capsicum minimum*, *C. fastigiatum* (*Solanaceæ*), U.S. Cayenne pepper is from Nepal.

Contains as chief constituent Capsaicin—formula variously stated.

Dose.— $\frac{1}{3}$ to $\frac{1}{4}$ grain (0.008 to 0.016 Gm.) in a pill.

Capsicin. *Syn.* Oleo-Resin of Capsicum, U.S.

Prepared by exhausting with acetone, distilling off the greater portion of acetone; allowing the remainder to evaporate spontaneously in a warm place. Pour off the liquid portion, transfer the residue to a glass funnel, with a plug of cotton wool, and, when the fatty matter (to be rejected) has been completely drained, mix the liquid portions.

1 $\frac{1}{2}$ of acetone will exhaust (if percolated slowly) 1 of capsicum. Yield of oleo-resin 5 to 16%.—Caspari.

Gerrard found that Alcohol 90% is a good menstruum for extraction. He prepares a 2 in 1 liquid extract, and from this an ointment 1 in 10 with the official basis or hydrous lanolin, also a plaster 10%.

Pilula Capsici Composita. Capsicum Oleo-resin $\frac{1}{2}$ minim, Clove Oil $\frac{1}{2}$ minim, Calomel 1 grain, Aloes 2 grains. For the atonic stomach of drunkards.—H.

Emplastrum Capsici.

Evaporate the Alcohol from Liquid Extract of Capsicum 10, and stir into Resin Plaster 95. Contains 5% of Solid Extract (Gerrard).

U.S. has Oleo-Resin of Capsicum 0.25 Gm. brushed over adhesive plaster 15 Cm. square.

Capsicum plasters in rubber combination are also made in sheets 7 in. by 5 in., and yard rolls 7 in. wide.

Emplastrum Capsici Mite (Mild for dental use.) R.D.H.

Gaoutchouc 10, Yellow Paraffin 1. Heat carefully so as to just liquefy, and add Resin 10, Powdered Orris Root 4, Finely Powdered Capsicum 4. Mix and spread on linen and cut into pieces half the size of finger nail. Dry the gum thoroughly before application.

Emplastrum Capsici Forte, R.D.H.

Prepare as above omitting the powdered Capsicum.

Spread and brush the surface thinly with Oleo-Resin of Capsicum *q.s.* (Neither of these plasters contain lead.)

Fluidextractum Capsici, U.S. and B.P.C.

Dose.—1 minim (0.05 Cc.) 1 = 1 Alcoholic Percolate. Gerrard favours the following formula:—

Exhaust Capsicum 100 in fine powder (No. 60) by percolating with 90% Alcohol, distill off alcohol until the residual extract weighs 50, 1 of extract = 2 of drug, *i.e.*, double the strength of the U.S. preparation.

Unguentum Oleo-Resinæ Capsici, B.P.C.

Oleo-Resin of Capsicum, U.S.P. (was ethereal), 1, Yellow Wax $\frac{1}{2}$, Benzoated Lard 4. Melt the wax and lard, add the oleo-resin and stir until cold. For use as the liniment. Is too strong for tender skins—will bear dilution 3 to 6 times.

***Gyrol Pencils.**—A French specialty possessing the revulsive properties of Capsicum.

Tinctura Capsici (*Off.*). 1 in 20 of 70% alcohol U.S. 1 in a mixture of Alcohol (94.9% vol.) 95 and water 5, *q.s.* to 10.

Dose.—5 to 15 minims (0.3 to 0.9 Cc.).

Given internally it increases the flow of saliva and gastric juice. It also increases the peristalsis of the intestine, relieves atonic dyspepsia, and is useful in dipsomania—it allays the craving for alcohol. *c.f.* Mistura Capsici Sedativa, *infra*. The official tincture is too weak for external use as a rubefacient.

Tinctura Capsici Ætherea.

Prepared as official tincture, with pure ether *vice* alcohol, *c.f.* p 91.—L. i./90, 1066.

Tinctura Capsici Fortior, B.P.C.

Dose.—1 to 3 minims (0.06 to 0.18 Cc.). Principally used externally. Is practically identical with Concentrated Tincture of Capsicum (Turnbull). Capsicum in No. 80 powder 1, Alcohol (90%) *q.s.* to 3. Is useful for chilblains, but only when the skin is not broken.

This is too irritating generally. The writer's formula is:—

Linimentum Capsici. Adopted, slightly altered, by B.P.C.

Capsicum Fruit in No. 80 powder 10, percolate with Alcohol (90%) to 70, and add Oleic Acid 10, Oil of Lavender $\frac{1}{2}$. Painted on the skin, or applied sprinkled on piline or flannel, in an hour it produces a red glow; its action may be arrested by smearing the part with vaseline.

Useful in chest affections, rheumatism, sciatica, &c. Does not redden the skin, hence may be used on exposed parts.

Linimentum Capsici Duplex is the latter double strength.

Mistura Capsici Sedativa (anti-alcoholic).—L.H.

Dose.— $\frac{1}{2}$ ounce (15 Cc.) containing Capsicum Tincture 5 minims, Tincture of Ginger 20 minims, Potassium Bromide and Sodium Bicarbonate each 10 grains. Decoction of Cinchona to $\frac{1}{2}$ ounce.

Unguentum Capsici (*Off.*).

Capsicum Fruit, bruised, 12, Spermaceti 6 (better 9), Olive Oil 44. Heat on water-bath for 1 hour and strain. Resembles Smedley's Chilli Paste.

Alternative formula which is not wasteful of the fats:—

Liquid extract of capsicum (1=2 of drug, Gerrard) 60 grains, olive oil 1 ounce, spermaceti 60 grains, melt the fats and stir in the liquid extract. A more absorbent ointment would be liquid extract of capsicum 60 grains, hydrous lanolin 1 ounce 60 grains.

Capsicum Wool, CALORIFIC WOOL.—Oleo-resin of Capsicum 1, Ether, 30, Absorbent Cotton 19. Dissolve the oleo-resin in the ether, saturate the wool evenly with the solution and dry.

Alternative formula (Gerrard):—

Dissolve liquid extract of capsicum (Gerrard) 2 ounces in alcohol 90% 7 ounces. Pour the solution on to the cotton wool 9 ounces under pressure to saturate evenly. Dry and preserve in well closed cartons. Contains 10% solid extract. Colour with eosin, as otherwise the colour fades. Cover with oiled silk when applying to increase activity.

Very useful in rheumatic affections, bronchial and similar painful complaints where warmth relieves.

CASCARA SAGRADA (*Off.*), U.S.

Syn.—SACRED BARK.

The dried bark of *Rhamnus purshianus* (*Rhamnaceæ*).

Dose.—3 to 15 grains (0.2 to 1 Gm.) in cachets.

Tschirch has isolated a principle anthra-gluco-sagradin, and similar principles from Rhubarb, Senna and Rhamnus.

Oxymethylantraquinones are characteristic constituents of purgative drugs from widely separated natural orders, e.g., Rhamnus (*Rhamnaceæ*), Cassia (*Leguminosæ*), Quassia (*Simarubaceæ*), Aloe (*Liliaceæ*).—Tschirch, P.J. ii./09, 421.

The characteristic aperient action is not due to Emodin. Emodin is, however, a constituent, but chrysophanic acid or chrysarobin could not be found. Apparently no chemical differences between one and three year old ('matured') bark. This was said to exhaust a ferment and to moderate the griping action which the fresh bark possesses.—B. & C.D. ii./04, 268.

U.S. directs to be collected at least one year before being used. C.R. 1908 also advises.

Assay of the oxymethyl-antraquinone drugs.—Tschirch, P.J. ii./05, 225, 248.

Further methods of determination on colorimetric principles.—P.J. ii./05, 229.

Cascara glucoside, —a patented method of extraction.—P.J. ii./09, 696.

R. Purshianus, as well as *R. Californica* and varieties of the latter, have been found to flourish at Kew, and the bark yields extract of quality equal to the American. Jowett repeats that no difference chemically could be found between fresh and so-called mature bark 3 years old, and that *R. Pursh.* and *R. Calif.* are practically identical chemically. Holmes found *R. Calif.* not quite so hardy as *R. Pursh.* in Kent, and suffers from drought. *R. Calif.* is evergreen, the other deciduous.—P.J. i./09, 175.

Ph. Ned. gives Microscopy of Powder.

Flavoring.—See Extractum Cascara Liquidum.

Uses.—Cascara acts as a vegetable bitter, increases peristalsis, empties rectum, is useful for internal piles, and is a good laxative in habitual constipation.

Should never be prescribed as a cathartic, but useful to regulate the bowels, gradually decreasing the dose, after evacuation has been effected by pcdophyllin or euonymin.—C.D. ii./07,371.

Cascara Capsules ('mild') represent half a drachm of Liquid, or about 6 grains of Solid Extract. Capsules ('strong') of double this strength are also prepared.

Dose.—1, 2, or more. The mild are also prepared with 1 grain Euonymin in each in addition. **Dose,** 1 or 2 at bedtime.

***Cascarin Le Prince.** Prepared from an extract of the bark by precipitation with Sodium Carbonate. —Comptes Rendus, cxv., 286.

Cascara Jelly.

Dose.—1 to 4 drachms ("teaspoonful"), equivalent to Cascara Extract $\frac{1}{2}$ to 2 grains. Suitable for the treatment of habitual constipation.

The agar-agar basis renders the faeces more voluminous and richer in water. The Cascara Extract produces the stimulating action on the bowels.

The preparation is agreeably flavoured, but if desired the taste may be covered by taking with a little jam.

***Regulin.** (Patented.)

Dose.—1 teaspoonful up to 2 tablespoonful to be taken with stewed apples or other moist food.

Consists of broken up Agar Agar with some Cascara Extract. It increases the volume of the faeces, at the same time giving the necessary moisture.

Syrupus Cascaræ Aromaticus (*Off.*).

Tincture of Orange 2, Alcohol (90%) 1, Cinnamon Water 3, Syrup 6, Liquid Extract of Cascara 8.

Dose.— $\frac{1}{2}$ to 2 drachms (1·8 to 7 Cc.). Very small doses three times a day are pleasantly laxative. The taste is agreeably disguised.

Orange, Coriander, Anise, Cassia and Liquorice all mask the unpleasant taste of Cascara.—P.J. ii./01,151.

Elixir of Cascara, B.P.C., 1907, Liquid Extract of Cascara 34·5, Liquid Extract of Liquorice 34·5, Glycerin 29, Soluble Gluside 9·75, Anise Oil 0·05, Peppermint Oil 0·05, Oil of Cloves and Cinnamon of 1 each 0·025, Alcohol to 100. Is stated to improve in flavour if kept a month (Supplement 1908).

Extractum Cascaræ Sagradæ (*Off.*).

Dose.—2 to 8 grains (0·13 to 0·52 Gm.) in pill.—An aqueous extract (*Cascara Sagrada* should be indeclinable, being Spanish and not Latin).

U.S. **Extractum Rhamni Purshianæ** 1=4 of drug by hydro-alcoholic percolation and adjustment with glycyrrhiza. Fr. Cx. extracts with 60% alcohol.

Extractum Cascaræ Sagradæ Liquidum (*Off.*).

Dose.—30 to 60 minims (1·8 to 3·5 Cc.).

Is an aqueous extract preserved by the addition of one-fourth its volume of alcohol (90%). Deposits on keeping, and ferments in hot climates; the writer prefers alcohol (20%) as a menstruum. With this a more active preparation is formed. It may be made miscible

with water by the addition of half its volume of sal volatile.—P.J. 1891,250; 1892,827.

110 minims on evaporation on a water bath for 4 hours should yield not less than 20 grains of residue.

Ph. Ned. 1=1. Evaporated should yield 25% solid residue. P. Austr. yields 20%. P. Belg. is similar. P. Jap. makes with 'Alcohol' 90% and water equal parts. Fr. Cx. with 'Alcohol' 50% 1=1 by weight. Fluidextract U.S. 1=1 by 40% Alcohol approx.

C.R. 1908 advises more alcohol: *i.e.*, 5 ounces mixed with water 3 ounces and added to 12 ounces of concentrated percolate.

The following formula has been suggested *cf.* Glycetracts, p. 344 :—

Moisten Cascara 20 ounces with Water 15 ounces, and set aside 6 hours, pack loosely in percolator and percolate with more water to exhaustion. Evaporate percolate to 12 ounces, cool and add Glycerin 8 ounces, allow to stand, filter and add to the filtrate Strong Solution of Ammonia 80 minims. Without the Ammonia the preparation became turbid. The Glycerin re-dissolves some of the matter thrown out on heating, hence probably the supposed increased laxative action of a Glycerin Extract. The Glycerin Solution above mentioned filters easily. J. H. Franklin.—P.J. ii./07,114.

Acetic Acid extracts Cascara satisfactorily.—Y.B. 1899.—P.J. ii./09,142.

Goldby macerates Cascara in No. 20 Powder 100. with water 75 for six hours, then packs in percolator and pours on water until the fluid begins to drop—then closes percolator and macerates for a further 12 hours—finally percolates, reserving first 25. Proceed, percolating to exhaustion, evaporate to 37.5, add the reserve and Alcohol 90% 20, Glycerin 10 previously mixed and water *q.s.* to 100. By this means over-heating is avoided and the extraction is accomplished with less water. The Glycerin is, of course, not contained in the official liquid extract and may be omitted.—P.J. ii./08,838.

Symes found that the "marc," after extracting in the ordinary way, could be further extracted with diluted ammonia in the proportion of 10 fl. ounces of the B.P. solution to 2 gallons of Chloroform water to yield a substance with purgative properties. To the first percolate (from 28 lbs. of Bark), after adding 2 pints of Glycerin and the Ammoniacal liquor (evaporated), add dilute Alcohol to produce 28 fl. lbs. The activity of the official liquor is stated thus to be materially increased.—P.J. ii./09,130, 139; L. ii./09,315.

The refractive indices of commercial fluid extracts of Cascara Sagrada found to agree with the specific gravity and amount of extractive. The refractive index would be useful in indicating that the extractive of galenicals is free from extraneous matter.—C.D. ii./09,185.

Flavoring.—Syl Lavandulæ, Syl Vanillæ; Extractum Glycyrrhizæ Liquidum, *v.* also Syrupus Cascara Aromaticus.

Fluidextractum Rhamni Purshianæ Aromaticum, U.S.—*Average dose.*—15 minims (1 Cc.) 1=1. A glycono-hydro-alcoholic percolate containing liquorice and magnesia flavoured with compound spirit of orange. Sometimes called "Aromatic Cascara" in the States. The magnesia is said to destroy the bitter taste, as also in—

Extractum Cascaræ Sagradæ Liquidum Insipidum, B.P.C.
1901. *Dose.*—30 to 60 minims.

The bark in powder mixed with 10% of light magnesia, is made into a paste with water, and dried, then powdered and percolated with alcohol (60%). The first 85 of percolate is reserved and the remainder concentrated to a soft extract, mixed with the reserved liquid and alcohol (90%) *q.s.* to 100.

Magnesium Hydrate to take the taste away.—P.J. ii./08,354.

B.P.C. Supplement 1908 gave a formula for Miscible Liquid Extract of Cascara which was to replace the Tasteless Liquid Extract of 1907, but this product is as bitter as the official Liquid Extract.

Mistura Cascaræ. Gr. ORM. H.

Liquid Extract of Cascara, Liquid Extract of Liquorice, Syrup of Orange Peel, Chloroform Water, of each 15 minims for one dose.

Mistura Cascaræ Composita. ST. TH. H.

Liquid Extract of Cascara 30 minims, Liquid Extract of Liquorice 30 minims, Sal Volatile 20 minims, Chloroform Water to 1 ounce.

⑤ Haustus Cascaræ SAGRADÆ Compositus, Vic. Park.

Liquid Extract of Cascara 1 drachm, Hyoscyamus Tincture $\frac{1}{2}$ drachm, Tincture of Nux Vomica 10 minims, Aromatic Spirit of Ammonia 1 drachm, Magnesium Sulphate 1 drachm, Syrup of Ginger 1 drachm, Water to 1 ounce.

Mistura Hepatica. *Dose.*—1 to 2 drachms in water. Liquid Extract of Cascara 20, Tincture of Jalap 20, Tincture of Podophyllum 10, Compound Tincture of Gentian 10, Chloroform Water 50, Sal Volatile 10.

Mistura Laxativa, U.C.H. *Dose.*— $\frac{1}{4}$ to 1 ounce.

Liquid Extract of Cascara 1 drachm, Liquid Extract of Liquorice 1 drachm, Sodium Bicarbonate 5 grains, Water to 1 ounce.

Pastils of Cascara each contain $2\frac{1}{2}$ grains of Extract, and are coated with Tolu. *Dose.*—1 or 2.

⑥ Pilula Cascaræ Composita.

Extract of Cascara $1\frac{1}{2}$, Extract of Nux Vomica, Alcoholic Extract of Belladonna, of each $\frac{1}{2}$, Milk Sugar 1. In grains for one pill, or in grammes for fifteen, each pill weighing $3\frac{1}{4}$ grains.

Dose.—One before dinner or at bed-time.

Is an agreeable and efficient aperient, has certain and gentle action continuing beyond the first day; good for liver inaction.—B.M.J. ii./93,596.

Tablets, plain or sugar coated, 1, 2, 3, 4, and 5 grains.

Dose.—1 or more according to size.

Tinctura Cascara SAGRADA.

Percolate 1 to 5 with Alcohol 60%.

Laxative dose.—10 to 60 minims (0·6 to 3·5 Cc.).

⑥ Tinctura Laxativa.

Dose.—20 to 60 minims (1·2 to 3·5 Cc.).

Liquid Extract of Cascara SAGRADA 2, Aromatic Spirit of Ammonia 2, Spirit of Chloroform 2, Tincture of Belladonna 1, Tincture of Nux Vomica 1. This is an agreeable and elegant form of administering cascara, being miscible with water.—B.M.J. ii./93,596.

Trochisci Cascara SAGRADA et Olei Menthæ Piperitæ.

These are made with fruit basis, contain $2\frac{1}{2}$ grains of Extract flavoured with Peppermint, and have a useful corrective action. *Dose.*—1 or 2.

Vinum Cascara, Martindale.

Dose.— $\frac{1}{2}$ to 1 oz. (15 to 30 Cc.).

Liquid Extract of Cascara 1, Sugar 1, Aromatic Elixir 1, Sherry to 20. Mix and decant from any sediment which may form on standing.

Exodin. *Dose.*— $7\frac{1}{2}$ to 24 grains (0·5 to 1·5 Gm.).

A similar oxy-anthraquinone derivative, a yellowish powder with laxative properties. Constitution and formula:—J.C.S.A. i./04,902. Tablets contain 0·5 Gm.

Mucogène. $C_{12}H_{11}N_2O_2Cl = 324\cdot21$ (326·60 I. Wts.). *Dose.*—2 to 3 Capsules at bedtime. Also an anthraquinone derivative, is employed in capsule form, each containing 0·1 Gm., in habitual constipation. Said to be quite a specific.

Grains de Vals. These have an aperient and depurative action. For chronic constipation, also migraine and congested liver.

CEREVISIÆ FERMENTUM.

Syn. FÆX MEDICINALIS. *Dose.*— $\frac{1}{2}$ to 1 ounce.

The cells and spores of *Saccharomyces Cerevisiæ*.

Uses.—Yeast is in use to add to poultices for application to unhealthy and sloughing wounds. Internally it is given to check boils; by some is considered to be a good remedy for diabetes, enabling patients to take more carbohydrates, and it is prescribed for septic endocarditis. It is said to raise the opsonic power of the blood to an infecting organism.

In acne from half a teaspoonful to a tablespoonful of fresh yeast with a little water may be given with meals.

Yeast dried at 30° C. is recommended in doses of 0.5 Gm. for constipation, given in keratinised capsules and tablets; it is a light grey powder, and is injected per rectum to break up fæces. Recently tried in tuberculous affections and in dysentery.

Fæxin, *Furonculine, Levurine and Zymin are special dry powdered yeasts. ***Ceredin** is similar. Of the latter $1\frac{1}{2}$ grain pills are made. Pills and Tablets of Fæxin Extract. *v. infra*.

The Acetone method of drying consists in treating the yeast with repeated quantities of Acetone, pressing off and then treating with Ether and finally drying at not exceeding 45° C. Another method is to work in a partial vacuum over Sulphuric Acid at 42° C. (108° F.). Spread the Yeast in very thin layers.

Dose of any of the above.—A teaspoonful with meals in water, beer, or milk. Zymin is also taken mixed with equal quantity of sterile cane sugar.

Levurine Tablets are prepared, each equivalent to one drachm of fresh yeast.—B.M.J. ii./05, 1348.

Manufacture of powdered yeast.—C.D. i./10, 295.

The fermentation of sugar can be effected by finely divided metals, *e.g.*, platinum. This goes to show that enzymes are catalytic agents.—C.W. ii./09, 723.

Extractum Cerevisiæ Fermenti. *Syn.* Fæxin Extract.

By extracting fresh Yeast with Alcohol we obtain about 3% of oily extractive matter. This has been used for all the various affections for which fresh and dried Yeast is employed, *e.g.*, in acne, erysipelas, furunculosis, folliculitis, leucorrhœa, diabetes, conjunctivitis phlyctenulosa, typhoid and acute articular rheumatism.

Fæxin Extract Pills and Tablets contain 3 grains (0.2 Gm.).

Glycogen 5% (equivalent to 25% of the dried material) is a constituent of yeast.—Pavy and Bywaters JI. Phys. Nov. 29'07.

Phthisis treated, with influence on opsonic index. There is an increase in leucocytes in the blood on giving yeast—said to be due to the Nuclein.—L. i./05, 1493.

Phlyctenular keratitis cured by 4 Gm. doses daily of dry beer yeast with customary local applications.—Oph., May, 1906, 302.

Fæxin is a decided 'anti-Staphylococccic Agent'—in cases of dyspepsia due to swallowing naso-pharyngeal pus, it acts gastrically, and probably by *direct* contact, as an antidote. It not only checks vomiting, but *after* 14 to 21 days' usage it will be noted that the patient loses the icteric complexion, and gets a healthy colour in the face. It takes some time to show *full* effects.—Campbell Williams.

Burns well treated by either fresh or dried yeast made into a paste with tepid boiled water on sterile gauze bandages. Pain is relieved almost instantaneously. Suppuration never occurs, nor cicatricial deformity.—B.M.J.E. ii./o8,16.

Manufacture of Commercial Yeast Extracts by hot water or ether and water extraction. Qualifications of these as articles of food.—B.M.J. ii./o8,451.

The alcoholic ferment of yeast-juice.—Nature, Mar. 3, 1910, p. 28.

A. C. Chapman in support of Yeast Extract in answer to Gamgee's condemnation.—B.M.J. ii./o8,1741.

Nuclein.—*Syn.* Nucleol.

Dose.—15 grains (1 Gm.) several times daily.

Tablets, 1 grain (0.065 Gm.).

Is considered to be a compound of Nucleinic Acid with Albuminates and Carbohydrates. It tends to stimulate formation of white blood corpuscles, and hence to act as a bactericide. Septicæmia has been treated with it.

Good results have in the past been obtained from injections of Nuclein in tuberculous patients (De Backer).

The subcutaneous injection of Nuclein is said to raise the opsonic power to an infecting organism.—R. W. Allen.

The suggestion to use Nuclein in cancer was based on the fact that in the sexual generation of the normal alternation of generations of plants the nuclei have only $\frac{1}{2}$ the number of Chromosomes present in the nuclei of the asexual generation, and that the normal in the plant seemed to resemble the pathological in the human being's cancer cells.—B.M.J. ii./o9,1217.

Acidum Nucleinicum.

White powder somewhat soluble in water in the presence of a sufficiency of Sodium Hydroxide or Potassium Acetate. Its solution is acid to litmus paper. Insoluble in Alcohol. 5% aqueous solutions made with Alkali have principally been utilised.

Dose.—15 minims (1 Ce.) of this solution hypodermically. Sterules, Hypodermic contain ($\frac{3}{4}$ grain in 15 minims). *Per os* $\frac{1}{2}$ to 2 grains.

Sodium Nucleinate.—May be prepared from yeast by treating same warm with Sodium Acetate Solution 10% strength containing 1.65% Sodium Hydrate. Concentrate the liquor, neutralise with Acetic Acid and precipitate the Sodium Nucleinate with Alcohol (Neumann).

Has been used in treatment of anæmia, scarlet fever and puerperal fever, also in tuberculosis.

Hypodermic Injection of 0.4 Gm. Sodium Nucleinate in 40 Ce. of Normal Saline increases leucocytosis, and also the resistance of the patient in typhoid.—Pr. Sept. 1907,438; M.A., 1908,31.

Calcii Nucleinas. *Dose.*—7 $\frac{1}{2}$ to 15 grains ($\frac{1}{2}$ to 1 Gm.). Whitish powder soluble in water suggested in rachitis and scrophulosis.—M. o8,117.

Bismuthi Nucleinas. *Dose.*—20 (1.3 Gm.) to 40 grains (2.6 Gm.) yellowish powder containing 50% Bi. Insoluble in water and in dilute acids, splits up in the intestines hence used as astringent for chronic intestinal catarrh. Was used on children under 2 years of age, also in cases of tuberculous diarrhœa with benefit.

***Nargol**, ***Mercuriol** and **Cuprol** are compounds of Nucleinic Acid with respectively Silver (L. ii./oo,1742), Mercury and Copper (P.J. ii./oo,305). Cuprol and Nargol are of use in granular ophthalmia in the form of 5% instillations. Nargol is soluble in water 1 in 4. Contains about 10% Ag.

Ⓔ***Nucleogen Tablets**. (0·05 Gm.). *Dose*.—2 thrice daily after food. Contain Iron Nucleinate and Arsenic. In tuberculosis, neurasthenia and chorea.—M., 308,118.

CERIUM.

Ce = 139·2 (140·25 I. Wts.).

This element, in addition to lanthanum and didymium, occurs as silicate in Cerite and as phosphate in Monazite, also in Samarskite and Gadolinite.

Monazite is a mineral of fairly wide distribution in Brazil (in the State of Rio de Janeiro). For commercial details, *vide* P.J. ii./09,492.

Cerium has Sp.Gr. 6·7, Lanthanum 6·1, and Didymium 6·5. The last-mentioned has been split up into Praseodymium = 140·6 (I. Wts.), and Neo-dymium = 144·3 (I. Wts.).

Cerium possesses a variable valency or habit of chemical combination. It is, like aluminium, either trivalent, or in some compounds apparently tetravalent, or even hexavalent as in the peroxide CeO_3 , in this respect differing from the majority of the rarer earth metals and resembling the elements which are known to possess physiological action, for example iron, arsenic, antimony and iodine.

G. T. Morgan has put forward cerium sulphocarbolate as worthy of trial, and has prepared a number of other organic Cerium Salts detailed below.

Cerium oxide is contained in incandescent gaslight mantles. The filament in Nernst lamps is said to contain zirconia and yttria.

Rutile is the ore Titanium Dioxide used in leather dyeing.—C.D.

Cerii Oxalas. (*Off.*), **U.S.** (Ph. Ned., Jap.). $\text{Ce}_2(\text{C}_2\text{O}_4)_3, 9\text{H}_2\text{O} = 701·34$ (706·644 I. Wts.). *Syn.* CER OXYDULOXALAT (German). 10 H_2O is considered more correct than 9.

Dose.—2 to 10 grains (0·065 to 0·3 Gm.). U.S. *Average* 1 grain.

A white crystalline powder insoluble in water. When incinerated it loses 53% of its weight. U.S. and B.P. allow a proportion of didymium and lanthanum oxalates.

Uses.—Is given in vomiting, particularly that of pregnancy, also in chronic diarrhoea, hysteria, epilepsy and migraine.

Cerii Sulphocarbolas. *Syn.* CERII PHENOL-SULPHONAS. *Dose*.—1 to 5 grains (0·065 to 0·32 Gm.) $\text{Ce}_2[\text{C}_6\text{H}_4(\text{OH})\text{SO}_3]_6 = 1309·2$ (1319·16 I. Wts.) (+Aq.).

A well-defined crystalline salt resembling the corresponding thorium body in appearance (*vide* p. 668).

The following Salts of Cerium are also obtainable commercially,—Cerium Ammonium Nitrate; Cerium Chloride, Nitrate, Oxide, Acetate, Benzoate, Bromide, Bromate, Carbonate, Citrate, Hypophosphite, Iodide, Lactate, Malate, Salicylate, Sulphate, Valerianate, Also Bismuth-cerium Oxalate, Bismuth-cerium Valerianate and Bismuth-cerium Salicylate (*q.v.*).

* *Note*.—Some distinguish between a medicinal preparation of arsenic and a preparation containing it. Personally we think it exceedingly difficult to draw the distinction.

Further organic salts worthy of attention are :—

Cerous Sulphocarbolate, Camphor- β -Sulphonate, Benzene-Sulphonate, Sulphanilate, Naphthionate, Dichloracetate, Perchlorate.—*Trans. Chem. Soc.* 1907, Vol. 91.

Isovalerate (sparingly soluble), Oleate (brownish mass), Cinnamate (insoluble), Orthocoumarate (insoluble), Camphorate (insoluble), Succinate (insoluble).—*G. T. Morgan, P.J. i./07, 429.*

Cerous Salts of the Acetic Series from the formate to the butyrate are soluble.—*Zeit. Anorg. Chem.* 1905, 45, 89.

Ⓟ CHLORAL HYDRAS, (*Off.*), U.S. P. JAP., P. HELV.

$C Cl_3 \cdot CH \cdot (OH)_2 = 164 \cdot 15$ (165.404 I. Wts.).

TRICHLORETHYLIDENE GLYCOL.

Dose.—5 to 20 grains (0.32 to 1.3 Gm.) in aqueous solution, or in chloroform water well diluted. *Fr. Cx.* has *maximum single dose* 60 grains, during 24 hours 180 grains approximately.

This compound is obtained by the action of dry Chlorine upon Alcohol. Chloral-alcoholate, the principal product of the reaction, is then decomposed with Sulphuric Acid. Chloral thus produced is hydrated by bringing it in contact with the necessary quantity of water, warming to about 50° C., and allowing it to cool.

Soluble, 4 in 1 of water, 5 in 1 of alcohol, 2 in 1 glycerin, 2 in 1 of ether, and 1 in 3 of chloroform, likewise soluble in oils and fats.

Flavoring.—Glyl Rosæ, Glyl or Syl Sassafras, Syl Amygdalæ Amaræ; Syrupus Aurantii Floris.

Uses.—As a hypnotic, it is often combined with opiates, morphine, or bromides, but it is incompatible with quinine. Its use is contra-indicated in heart affections, Bright's disease, and when the vital force is very weak. Its sedative action resembles that of chloroform.

In epilepsy small doses may be efficacious.—*Li. i./09, 908.*

Has been recommended as a deodorant for sputum.—*Pres.* 1910, p. 5.

Antidotes to Chloral.—Keep patient awake, strong ammonia to nostrils. Stomach pump or emetics (zinc sulphate 20 grains), followed by amyl nitrite coffee, electricity, oxygen, picrotoxin, or strychnine. It is useful as an antidote to poisoning by strychnine, and as a remedy for tetanus.

Tetanus, recovery from, under large doses of chloral.—*Pr.* xlvii.132 *B.M.J.* ii./01, 475; ii./04, 1460.

Should be expunged from list of hypnotics, cheapness its only advantage. *B.M.J.* i./09, 555.

Incompatible with alkalis, ammonium salts, potassium iodide or permanganate, and with bromides in presence of alcohol,—chloral-alcoholate may separate.—*P.J.* i./04, 215; i./07, 528. Liquefies with camphor, *q.v.*

Ⓟ *Enema Chloral*, L.H. Chloral hydrate 10 to 40 grains, starch enema to 4 ounces.

Severe chorea successfully treated.—*L.* ii./89, 205.

Sea-sickness. Drachm doses of a mixture of 2 drachms of the syrup with 30 grains ammonium bromide, made up to 1½ ounces with water.—*B.M.J.* ii./04, 1405.

Examination, method of titration.—Y.B.P. 1900, p. 92.

***Isopral.** *Dose.*—10 to 45 grains (0.65 to 3 Gm.). Trichlorisopropyl alcohol $\text{CCl}_3\text{.CHOH.CH}_3 = 162.18$ (163.42 I. Wts.).

A crystalline body slightly soluble in water. Hypnotic but not so poisonous as chloral.—P.J. i./05, 921; B.M.J.E. ii./05, 479. Must be kept in a closed glass vessel and in a cool place, being volatile. In various forms of mental disease, e.g., epilepsy, mania, melancholia, a safe hypnotic. Use in gastric ulcer contra-indicated on account of its caustic power.

Acts rapidly, dangerous, has injurious effect on the heart.—B.M.J. i./09, 555.

Preparations.

Ⓟ **Chloral Camphoratum**, B.P.C. (Pigmentum Chloral et Camphoræ, T.H.)

Chloral Hydrate 1, Flowers of Camphor 1. Sp. Gr. 1.223.

Combine in a warm mortar. It remains liquid at ordinary temperatures, and forms a valuable application painted on painful parts in neuralgia and rheumatism. It mixes freely in alcohol, ether, oils, and fats, but the camphor is precipitated on adding to water or glycerin.

The compound (chloral and camphor) dissolves the alkaloids atropine, morphine, and veratrine to the extent of 1 in 30 or more, but their salts are less soluble in it. Liquefactions of a similar kind take place on mixing and gently heating respectively chloral hydrate 1 with menthol 1, or phenol 3, or thymol 1. Quinine salts and chloral hydrate also form liquid combinations.

Ⓟ **Chloral Camphoratum cum Cocaina**, B.P.C. Chloral Hydrate 45, Camphor 45, Cocaine 10, for toothache.

Chloral, Glycerin and Glacial Phosphoric Acid, equal parts, placed in the alveolus after dental extraction will soon stop the pain—the mixture is strongly antiseptic.—Pres. Jan. 07.

In fibrositis the mixture of chloral hydrate, camphor and menthol is found to be the most satisfactory treatment. Painted over the part, then gently rubbed in with the fingers.—Luff., Clin. Jl., Oct. ii./05.

Ⓟ **Pigmentum Chloral Compositum**.—W. H. has Chloral Hydrate 1, Menthol 1, Thymol 1, Camphor 3. Is Linimentum Chloral Compositum.—R.D.H.

L.H. has Chloral Hydrate, Menthol, Camphor of each 1.

Ⓟ **Chloral Tannin Solution**—Syn. CAPTOL.

Chloral Hydrate 1, Tannin 1, melt together on water-bath and dissolve in water, q.s. to produce 8. For strengthening the hair.

Ⓟ **Liquor Bromo-Chloral Compositus**.

Dose.— $\frac{1}{2}$ to 2 drachms (1.8 to 7 Cc.). 1 drachm contains nearly 10 grains each of Chloral Hydrate and Potassium Bromide.

B.P.C., 1907, has not materially altered from B.P.C., 1901, which was:—

Chloral Hydrate 1,500 grains, Tincture of Indian Hemp 400 minims, Tincture of Fresh Orange Peel 400 minims, Henbane Juice 1,600 minims, Syrup $3\frac{1}{2}$ ounces, Liquid Extract of Liquorice $\frac{1}{2}$ ounce. Dissolve, add Potassium Bromide 1,600 grains dissolved in Distilled water 7 ounces filter, and add Distilled water to 20 ounces.

Resembles the American hypnotic Ⓟ ***Bromidia** which is stated to contain in each drachm chloral hydrate 15 grains, potassium bromide 15 grains, extracts of cannabis and of hyoscyamus $\frac{1}{8}$ grain each.

Dose.— $\frac{1}{2}$ to 1 drachm in syrup or water.

Ⓟ **Suppository of Chloral.**

Chloral Hydrate 5, Oil of Theobroma 10. In grains, for one suppository, in grammes, for fifteen.

Press into moulds. Heat must not be applied. It is useful in infantile convulsions, where nothing can be administered by the mouth. It should be forcibly retained for a few minutes with the finger, if necessary. It is locally irritating.

Sea-sickness, treated by 20 to 30 grains per rectum.—B.M.J. i./05, 1090.

Ⓟ **Syrupus Chloral (Off.).** *Dose.*— $\frac{1}{2}$ to 2 drachms (1·8 to 7 Cc.).

Contains 10 grains in 1 drachm.

Chloral Hydrate 80 grains, Distilled water $1\frac{1}{2}$ drachms. Dissolve and add Syrup *q.s.* to 1 ounce.

Ⓟ **Tablets of Chloral, 5 and 10 grains (0·32 and 0·64 Gm.), to be dissolved—not swallowed whole, might blister.** *Dose.*—1 or more.

* **Chloralamid.** *Syn.* CHLORAL FORMAMIDE, P.G. Choral Formamidum, U.S.

$\text{CCl}_3\text{CH}(\text{OH})\text{NH}\cdot\text{COH} = 191$ (192·422 I. Wts.).

Dose.—15 to 45 grains (1 to 3 Gm.) in weak spirituous or acidulated solution.

In colourless inodorous shining crystals with a faintly bitter taste; prepared by combining anhydrous Chloral 147 with Formamide 45 and recrystallising—care being taken not to heat above 55°C .; soluble about 1 in 20 of water, 1 in 2 of alcohol. In dispensing should not be heated over 55°C . It melts at $114\text{--}115^\circ\text{C}$. Incompatible with alkalis.

Uses.—Hypnotic in insomnia of alcoholism, neuralgia, hysteria and cardiac diseases.

Does not engender a habit. May be given in 45 to 60 grain doses.—B.M.J. i./09, 555.

Elixir Chloralamidi. *Dose.*—1 ounce (30 Cc.) = 30 grains (2 Gm.).

Chloralamid 2 Gm., Alcohol 5 Cc., Aromatic Syrup 5·4 Cc., Glycerin 15 Cc., Water *q.s.* to 30 Cc.

Haustus Chloralamidi, G.H.

Chloralamid 30 grains, Mucilage Mixture to 1 ounce, for one dose.

Tablets, 5 grains (0·32 Gm.). *Dose.*—3 or more.

Chlorobrom. *Dose.*— $\frac{1}{2}$ to 1 ounce. A specialty said to contain 30 grains each of chloralamid and potassium bromide in an ounce, flavoured with liquorice, for insomnia and sea-sickness.

* **Chloralose.** *Syn.* ANHYDRO - GLYCO - CHLORAL. $\text{C}_8\text{H}_{11}\text{Cl}_3\text{O}_6 = 307\cdot13$ (309·468 I. Wts.).

Dose.—3 to 10 grains (0·2 to 0·65 Gm.), in cachet.

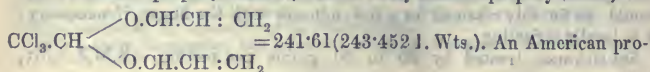
In white crystals M.P. 187°C ., formed by the action of chloral on glucose; slightly soluble in water, with bitter taste. Is a useful hypnotic, without after-effects, excepting after large doses.

Somnal. *Syn.* ETHYLISED CHLORAL-URETHANE.

Dose.—30 to 45 minims (2 to 3 Cc.).

A solution of Chloral Urethane in Alcohol, said to be an efficient soporific.

*Somnos. *Dose.*—1 to 4 drachms. Hypnotic. A solution of "trichlorethidine propenylether" (? Trichlorethylidene-dipropenyl-ether):—



prietary, given as a sedative, and for insomnia. A derivative of chloral.

Ⓟ CHLOROFORMUM (*Off.*) U.S., P. JAP., P. HELV., FR. CX.

$\text{CHCl}_3 = 118\cdot48 (119\cdot388 \text{ I. Wts.}).$

Ⓟ *Chloroform and all preparations or admixtures containing more than 20% of Chloroform.*

Syn. TRICHLORO-METHANE; FORMYL TERCHLORIDE.

Dose.—1 to 5 minims (0·06 to 0·3 Cc.), in mucilage and water, or in a perle; 3 drops = 1 minim. Small doses may be given as chloroform water or spirit of chloroform. Very large amounts (up to 2 ounces) have been taken internally without causing death.

A. D. Waller by experiments on striated muscle states that the physiological power of chloroform is 12 times that of ether and 100 times that of alcohol.—*Proc. Phys. Soc.*, Dec. 1908.

Chloroform is now largely prepared by the action of chlorinated lime on acetone, as well as from both methylated and duty-paid alcohol.

Books give three different equations to represent the reaction. The one in which three molecules of alcohol yield two of Chloroform agrees best with practice.—C.D. Feb. '08. The method of manufacture is now so perfected that we may safely say it is almost impossible to purchase impure "Chloroform for Anæsthesia"—a number of tests have, therefore, been omitted.—*Vide* Edn. XII., p. 231, and the B.P.

Ⓟ **Acetone Chloroform** specially prepared for anæsthesia. Should be kept in amber-coloured, stoppered bottles or in the dark.

Chloroform has Sp. Gr. 1·490 @ 15° C. Boils at 60°—62° C. Miscible in all proportions with Alcohol, Ether and Oils. Contains about $\frac{1}{2}$ per cent. by weight of ethyl hydroxide (alcohol), as preservative.—*c.f.* P.J.ii/03,326. *Uses.* Inhaled is anæsthetic and analgesic. Internally is anti-spasmodic and sedative for asthma, colic, cough, hysteria, and neuralgia. Externally in liniments to promote absorption and allay pain. See General Preparations of Chloroform. 1 in 500 is a preservative of Infusions and Animal Extracts. It is a useful deodorant, *e.g.*, for the hands after post-mortem work.

Test for Decomposition of Chloroform:—

Small pieces of Pith steeped in Congo Red Solution. Acidity would cause the Congo Red dye to change to blue.—L. i./07,1033.

A death after anæsthesia from chloroform, nitrous oxide gas and oxygen.—L. i./99,1095.

2% chloroform vapour safe for anæsthesia.—B.M.J. ii./03,141; ii./04,161; L. ii./04,1856; J.C.S.A. ii./04,756.

If patient at all dyspnoic, Chloroform is best anæsthetic.—L. ii./07,139.

A death from chloroform anæsthesia. The chloroform was from duty paid spirit, and the opinion was expressed that this chloroform was safer than that from Acetone or Methylated Spirit.—P.J. ii./09,660.

Combined Use of Chloroform and Oxygen.—The administration of oxygen with chloroform as an anæsthetic is said to greatly decrease the danger of the anæsthetic. This method is sometimes conducted by passing the oxygen through a wash-bottle containing the anæsthetic. By this means, however, the quantity of the chloroform or ether is relatively small in comparison with the oxygen passed through. Hare suggests for alternative use a funnel-shaped leather inhaler containing a piece of spongiopiline or felt. In the upper surface of the leather inhaler is a small metal tube for connecting with the oxygen supply. By this means a definite quantity of anæsthetic is given and the amount of oxygen can be varied as desired.

Crile's Nasal Tube method of giving Chloroform (with a little oxygen), preceded by Morphine and Atropine.—L. ii./09,364.

Chloroform and ether are used locally in neuralgia, sciatica and similar affections, and by Cataphoresis, *q.v.*

Antidotes.

Instructions for treatment if dangerous symptoms arise during administration of chloroform.

See that the airway is clear and the clothing loose. Place the patient upon the floor with a pillow under the shoulders, and, with the tongue held forward, begin artificial respiration with oxygen at once; apply weak ammonia vapour and Amyl Nitrite to the nostrils and inject hypodermically 1 drachm of ether or brandy* or $\frac{1}{10}$ grain of strychnine. Hot flannels should be placed over the heart. Atropine injection is useful. As final measure Faradism or acupuncture of the heart should be tried.—R.D.H.

Inversion of the body, has frequently saved patient.

Copious rectal injection of Sodium Lactate Solution recommended to restore alkalinity of the blood—assuming acetone and diacetic acid are products of the effects.—M.P. i./07,200.

Lavage of stomach with 2 litres of warm Sesame Oil for poisoning, until the washings were free from odour of Chloroform, afterwards Saline Injection. Recovery.—P.J. ii./09,364.

If $\frac{1}{4}$ grain of morphine be first injected hypodermically, less Chloroform is needed, the insensibility is more profound, and the danger attending its use is lessened. Strychnine has also been suggested to give tone to heart muscle and so to combat the danger of death by syncope.

Heart massage in Chloroform Syncope by the subdiaphragmatic route often induces recovery.—B.M.J. ii./09,1471.

* Brandy Sterules as also Ether Sterules are handy to carry in the operating bag.

References to Chloroform.

(A number of older ones deleted.)

Inadvisable to continue the general use of chloroform, seeing that its death-rate is 1 in 2,300 cases, while A.C.E. is 1 in 5,000, ether 1 in 13,500, and nitrous oxide almost nil.—B.M.J. ii./97,160.

Chloroform inhalation combined with morphine hypodermically in acute maniacal delirium.—L. i./93,861.

Recovery under strychnine after drinking two ounces.—B.M.J. ii./97, 1498.

Two deaths, one with chloroform alone, the other with A.C.E. ($3\frac{1}{2}$ ounces) and ethyl chloride (5 Cc). The question is asked, how prevent acetone poisoning?—B.M.J. i./07,617.

Accidents in chloroform inhalation.—L.ii./06,1232.

Alleged action of chloroform on the heart. It may be safely given in any operation, providing the patient is suitable.—B.M.J. i./07,1030.

By the aid of Vernon Harcourt's "Chloroform Regulator," the exact percentage of chloroform used is gauged; never more than 2% is necessary.—L. i./03,800.

In phthisis inhalation with a little eucalyptus oil, palliative; the chloroform acts as a bactericide.—B.M.J. i./06,198.

With Dubois' Apparatus Chloroform can be administered with absolute safety—limits percentage to 2.—L. i./09,91.

Perfect and safe narcosis with chloroform can only be obtained when some regulating inhaler is employed.—L. ii./09,189.

Toxæmia fatal after Chloroform.—L. ii./08,799.

Three cases of delayed poisoning with.—L. ii./09,81.

Molecule for molecule Waller finds Chloroform about 100 times as toxic as Ethyl Alcohol.—L. ii./09,369.

The administration of Chloroform vapour above 2% in the inspired air is fraught with danger to the patient. The drug is stated to be absorbed by the corpuscles rather than by the plasma of the blood. 'Carius' analyses best for estimating. In chloroform narcosis the transport of chloroform from and to the lungs is a function of the red corpuscles.—Na. Jan. 9/08 (B.M.A. Inquiry).

Review of recent work on Anæsthetics.—Pr. Feb. 09,231.

Shock should be treated by rectal injection of Suprarenal Extract (*q.v.*), in preference to strychnine, brandy, &c.—Blumfield. Pr. Feb./09,242.

Delayed poisoning following chloroform inhalation. In one case—a boy who had taken chloroform upon a previous occasion without detriment—recovered under a mixed treatment of alkalies and glucose *Vide* Glucose.

Anæsthetic Preparations of Chloroform.

Ⓟ Glass Capsules of Chloroform.

Encased in cotton wool and silk; contain 10 minims in each. Are convenient for use in *asthma*, &c.; may be fractured and used by the patient while in bed. Also containing 20, 30, and 60 minims—the last *for obstetric purposes*, avoiding risk of overdose.

A slight inhalation of chloroform combined with amyl nitrite useful in vagal and vaso-vagal attacks.—L. i./07,1554.

Ⓟ **Gelatin Capsules of Chloroform.**

Contain each 5 minims; are for similar uses, but the chloroform is apt to volatilise; *see also* Perles, p. 235. Very useful in sea-sickness.

Ⓟ **Capsules of Chloroform with Ethyl Iodide, v.p. 96.**

Ⓟ **A.C.E.** (Alcohol, Chloroform and Ether).

Absolute Alcohol, Sp. Gr. 0.795, 1; Chloroform, Sp. Gr. 1.497, 2; Purified Ether, Sp. Gr. 0.720, 3; Sp. Gr. about 1.01. The three ingredients are intended to evaporate uniformly.

A.C.E. is as effective as pure Chloroform, and a safer agent when deep and prolonged anaesthesia is to be produced, while at the same time it is sufficiently rapid in its operation to be convenient for general use, although it takes a longer time than Chloroform (10 to 15 minutes) to procure anaesthesia. It is of service in midwifery. Several deaths, however. (*c.f.* p. 232).

Ⓟ **C.E.**, *i.e.*, a mixture of chloroform 2 parts with ether 3 parts, is an even better anaesthetic mixture in some cases, *e.g.*, where the airway is encroached upon as in angina Ludovici, in thyroid enlargement, in sublingual abscess, etc.—L. ii./07,139.

This mixture in same proportions using a Skinner's mask employed in a variety of grave operations—panhysterectomies, removal of double pyosalpinx, difficult appendicectomies, excisions of rectum, &c. Time of induction of anaesthesia averaged about 8 minutes. The mixture is recommended.—L. ii./09,11.

In general cases C.E. is best. The adjustment of vapour percentages is considered with the suitability of the patient.—L. ii./07,140.

As anaesthetic " C_1E_2 ." In adenoids and enlarged tonsils this is best.—B.M.J. i./09,1354.

Ⓟ **Vienna Mixture** is Chloroform 1, Ether 3.

Renal activity affected by *chloroform anaesthesia*. Quantity of urine with light anaesthesia increased, with full anaesthesia decreased.—B.M.J. i./06,608.

During full *narcosis with A.C.E.* the outflow of urine is diminished, but to a less degree than with chloroform or ether. The excretion of nitrogen is less depressed than the volume of urine. Effect on concentration of the urine is variable. Chlorides increased to a less degree than with chloroform, but to greater degree than in the case of ether.

Full narcosis with C.E. causes urine to be diminished less than with ether. In nitrogen excretion resembles effect of ether rather than that of either chloroform or A.C.E. The urine is more concentrated than the normal. Chlorides are affected as with ether *q.v.*

Inhaler. simple and inexpensive for administering A.C.E. and C.E.—will not get out of order.—B.M.J. i./05,24.

A chloroform and ether regulating Inhaler.—L. ii./05,296.

Drop bottle for chloroform-ether mixture.—L. ii./05,297.

Tongue clip for use in anaesthesia.—L. ii./05,606.

Ethyl Chloride in small amount occurs in Chloroform.—Dott, C.D., Feb. 22/08.

General Preparations of Chloroform.

Aqua Chloroformi (*Off.*) and P. Jap.—1 in 400 of water.

Dose.— $\frac{1}{2}$ to 2 ounces (15 to 60 Cc.).

Salts, like sodium sulphate, are apt to cause deposition of chloroform from aqueous solution. P. Austr. is 1 in 100.

Ⓟ **Chloroformum Camphoratum, B.P.C.**

Camphor 2, Chloroform 1.

Useful for toothache, applied on cotton wool.

(P) Chloroformum Mastiche.

Mastiche 1, Chloroform *q.s.* to 2.

(P) Guttæ Chloroformi cum Menthol Compositæ.—INSUFFLATOR DROPS,—DUNDAS GRANT. Menthol 20 grains, Chloroform $\frac{1}{2}$ ounce Acetic Ether and Alcohol 90% of each 2 drachms.

Directions.—5 drops to be placed upon the wool in the inhaler on each occasion of use.

Used in cases of chronic tympanic and Eustachian catarrh; their value depends to some extent upon the ease with which air containing a little chloroform vapour passes up the Eustachian tubes. Inhalations with an Eustachian Self-inflator are to be conducted as follows:—Drop the amount prescribed on to the wool in the mouth-piece of the inflator by means of a medicine dropper. With the glass mouth piece he'd firmly between the lips, and the nose-piece tightly in the freer of the two nostrils, compress the other nostril to close it completely. Draw a deep breath (not through the instrument) and then blow vigorously and suddenly through it so as to puff out the cheeks and 'crack the ears.' If vapour is too irritating blow through the instrument a few times before use. To concentrate h effect on the right ear close firmly with the finger the *left* ear and bend the head sideways over the left shoulder—*vice versa* for the left ear.—C.L.T.E.

(P) Linimentum Chloroformi (Off.).

Chloroform 1, Liniment of Camphor 1.

Vaseline might with advantage replace the oil of the camphor liniment for this preparation. U.S. orders Chloroform 3, Soap Liniment 7.

(P) Oleum Chloroformii, P.G. iv. Chloroform 1, Olive Oil 1.

(P) Liquor Chloromorphiæ, Chloromorphia Solution. (Miscible.)

				Contains in a 10 minim dose:—
Chloroform	...	...	150	$1\frac{1}{2}$ minims.
Glycerin	...	...	400	4 minims.
Liquid Extract of Liquorice	...	...	100	1 minim.
Morphine Hydrochloride	...	...	10	$\frac{1}{11}$ grain.
Solution of Atropine Sulphate	...	...	20	$\frac{1}{5}$ minim.
Oil of Peppermint	...	...	2	$\frac{1}{50}$ minim.
Alcohol (90 %) <i>q.s.</i> to	...	...	1000	

Dissolve the Morphine Hydrochloride in the Liquid Extract of Liquorice, Glycerin and Atropine Solution previously mixed; in part of the Alcohol dissolve the Chloroform and Oil of Peppermint; mix with the morphine solution, and add Alcohol *q.s.* to 1,000.

Dose.—5 to 15 minims (0.3 to 0.9 Cc.). Is a homogeneous mixture, and useful sedative, resembling the secret remedy, **(P) Chlorodyne**, in active constituents; but see also chapter on 'Patents.'

(P) Capsules (gelatin) containing 5 minims for use of travellers are convenient.

④ Tinctura Chloroformi et Morphinae Composita (Off.).

Dose.—5 to 15 minims (0·3 to 0·9 Cc.).

Contains in a
10 minim dose:—

Chloroform	75	$\frac{3}{4}$ minim.
Morphine Hydrochloride	10	$\frac{1}{11}$ grain
Diluted Hydrocyanic Acid	50	$\frac{1}{2}$ minim.
Tincture of Capsicum	25	$\frac{1}{4}$ minim.
Tincture of Indian Hemp	100	1 minim.
Oil of Peppermint	1·5	$\frac{1}{80}$ minim.
Glycerin	250	$2\frac{1}{2}$ minims.
Alcohol (90%) <i>q.s.</i> to	1000	

Mix. Contains approximately four times the proportion of morphine present in the preparation of B.P. 1885.

N.B.—Contains Hydrocyanic Acid which the Chloromorphia Solution does not.

Poisoning by 4 ounces of Chlorodyne, with recovery by use of atropine, strychnine, and stimulants. — L. ii./90,670, *vide* also L. ii./96,1456; i./98,1686.

⑤ Perles of Chloroform contain about 3 minims (0·18 Cc.). in each.

Dose.—1 or 2. Useful in sea-sickness.

Spiritus Chloroformi (Off.).—*Syn.* Chloric Ether. 1 in 20 of alcohol (90%). U.S. has 3 in 50.

Dose.—30 to 40 minims (1·8 to 2·4 Cc.), or 5 to 20 minims (0·3 to 1·2 Cc.) repeated.

Emulsio Chloroformi. U.S.

Average *Dose* 2 drachms. Chloroform 4, Tragacanth 1 (shaken in dry bottle). Add water 25, shake vigorously. Then almond oil 6, in several portions with shaking. Finally water to 100.

Tinctura Chloroformi Composita. B.P.C. (B.P. 1885). Chloroform 2, Alcohol 90% 8, Compound Tincture of Cardamoms 10.

Dose.—5 to 60 minims.

CHRYSAROBINUM (Off.) U.S. P. Jap.

$C_{20}H_{26}O_7 = 494·46$ (B.P. and U.S. Wts.) (498·208 I. Wts.). *Syn.* Commonly but erroneously called CHRYSOPHANIC ACID.

Dose.— $\frac{1}{2}$ to $\frac{1}{4}$ grain (0·01 to 0·032 Gm.) or more.

A substance containing a varying proportion of Chrysophanic acid, obtained from Araroba (*q.v.*) by extraction with hot chloroform.

C.R. 1908 advises the name 'Araroba Purificata' to replace Chrysarobinum.

May be converted into Chrysophanic acid $C_{14}H_5(CH_3)(OH)_2.O_2 = 252·17$ 204·08 I. Wts.) by oxidation in alkaline solution and subsequent precipitation of the acid: $C_{20}H_{26}O_7 + 2O_2 = 2C_{14}H_5(CH_3)(OH)_2.O_2 + 3H_2O$.

A tasteless inodorous crystalline yellow powder. It is contained in rhubarb root (principally as Chrysophanic acid) and dock root. It partially dissolves in potash solution, with brown colour. Ash limit 1%

Solubility.—In water only slightly; in ether 30, and in benzene 25 chloroform 18 (at 25° C. U.S.).

Dott says 'not readily' in hot alcohol. Partially and sparingly soluble in petroleum spirit, nearly insoluble in water.

Uses.—Externally as ointment or pigment. Chrysarobin is a powerful stimulant and parasiticide in acne rosacea, psoriasis, lupus, ringworm of the scalp, pityriasis and tinea circinata.

In alopecia successful after other remedies had failed.—B.M.J. i./07,491.

Unguentum Chrysarobini (*Off.*).

Chrysarobin 1, Benzoated Lard 24. Mix, heat to dissolve as much as possible, and stir till cold. U.S. has 3 in 50 of Benzoated Lard.

It stains the skin and hair, and a strong ointment after three days' continued use sometimes produces feverishness and irritation. 5 to 10 grains to an ounce may be better. Its stains can be removed by benzol, weak solution of potash or chlorinated lime.

Unguentum Chrysarobini Compositum (Unna) and St. J. H.

Chrysarobin 5, Salicylic Acid 2, Ichthyol 5, Vaseline 88.

Psoriasis treated by an ointment of Chrysarobin 5, Salicylic Acid 2½, Birch Tar (Oleum Rusci) 5, Soft Soap 6½, Vaseline 6½ (Unna).—Glasgow Med. Jl., Dec. 05,465.

Baculum Chrysarobini, St. M.'s H.

Chrysarobin 3, Wax 2, Lanolin 5.

Ⓟ Pigmentum Chrysarobini.—*Adopted by G. H.*

Chrysarobin 1; Gutta Percha Solution (B.P. 1885), 9.

In psoriasis, painted on twice a day with a brush for ten days during which time patient does not take a bath,—finally washing off.—L. i./09,968.

Ⓟ Traumaticin, adopted by P. Belg., composed of Gutta Percha (purified) 1, Chloroform (by weight) 9, is also used for making the above pigment. More cleanly than liniments or ointments. Can be prepared stronger in gutta percha for special purposes if desired.

Pigmentum Chrysarobini et Pyrogallol.

Chrysarobin 1, Pyrogallol 1, Ether and Alcohol, of each 10; Collodion 120. Apply after bathing every third day for psoriasis and ringworm.

Chrysarobin may also be applied with Camphoid, *q.v.*

Ⓟ Suppositorium Chrysarobini.

Chrysarobin 1¼ grains, Iodoform $\frac{3}{16}$ grain, Belladonna Extract $\frac{1}{4}$ grain, Glycerin *q.s.* to make a suitable paste and Cacao Butter *q.s.* to 30 grains. Found to give extraordinary results in hæmorrhoids.—U.S.D.

Araroba. *Syn.* Goa Powder (*Off.*). Crude Chrysarobin.

Araroba Depurata, P. Austr.=Chrysarobinum.

A brownish concretion from the cavities in the trunk of *Andira araroba* (*Leguminosæ*), dried and powdered.

Crude Araroba is imported from Brazil; not less than 50% of its weight is chrysarobin, or chrysophanic acid so-called. The Indian mode of using the drug was to cut a lime fruit, dip it in the powder and dab it on the affected skin. The Brazilians mix it with vinegar.

***Eurobin, Chrysarobin-tri-Acetate.** A brownish powder recommended as a substitute for chrysarobin. Solutions of 2 to 3% are said to be effective and free from toxic effects, non-irritant, and do not stain.

Lenirobin is Chrysarobin-tetra-acetate.

Bakkola Cure for cancer, a fungus growing on birch trees in Finland contains a substance allied to chrysarobin.—L. i./09, 1263.

CINCHONÆ CORTEX.

(*Rubiaceæ.*)

The principal dried barks used for the production of the salts of the Cinchona alkaloids are:—Red Cinchona bark, from *Cinchona succirubra*; Yellow Cinchona bark, obtained from *Cinchona Calisaya* containing upwards of 6% of alkaloids (half of which is quinine); pale Cinchona bark (crown or Loxa bark), from *Cinchona officinalis* (containing 5% alkaloids of which 3½% may be quinine); the bark of *Cinchona lancifolia*, Mutis; Columbian Bark (containing about 2% alkaloids, of which only small proportion is quinine); and other species of Cinchona; that of certain species of Remijia may also be used. The only kind official for making galenical preparations is the cultivated Red Cinchona, v. p. 238.

Cinchona, U.S., is from various species. 5% total alkaloids; 4% ether-soluble. *C. rubra* is separately official.

C. CALISAYA, Quinquina Jaune, is official in Fr. Cx. for making Extract. 1000 Gm. of good Calisaya Bark should yield 30 Gm. of Quinine Sulphate (+ 8H₂O) = 25 Gm. approx. of anhydrous Quinine Sulphate = 22 Gm. approx. of anhydrous Quinine.

C. SUCCIRUBRA, Fr. Cx. Quinquina Rouge is to contain at least 50 Gm. total alkaloid = 15 Gm. Quinine Sulphate (+ 8H₂O) = 12½ Gm. approx. anhydrous salt dried at 100°C. = 10.9 Gm. approx. of Quinine base anhydrous—per 1000 Gm. of bark.

The Quinine barks, as they are called, now imported from South America, are chiefly the Calisaya in quills; those known as Cuprea barks, the produce of species of Remijia, are expensive and not now imported. A larger quantity of cultivated bark, the produce of *C. succirubra*, *C. officinalis*, and hybrids, arrives from Madras and other parts of India; most of the rich Java bark, produced by *C. Calisaya*, var. *Ledgeriana*, now goes direct to Amsterdam or Hamburg. The old natural "flat" Calisaya bark is not now met with, but a kind of yellow bark, pressed into flat pieces, is imported from Bolivia to replace it. The flatness is produced by tight packing in serous bound with green hide thongs which, contracting, keep it flat.

The cultivation of the Cinchonas is carried on in India, in the Nilgiri Hills in the south, and near Darjeeling in the north-east, also in Ceylon, Java, and Jamaica.

The species *C. succirubra* has proved to be the hardiest and most easily propagated, and, although on analysis the yield of cinchonidine and quinidine generally preponderates over that of quinine, yet the total yield—often up to 10%—of alkaloids from the bark of this Cinchona is very large (especially in the hybrids with *C. officinalis*); latterly the proportion of quinine in it has increased.

By far the largest proportion of the barks worked for quinine is Java *Ledgeriana* bark, all derived from the packet of seed obtained from one great tree by the Indian Manuel, and brought over by Ledger, which cost the Dutch Government £50 and Manuel his life. Of this bark Java produces nine to ten millions of pounds per annum, average test over 6% of sulphate of quinine, exceptional samples testing 10 to 12%. Much smaller quantities of *Calisaya* from South America, *Officinalis* from India and Ceylon, and *Succirubra* from India, Ceylon and Java, are also used, the latter being sought after by manufacturers of Pharmacopœa Germanica II. Quinine, which allows 10% or thereabout of Cinchonidine. Java Bark is year by year increasing in alkaloid content.—(Howard).

Cinchonæ Rubræ Cortex, Red Cinchona Bark. (Off.). Dose.—5 to 60 grains (0.32 to 4 Gm.). P. HELV. has minimum 6.5% alkaloids. FR. CX. has 5% *vide antea*.

The dried bark of the stem and branches of cultivated plants of *Cinchona succirubra*. Tested by official process, it should yield between 5 and 6% of total alkaloids, of which not less than one-half should consist of quinine and cinchonidine.

Assay method improved upon.—Gadd, P.J. ii./05, 579. Cæsar and Lorentz's method.—C.D. i./08, 21.

Preparations of Red Bark.

Flavorings,—as for Quinine *q.v.*

Decoctum Cinchonæ. B.P. 1885.—1 produced 16. Dose.—1 to 2 ounces (30 to 60 Cc.).

Elixir Cinchonæ.

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.).

Liquid Extract of Cinchona 1, Simple Elixir 7. Mix.

Extractum Chinæ.

Dose.—1 to 4 grains (0.065 to 0.26 Gm.).

FR. CX.—Aqueous extract containing not less than 6% total alkaloids.

P. AUST. A cold water percolate, inspissated.

PH. NED.—Hydro-alcoholic 15 to 18% alkaloids.

P. BELG. contains 10% alkaloids, of which 2% is Quinine

P. HELV. and P. HUNG. at least, 12% alkaloids.

Extractum Cinchonæ Liquidum (Off.).

Dose.—5 to 15 minims (0.3 to 0.9 Cc.).

This contains 5% of total alkaloids, and is an acid preparation; 1 = about 1 of bark. (Ph. Ned. has 5 to 6%. P. Hung. at least 4%).

If prescribed with acid, as in the following;—Spirit of Chloroform 1½ drachms, Nitro-hydrochloric Acid 1½ drachms, Liquid Extract of Cinchona 1½ drachms, Water to 6 ounces, mix the first three ingredients in order written, and pour into the water to produce best result.

Liquid extract of red bark has been much lauded in America for giving drunkards a distaste for alcohol.

Cinchona does not extract so readily with acetic acid as with alcohol and glycerin, but it gives a more permanent extract.—P.J. ii./09, 142.

Methods of assay.—P.J. i./03, 268; Y.B.P., 1902, 55, 56. Useful suggestion for the U.S. method, Am. J. Ph. 1906, 454. Use of alcoholic potash solution in place of aqueous.—P.J. ii./01, 90; P.J. ii./05, 124. Various methods of making Liquid Extracts of Cinchona discussed: that of Wobbe having advantage of small quantity of liquor and rapid percolation; the extract does not deposit.—P.J. ii./04, 324.

Fluidextractum Cinchonæ, U.S. *Average dose.*—15 minims. Standardised to 4·0% *w/v.*; P. AUSTR. 4%; P. BELG. (glycero-hydro-alcoholic) 5%, of which 1% is quinine. A fluid extract with Potassium Iodide 3% is also in P. Belg. P. Helv. at least 6% alkaloids.

Infusum Cinchonæ Acidum (Off.).

Dose.— $\frac{1}{2}$ to 1 ounce (15 to 30 Cc.).

Red Bark in No. 40 Powder 1, in boiling distilled Water 20, with Aromatic Sulphuric Acid $\frac{1}{4}$; infuse one hour and strain.

Tinctura Cinchonæ (Off.).

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

About 1 in 5 of 70% alcohol; standardised to contain about 1% of alkaloids.

Might be made with 60% alcohol.—P.J. ii/09, 142.

U.S. Cinchona 40, Glycerin 15, Alcohol and Water in proportion of 675 and 250, *q.s.*, to 200. Assayed to 0·75% ether-soluble alkaloids.

Maceration for 24 hours with $\frac{1}{2}$ ounce hide powder to the pint is said to detannate the tincture.

Mistura Antidipsomania. N.H.W.

Tincture of Cinchona 1 drachm, Glycerin $\frac{1}{2}$ drachm, Tincture of Capsicum 3 minims, Decoction of Cinchona to $\frac{1}{2}$ ounce.

Tinctura Cinchonæ Composita (Off.).

Syn. HUXHAM'S TINCTURE OF BARK. About 1 in 10 of 70% alcohol.

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

U.S. Red Cinchona 50, Bitter Orange Peel 16, Serpentaria 4, Glycerin 15, Alcohol (94·9% vol.) and water in proportion of 675 and 250 of each, *q.s.* to 200.

Tinctura Chinæ Composita Whvtii, PH. NED. Cinchona 20, Orange Peel 20, Gentian 20, Alcohol 70°/300.

Vin de Quinquina Officinal (Fr. Cx.)

Macerate Cinchona 25 with Dilute Hydrochloric Acid 2, Alcohol 60% 75, for 24 hours shaking occasionally. Add Red Wine 920, macerate 24 hours and filter.

Dose.— $\frac{1}{2}$ to 5 ounces (15 to 140 Cc.). Less for children.

Vinum Chinæ, P.G. IV. *Dose.*—1 to 4 drachms.

Red Bark 1 in 25 of Sherry detannated by Gelatin and flavoured with Sugar and Tincture of Orange.

P. AUSTR. has—dissolve Gelatin 1, in hot water 20, and add Malaga 780. Allow to stand 24 hours and add Fluid-extract of Cinchona and Tincture of Orange of each 50, and Honey 100.

Vinum Chinæ. P. JAP. 1907. Dissolve White Gelatin 1, by warming, in Distilled Water 10, and add Sherry 1,000, Cinchona Bark in coarse powder 40, extract in the cold for eight days; press, in the expressed liquid dissolve Sugar 100, Tincture of Bitter Orange Peel 2, set aside in a cool place for 14 days and filter.

Vinum Chinæ Ferratum, P. AUSTR.

Dissolve Gelatin 1 in Water 20, add to Malaga Wine 955; after 24 hours add Iron and Quinine Citrate 5 dissolved in Water 20. Set aside 14 days, filter and preserve in wine bottles kept from the light.

CINCHONINA.

$C_{19}H_{22}N_2O = 292.05$ (294.196 I. Wts.).

Dose.—1 to 10 grains (0.035 to 0.65 Gm.).

Cinchonine salts are much the cheapest of the alkaloidal salts of Cinchona. Their nauseous, bitter taste is objectionable, as prophylactics some have thought them superior to quinine.

Cinchoninæ Hydrochloridum.

$C_{19}H_{22}N_2O.HCl.2H_2O = 364.0$ (366.696 I. Wts.).

Dose.— $1\frac{1}{2}$ to 10 grains (0.1 to 0.65 Gm.), or more.

In white acicular crystals, soluble 1 in 30 water and 1 in 2 of alcohol 85%. (Commercial samples we find vary.)

Cinchoninæ Sulphas, U.S.

$(C_{19}H_{22}N_2O)_2H_2SO_4.2H_2O = 717.2$ (722.51 I. Wts.; 717.17 U.S.).

Dose.— $1\frac{1}{2}$ to 10 grains (0.1 to 0.65 Gm.), or more.

In hard, colourless, short rhombic prisms, with a vitreous lustre. Soluble 1 in 70 of cold water, 1 in 10 alcohol 90%.

Dilute solution in Dilute Sulphuric Acid should not be markedly fluorescent (absence of Quinine and Quinidine).

Cinchoninæ Iodosulphas. *Syn.* ★ANTISEPTOL.

This odourless brown powder has been used as a substitute for iodoform. Contains 50% of iodine, is soluble in alcohol and chloroform, but insoluble in water.

Cinchoninæ Sulphocarbolas.

$C_{19}H_{22}N_2O.C_6H_4.SO_3H.OH (?) = 464.85$ (468.314 I. Wts.). In reddish white needles. Antiseptic febrifuge.

CINNAMOMI CORTEX (*Off.*).

The dried bark from *C. zeylanicum* (*Lauraceæ*).

Dose.—10 to 30 grains (0.65 to 2.0 Gm.).

Aromatic, carminative and antiseptic, employed as flavouring agent. Contains volatile oil and tannin. Official are, Compound Powder (1 in 3). Water (1 in 10), Spirit (also U.S.—1 of oil in 10); and

Tinctura Cinnamomi. *Dose.*— $\frac{1}{2}$ to 1 drachm.

1 in 5 alcohol 70%. Might be made with 60% alcohol.—P.J.ii./09, 142. U.S. has Saigon Cinnamon 40, Glycerin 15, Alcohol (94.9% vol.), and water in proportion of 27 and 10, *q.s.* to 200.

Oleum Cinnamomi (*Off.*) *Syn.* OLEUM CASSIÆ. U.S.

Dose.— $\frac{1}{2}$ to 3 minims (0.03 to 0.18 Cc.).

U.S. requires 75% Cinnamic Aldehyde by volume, Sp. Gr. 1.045 to 1.055 at 20° C. Bennett says should be 1.022 and 1.038.—P.J.ii./08, 622. Ph. Ital. requires at least 70%. Sp. Gr. 1.024 to 1.04.

The light yellow oil distilled from the bark has taste and properties representing it. The Chinese oil, as distinguished from that made in Ceylon, is known as Cassia Oil.

OLEUM CINNAMOMI (*P. Off.*)—Sp. Gr. 1.025 to 1.040 (*Off.* 1.025 to 1.035); O.R., from -0.5° to -1° ; R.L., 1.572 to 1.582; Sol. 1 vol. in 3 to 4 of 70% alcohol. One drop dissolved in 5 Cc. of 90% alcohol and one drop of test-solution of ferric chloride added should afford a pale-green, but not a blue or brown coloration (absence of cinnamon-leaf and cassia oils). It should contain 55 to 75% of cin-

namic aldehyde as determined by the following test :—Ten Cc. of the oil is added to 70 Cc. of 20% solution of sodium sulphite, and a few drops of phenolphthalein test-solution added to give a well-marked pink coloration. The mixture is heated in a water-bath, well shaken, and neutralised from time to time by the addition of a 10% solution of acetic acid until the liquid develops no further pink coloration, the process occupying from 30 to 45 minutes. The oily layer, which separates on standing, on cooling to 15° C., should measure not more than 4.5 Cc. nor less than 2.5 Cc., showing the presence of 55 to 75% of cinnamic aldehyde. Brewis said the increase from 55 to 75% would exclude some of the most fragrant oils.

'Leaf Oil' is practically free from Cinnamic Aldehyde.—P.J./ii.08,623.

Aqua Cinnamomi Concentrata may be made with *Quillaia Tincture* as *Aqua Menthae Piperitæ Concentrata* (*q.v.*). See also Ph. Form.

Soluble in alcohol 90% about 10 in 3.

Is occasionally prescribed as an inhalation (30 to 40 minims) with boiling water 1 pint.

Cinnamon oil has a reputation as a remedy against influenza and common colds, 20 drops being taken in a wineglassful of water or on sugar (method of dosage.—L. ii./06,1240.) Relieves pain in a carious tooth.

Capsules of Cinnamon Oil, 2½ minims with Quinine Sulphate, 1 grain, increased to 5 minims of the oil. In typhoid.—B.M.J. ii/04. 1450.

For colds and discharge from all the mucous membranes. Is antiseptic; stimulates the heart reflexly, and directly dilates blood vessels, thus exerting valuable action on vaso-motor-system. Action on bronchial tubes antispasmodic. Should be given in 20 minim doses in milk for first three hours, every other hour 15 minims for two doses, then three or four hourly 10 minim doses. If patient can take to bed cure will be rapid.—L. ii./08, 1661. See also *Oleum Eucalypti*.

Cinnaldehydum, U.S. *Vide Acidum Cinnamicum*.

Cinnamon Dental Paste. Iodoform made into a paste with Cinnamon Oil.

COAL TAR DERIVATIVES.

The Aromatic series of derivatives from coal tar, so freely used as antipyretics and analgesics, produce changes in the blood, diminishing its respiratory capacity and destroying red corpuscles.—L. i./93,377.

***Liquor Carbonis Detergens.**

This alcoholic preparation owes its properties in part to Phenol. Is used as a Lotion, from 1 drachm to 1 ounce to a pint of distilled water forms a yellowish milky emulsion; or, as an Ointment, *Liquor Carbonis Detergens* 1, *Unguentum Hydrargyri Nitratis* 3, *Unguentum Simplex* 4. In prurigo and chronic scaly skin diseases.

The following is also useful in eczema: *Liquor Carbonis Detergens* 2, *Liquor Plumbi Subaceatis* 2, *Zinci Oxidum* 4, *Glycerinum* 4, *Aqua* 36.

A ***Coal Tar Inhaler and Vaporiser** for use with *Liquor Carbonis* is made for treatment of whooping cough, croup, bronchitis, influenza and like affections.

Balneum Pielis Carbonis. St. John's Hosp.

Solution of Coal Tar 8 ounces, water 95° F. 80 gallons.

St. M.'s H. has Tar 3, Methylated Spirit 2, Ether 1. This lotion to be painted over the patient and allowed to dry, then followed with hot bath.

Lotio Plumbi Detergens, V.H.C.

Liquor Carbonis Detergens 1, Liquor Plumbi Subacetatis Fortior 2½. One teaspoonful to a pint of water.

Unguentum Picis et Acidi Salicylici, V.H.C.

Liquor Carbonis Detergens 30 minims, Salicylic Acid 15 grains, Ammoniated Mercury 5 grains, Soft Paraffin to 1 ounce.

Liquor Picis Carbonis (Off.).

Prepared Coal Tar (*Pix Carbonis Præparata (Off.)*).—Coal Tar (prepared by heating in a shallow vessel, at 120° F. for one hour, stirring frequently), 1, Tincture of Quillaia (1 in 10 of 90% alcohol) 5. Digest at 120° F. for two days, cool, and decant or filter.

Pruritus ani well treated by tar preparations.—B.M.J. ii./09,321.

In psoriasis 1 in 8 of lanolin to be rubbed in.—L. i./09,968.

Lotio Picis Carbonis Alkalina. St. Th. H.—Liquor Picis Carbonis 1 drachm, Sodium Bicarbonate 120 grains, Water to 1 pint.

Lotio Picis Carbonis Aromatica, St. M.'s H.

Prepared Coal Tar 3 ounces, Ether 2 ounces, Methylated Spirit 1 ounce. Dissolve, filter and add Peruvian Balsam 6 drachms, Salicylic Acid 1½ drachms.

Liquor Picis Carbonis et Ligni.

Dissolve Wood Tar 1 in 20 of official liquor above.

Liquor Picis Ligni may be prepared by dissolving Wood Tar 1 in 20 of Tincture of Quillaia (above).

The tincture of quillaia enables these solutions to form emulsions with water. One part to 7 or more is useful for skin affections as a lotion.

Liquor Picis Benzol et Acetoni.

Coal Tar 1, Benzol 4, Acetone 16.

Mix and filter from undissolved Tar particles. A thin layer of this painted on a part is useful to allay itching.—L. ii./08,923.

Aqua Picis, Ph. Ned., 5% by mixing with Pumice.

***Anthrasol.** A distillate from Coal Tar of the consistence and colour of Olive Oil. In skin affections.

Does not stain linen or skin, 20% in soft paraffin for pruritus or 10% with a glycerin starch base.—B.M.J. i./05,310.

In squamous eczema.—B.M.J.E. i./10,36.

Water in which cinders had been soaked gave an alkaline reaction and was rich in chlorides and sulphates. This liquid was hostile both to ankylostoma ova and larvæ, killing them in 24 hours.—L. i./10,355.

Acetanilidum (Off.).—*Syn.* PHENYLACETAMIDE (ANTIFEBRIN) $\text{CH}_3\text{CO.NH.C}_6\text{H}_5 = 134\cdot10$ (135·082 I. Wts. ; 134·09 U.S.). P. Austr.

Dose.—1 to 3 grains (0·065 to 0·2 Gm.) or more (average 4 grains U.S.). P.G., Max. dose 0·5 Gm.; Max. daily dose 1·5 Gm. in cachets or suspended in water by compound tragacanth powder.

Prepared by the action of glacial acetic acid on aniline. In small white odourless glittering crystals, which produce a burning sensation on the tongue, and melt at 236·5° F. (113·5°C.).

Antidotes.—Emetics (Inhalation of Ether and Oxygen), Stimulants—*e.g.*, Strychnine hypodermically, warmth to feet and body.

Deaths from and risks with acetanilide.—P.J. ii./96,14; B.M.J. i./98, 1539; B.M.J. ii./98,434,987.

Soluble 1 in 200 of water, slightly in glycerin, 1 in 4·2 of alcohol 90%, 1 in 20 of brandy with difficulty; easily in chloroform, benzol and ether.

Determination of acetanilide or phenacetin in mixtures. They cannot be determined when present in the same preparation, but satisfactory method singly.—P.J. i./07,521; Am.Jl.Ph., April, 1907.

Uses.—As a febrifuge and antipyretic, hypnotic sedative, anti-epileptic, anti-arthritic, and nervine tonic. Checks the chills and fever of phthisis, quiets the nervous system, and is useful in typhoid. Relieves sciatica and the darting pains of locomotor ataxy.

Multiple soft chancres well treated by local application twice daily of Powdered Antifebrin.—(Whitla).—B.M.J., ii./08, 1788.

Useful to control pains in tabes dorsalis.—L.i./10,355

'Tablets, 3 grains. *Dose.*—1 or more.

Also made with Caffeine; useful in migraine.

Effervescent Acetanilide. *Dose.*—1 drachm.

In two strengths, 1 and 3 grains in 1 drachm.

Pulvis Acetanilidi Compositus, U.S., B.P.C.

Dose.—3 to 5 grains (0·2 to 0·32 Gm.).

Acetanilide 7, Caffeine 1, Sodium Bicarbonate 2. *'Daisy' powders consist of Acetanilide alone.—B.M.J. ii./06,27; L. ii./06,1390.

Effect of other drugs on toxicity of Acetanilide:—

Caffeine is of very little value in combating the heart distress of Acetanilide poisoning. Sodium Bicarbonate has, however, much greater power in this direction; this probably prevents the whole dose of the drug entering at once into the blood. The toxicity of Acetanilide is increased by Codeine, Heroine and Morphine. Salicylic Acid and the Bromides do not affect the case one way or the other.—L. i./09,1706; ii./09,1189; P.J. i./09,869:—

Worth Hale found following proportionate toxicities:—

Acetanilide and Sodium Bicarbonate 100.

Acetanilide alone 128.

Acetanilide, Caffeine, and Sodium Bicarbonate 150.

Acetanilide and Caffeine 210.

In experiments upon both warm and cold-blooded animals Caffeine exerted a fairly marked antagonistic effect so far as heart rate was concerned, but it had only a very slight action upon the lessened contractile power of the heart muscle. The antagonism is so imperfect that it is probably of little value in relieving the heart distress of Acetanilide poisoning, despite the popular belief in its efficacy. When given to the intact animal (mice and guinea pigs) it markedly increased the toxicity of Acetanilide. Not only were less than half the minimum fatal doses of each drug separately surely fatal, but in certain experiments even smaller amounts resulted in death, thus proving a complete absence of any antagonistic action, but on the contrary an even greater toxicity than a mere summation of the toxic effects of each drug.—Int. Cong.

Ammonol.

Dose.—5 to 20 (?) grains (0·32 to 1·3 Gm.).

A white powder, containing acetanilide, sodium bicarbonate and ammonium carbonate. Tablets 5 grains. Relieves dysmenorrhœa.

Ammonol Salicylate is a white powder soluble in water about 1 in 50

Antinervin. Reported to be salicylic acid, potassium bromide, and acetanilide.—P.J. 1891,1169.

***Phenalgin.** Said to be 'Phospho-ammonio-phenylacetamide.' *Dose* —5 to 20 grains (0·3 to 1·3 Gm.).

A mixture with antifebrin (50% on the label) as the active base. A white powder soluble in water about 1 in 120 with some residue, as an antipyretic and hypnotic. **Tablets and Gelatin (Hard) Capsules**, 2½ grains. Toxic and has depressing action on the heart.—L. ii./o8,1223.

Acetophenone. *Syn.* HYPNONE. $C_6H_5.CO.CH_3 = 119.16 (120.064 \text{ I. Wts.})$.

Dose.—1½ to 5 minims (0·1 to 0·3 Cc.) in almond emulsion, or with mucilage or syrup and peppermint water, or in **Capsules** containing ½ minim. A colourless liquid, with odour of Bitter Almonds. Insoluble in water, but soluble in alcohol and oils. Used as an hypnotic requires care.

Anilin. *Syn.* MONO-PHENYLAMINE, ANILIN OIL.

$C_6H_5NH_2 = 92.4 (93.066 \text{ I. Wts.})$.

A brownish (when freshly prepared) oily liquid, with Sp. Gr. 1.027. Of burning taste, soluble in alcohol and oils, slightly in water.

At Anilin Colour Works, cyanosis produced in workmen by inhalation of dust, &c.—L. ii./o6,1774.

Antidotes.—Fresh air, emetics, alkaline salt (NaCl) solution, sodium sulphate, artificial respiration, oxygen, bleeding or transfusion.—Murrell.

Anilin-Iodoform.

Dissolve Iodoform 1 in Anilin Oil 10 (by weight).

⑧ **Anilin-Cocaine.**

Dissolve Cocaine (base) 5 in Anilin Oil 100 (weight).

These are employed in aural treatment.

Anilin Sulphate. $(C_6H_5NH_2)_2H_2SO_4 = 282.14 (284.218 \text{ I. Wts.})$.

Dose.—½ to 3 grains (0·032 to 0·2 Gm.)

Has been used for emphysema and asthma; must be used cautiously, as it may cause cyanosis.

Paraphenyldiamine. $C_6H_4(NH_2)_2 = 107.34 (108.084 \text{ I. Wts.})$

Prepared by nitrating Acetanilide and subsequent reduction with tin and Hydrochloric Acid. In white or reddish crystals soluble in water, Alcohol and Chloroform.

This body is dangerous as a hair dye—may produce skin eruptions, eczema, etc., nausea or nervous symptoms, sleeplessness, dizziness, weakness, etc., or impairment of vision.—B.M.J. ii./o9,812.

Few workers liable to be affected with traumatic dermatitis from this substance as it is much used in dyeing.

The only cure when ladies are affected by use of hair dye containing it is shaving the head. If is cheaper than Silver Nitrate hence probably reason of its use by hairdressers.—B.M.J. ii./o9,918.

It may be yet made into a safe hair dye, but it is not stated how. Several combinations are described, but all poisonous.—P.J. ii./o9,535.

Necessity for prohibition of sale, and false descriptions.—L. i./10,66.

Acidum Sulphanilicum. $C_6H_4NH_2SO_3H, 2H_2O (1:4) = 207.62 (209.168 \text{ I. Wts.})$.

Dose.—5 to 10 grains (0·3 to 0·6 Gm.).

In small white crystals, slightly soluble in water. Used in Ehrlich's Diazo Test, now deleted from this work. Iodism removed by daily administration of 15 grain doses of the Acid in 7 ounces of water.—L. i./o9,396.

Has been employed to relieve iodism, catarrh, laryngitis, and otitis. It is analgesic, and is best given as—

Sodii Sulphanilas. $C_6H_4NH_2SO_3Na, 2H_2O=229.5$ (231.16 I. Wts.).

Dose.—5 to 15 grains (0.32 to 1 Gm.).

In white shining scales, easily soluble in water. Useful in acute catarrh. Said to convert the harmful nitrites in the saliva and nasal mucus into innocuous diazo bodies.—L. i./95,49.

Zinci Sulphanilas. *Syn.* *NIZIN.

$(C_6H_4NH_2SO_3)_2Zn. = 406.63$ (409.626 I. Wts.).

White crystals soluble 1 in 7 water, 1 in 250 Alcohol 90% (by our experiments). Solutions 1 in 500 to 1 in 250 are injected in the acute stage of gonorrhœa.

In atrophic rhinitis the recesses of the nasal fossæ packed with strips of gauze in 1 to 2% solution.—L. ii./08,738.

Anthrarobin. $C_6H_4C(OH)CH.C_6H_2(OH)_2=224.38$ (226.08 I. Wts.).

A light brownish powder, darkening with age, obtained by reduction from alizarin. It is a powerful deoxidising agent, soluble in weak alkaline solutions.

Used in psoriasis, 10% ointment, also for tinea tonsurans and other skin diseases.

Acetozone.—A mixture of equal weights of BENZOYL-ACETYL-PEROXIDE, $C_6H_5CO.O.O.COCH_3=178.71$ (180.064 I. Wts.) and an inert absorbent powder (infusorial earth).

Benzoyl-Acetyl-Peroxide is a white crystalline powder melting at 98° F. very slightly soluble in water, also in oils and alcohol; is decomposed by alkalis, and it decomposes organic material. Is antiseptic, deodorant, anæsthetic and diuretic.—L. ii./04,1160. Hydrolyses in presence of water. Should be kept in a dry place. Ointments must be made with mineral materials. Is found useful in small doses in typhoid, dysentery and cholera. Solutions for use may be made by shaking 10 grains of the powder in 20 ounces of water.—B.M.J. i./07,634.

In making solutions, alcohol, glycerin and other organic substances should not be employed.

Excision of tonsils. After treatment consisted in syringing with Acetozone solution. Rapid healing.—L. ii./08,451.

Benzoyl Peroxide, $C_6H_5-CO.O_2.CO.C_6H_5=240.26$ (242.08 I. Wts.) a crystalline compound, melting at 103.5°, prepared by the interaction of 100 of sodium peroxide and 180 of benzoyl chloride, at a low temperature. Soluble slightly in water, more so in alcohol.—C.D. i./06,162; F.N. 1908,34.

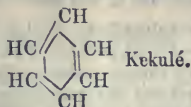
Uses.—For burns and ulcers in the form of a solution in oil (2 to 3%).

***Neuronal.** *Average dose.*—15 grains. *Syn.* BROMO-DIETHYL ACETAMIDE. Contains 40% bromine. Sedative and hypnotic in epilepsy. Induces sleep but is unduly depressing.—L. ii./08,1223.

Probably owes hypnotic action to its hydroxyl groups.—Acts more strongly than is accounted for by the Br. content. May be safely increased up to 22½ grain dose.—B.M.J. i./09,351.

Benzol. (*Off.*). FR. CX.—‘Benzine.’ (Avoid this term for this body.—W.H.M.) *Syn.* BENZENE.

$C_6H_6 = 77.46$ (78.048 I. Wts.)



Dose.—5 to 10 minims (0.3 to 0.6 Cc.), in capsule or oily solution.

A mixture of homologous hydrocarbons obtained from light coal tar oil. Contains about 70% of Benzene and 20% to 30% Toluene. Sp. Gr. 0.880 to 0.888. Crystallizable and purified by sulphuric acid and redistillation.

Uses.—For cough, and whooping-cough, and in influenza. It quickly destroys pediculi capitis or pubis, applied freely; one application generally sufficient.—For seborrhœa, should be brushed on the skin.

It has antiseptic and preservative action on organic matter, *e.g.*, 2 drops preserved 8 ounces of Infusion of Gentian several days in an open vessel.

This body is entirely distinct from **Petroleum Benzine** or **Benzo-line**, obtained in the fractionation of the hydrocarbons in Shale. Petroleum Ether and Benzine (*v.pp.* 522, 523) are used for heating cauteries for nævi, &c.

Benzol is not suitable for this purpose—it burns with a smoky flame. The coal tar product (best spelt Benzene) is better for removing grease stains. A *test* for it is to drop into a sample a few grains of Dragon's Blood. If the genuine article it is at once coloured; if the Petroleum article scarcely any effect.—C.D. i./o8, 464.

Michael Faraday discovered the body in the liquid of coal gas cylinders (as then used) calling it Bicarburet of Hydrogen $C_{12}H_6$. It was renamed Benzole by him and Benzine by the French (who still adhere to the term—*vide* FR. CX.). Benzole would be the best name for this body, ‘ol’ being retained for Alcohols; Benzine, or better Benzin, being kept for the petroleum distillate.—Raubenheimer, C.D.ii./o8, 144. *c.f.* 522 *et seq.*

Dott, however, prefers Benzol or rather Benzene for the Coal Tar body, in fact his views are entirely opposite.—C.D.ii./o8, 367.

Raubenheimer answers—in to us a most convincing way—upholding his previous opinions.—C.D. Dec. 5/o8.

Toluol (Methyl-Benzene) $C_6H_5CH_3 = 91.37$ (92.064 I. Wts.) and **Xylol** (Dimethyl-Benzene) $C_6H_4CH_3CH_3 = 105.28$ (106.08 I. Wts.) have chemical and physical properties allied to Benzol. The 1:2 xylol boils at 141° , 1:3 xylol boils at 139° , 1:4 xylol boils at 138° .

Xylol. *Syn.* **Xylene** unless otherwise specified is a mixture of the three modifications. In *dose* of 5 to 15 minims in capsule rendered less likely to dissolve in the stomach juice has been employed in respiratory affections and in dyspepsia and has also been suggested for use in certain skin diseases consequent on the latter.

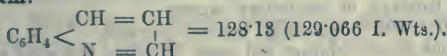
A small quantity of Toluol added to a fresh vegetable infusion has a remarkable preservative action as Benzine above. As solvent naphtha—a mixture of toluol and xylol—obtained in distilling coal-tar is used on a commercial scale as a solvent for indiarubber. No solvent for indiarubber can be said to be rapid, mechanical agitation for days of the finely comminuted material with the solvent being needed.

Toluol-azo-toluol-azo- β -naphthol. *Syn.* SCARLET R.

To regenerate skin injected hypodermically as oily solution gives rise to proliferation of the epithelium. Also prepared in 5 and 8% ointments for use where growth of new skin is desirable.—B.M.J.E.ii./09,12. Pres. 1910,3.

Fluorescent Salts for ulcerated surfaces. 5 to 10% aqueous Eosin solution is painted on the part, which is then exposed to sunlight. Scarlet red is similarly used suspended 5 to 10% in olive oil, soft paraffin, or with zinc ointment. Result in formation of skin is astonishing.—P.J.ii./09,344.

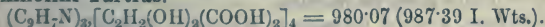
Chinolinum.



Dose.—3 to 10 minims (0.18 to 0.6 Cc.).

A transparent, colourless, strongly-refracting, mobile, oily liquid, with a peculiar odour, soluble in alcohol, but insoluble in water. May be prepared by the oxidation of nitro-benzene and aniline. 1 in 200 solution (containing glycerin 20, and sodium chloride 9.2) is said to be useful for preserving anatomical specimens.

Chinolini Tartras.



Dose.—5 to 15 grains (0.32 to 1 Gm.) in chloroform water, with syrup of orange, or in cachet.

Glistening, white acicular crystals, nauseous in taste, and soluble about 1 in 80 of water. Antiseptic and antipyretic, *e.g.*, in enteric and intermittent fevers, useful in neuralgia.

Chinoline Salicylate. $\text{C}_9\text{H}_7\text{N} \cdot \text{C}_6\text{H}_4\text{OH} \cdot \text{COOH} = 265.14$ (267.114 I. Wts.) is less soluble than the above.

***Chinosol.**— $2(\text{C}_9\text{H}_6\text{NOSO}_3\text{K})\text{H}_2\text{O}$ (?) or $2(\text{C}_9\text{H}_6\text{NOH})\text{K}_2\text{S}_2\text{O} = 540.48$ (544.472 I. Wts.). *Dose.*—1 to 5 grains.

Yellow crystalline powder, readily soluble in water, sparingly in alcohol. A 2% solution checks surface hæmorrhage and for scalds. 1 in 1,000 for the hands.

M.Pt. 175 to 177° C.—P.J.ii./09,342.

Tablets containing 5, 8 and 15 grains are prepared. One of the latter dissolved in a pint of water is said to be equal to Phenol Solution, 1 in 40, as an antiseptic.

A crude form is prepared for veterinary use.

Chemical examination appears to indicate that it is really a simple mixture of potassium sulphate and oxychinoline sulphate. Quite as poisonous for rabbits as Lysol. Subcutaneously it is 100% more poisonous, but when absorbed from the peritoneum it is 50% less poisonous.—Am. Jl. Ph. Mar. '08,149.

In treatment of chronic exzema 1 in 200 or 1 in 300 combined with Lotion Calamine Oleosa (*q.v.*).—B.M.J.i./09,1341.

Gauze, Chinosol, 3% 6 yards pieces.

***Cryogenin.**—*Syn.* META-BENZAMINE-SEMICARBAZIDE. *Dose.*—3 to 24 grains (0.2 to 1.5 Gm.).

A crystalline body soluble about 1 in 100 of water and about 1 in 25 of alcohol 90%. Antipyretic in phthisis and in typhoid.—B.M.J.E. i./05,19. Considered safer and more efficacious in phthisis than pyramidon.—L.ii./09,1812.

***Exalgin.** *Syn.* METHYLACETANILIDE. FR. Cx.

$C_6H_5N(CH_3)CH_3CO=148.01$ (149.098 I. Wts.).

Dose.— $\frac{1}{2}$ to 1 or 2 grains (0.032 to 0.13 Gm.) in pill. In colourless crystals, with a slight saline taste.

Soluble 1 in 60 of water, freely so in alcohol.

Mistura Exalgin. *Dose*—2 to 4 drachms (7 to 15 Cc.). Exalgin'1 Tincture of Orange 4, Syrup of Orange-Flower 12, Water to 96.

Tabellæ Exalgin.— $\frac{1}{2}$ grain (0.032 Gm.) each, with chocolate.

An analgesic, anti-neuralgic, antipyretic (only in unsafe doses). Toxic doses cause paralysis of respiratory organs.

Incompatible (chemically) with salicylic acid.

Eight grains caused fainting and sense of dying, but rapid recovery.—B.M.J. i./98, 1518.

Fluoresceïn.—Resorcin-phthaleïn Anhydride.

Tetraoxyphthalophenon Anhydride.

$C_{20}H_{12}O_5=329.60$ (332.096 I. Wts.).

In yellowish red powder, sparingly soluble in water, more so in presence of an alkali, *e.g.*, Sodium Hydroxide, forming Sodium Fluoresceïn; showing a most intense green fluorescence.

Alcoholic solution, a useful indicator in acidimetry, especially for ammonia.—P.J. i./01, 424.

Liquor Fluoresceïnæ, R.O.H. Fluoresceïn 2 and Sodium Bicarbonate 3 in 100. Useful to diagnose corneal lesions. The ulcers and parts denuded of epithelium take a green colour, which persists for 2 or 3 hours. Loss of substance in conjunctiva is denoted by a yellow colouration.—L. i./91, 447.

'Sterules' of the solution are cleanly in use.

Fuchsine.—Rosaniline Mono-Hydrochloride (principally)

$\begin{matrix} H_2N.C_6H_4 \\ H_2N.C_6H_4 \end{matrix} > C < \begin{matrix} C_7H_6 \\ C_7H_6 \end{matrix} > NH.HCl = 335.21$ (337.650 I. Wts.).

Syn. MAGENTA; ANILIN RED, RUBINE.

Dose.— $\frac{1}{2}$ to 4 grains (0.032 to 0.26 Gm.), in a pill.

Iridescent crystals, forming a deep-red solution for staining *B. tuberculosis*—*Vide* Bacteriological Notes.

Given in renal albuminuria. Must be arsenic-free.

Rosaniline (*Syn.* Roseïne) Acetate.

$C_{20}H_{19}N_3.C_2H_4O_2 + 5H_2O=448.0$ (451.294 I. Wts.).

Dark red crystals soluble in water and in alcohol. It is the most soluble of the rosaniline salts.

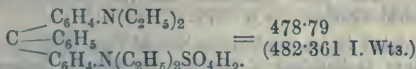
Both these bodies are sometimes called 'Roseïne.'

Lactophenin (LACTYL-PHENETIDIN P. Jap. P. Helv.).

$C_6H_4.OC_2H_5.NH.CO.CH(OH)CH_3=207.59$ (209.13 I. Wts.). *Dose.*—5 to 15 grains (0.32 to 1 Gm.).

A compound of lactic acid and phenetidin, in small white crystals, tasteless, soluble 1 in 330 of water (P. Jap. 1 in 500). Is an analgesic, given with good results in neuralgia, migraine, and articular rheumatism, and as an antipyretic in typhoid, scarlet fever, influenza, and other zymotic diseases and in insomnia of insanity.

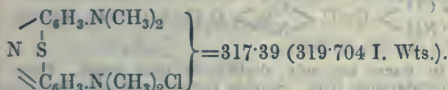
Malachite Green. *Syn.* Brilliant Green 'G'; DIAMOND GREEN 'G.'



must be free from Zinc Chloride. Injections of 1 Cc. of 1 in 2,000 solution in normal saline experimentally in trypanosomiasis.—B.M.J. ii./04,1449,1645; M.A. 906,32,510. Further treatment; Quinine and arsenic preparations.

Induced immunity to further infection.—D.M.W., 1906,21,863.

Methylene Blue.—*Syn.* METHYLTHIONINÆ HYDROCHLORIDUM. U.S. METHYLENUM COERULEUM, P. Helv. FR. CX. (+3H₂O).



Dose.—1 to 4 grains (0·065 to 0·26 Gm.) in Pill, Cachet, or Capsule; or hypodermically, 1 grain.

Dull dark green crystals, forming an intense blue solution in water Soluble in 50.—FR. CX. 1 in 20.

Incompatible with caustic alkalis.

N.B.—Distinguish carefully from the commercial article containing zinc chloride. U.S. provides special tests.

Uses.—Has been recommended as an analgesic, of service in rheumatism, and painful nervous affections; also in malaria, ague, nephritis, and retinitis with varying results. Colours urine blue, and faeces become blue on exposure to air. *This should be mentioned to the patient.*

In cystitis, the 2 grain capsules should be given and the bladder washed out with 2% solution.

In dysentery a rectal injection 1 in 5,000. In chronic suppurative otitis media and conjunctivitis—1 in 500 solution warm is instilled.

In intertriginous eczemas, 3 to 5% solution is valuable.

Chlorinated Soda Solution, *q.v.* will remove stains caused by it.

In gonorrhœa, Hare suggests capsules containing methylene blue 2 grains, oil of sandal wood 3 minims, oleo-resin of copaiba 3 grains, oil of cinnamon 1 minim.

In ulcerative colitis irrigation with methylene blue, 2 to 3 grains in 1 pint has been tried.—B.M.J. i./09,770.

Methylene Blue Test for the permeability of the kidney. 1 Cc. of 1 in 20 solution is injected into the gluteus maximus and the urine is of pale green colour.

Full discussion on the elimination of Methylene Blue after injection.—Thromogen usually appears in about fifteen minutes, the blue in thirty minutes.—L. i./07,711.

Further work on. The method is sufficient to compare the work of the two kidneys. Both the Methylene Blue and Phlordin test are most trustworthy.—L. i./07,795.

Certain organs are stated to become blue while others remain normal colour. The latter are those in which reduction is going on, as Methylene Blue is colourised when reduced.—L. i./07,784.

To determine functional condition of the stomach caoutchouc membrane capsule of 2 grain.—L. i./08,1292.

Indigo or Indigotin (natural) is obtained from the shoots of *Indigofera Tinctoria* (*Leguminosæ*) in India and Java, by maceration with lime and water. The pure substance has the composition $C_{10}H_{10}N_2O_2$. For chemical synthesis, *v.p.* 879.

Indigo Carmine is stated to be the Sodium Salt of Disulphindigotic Acid (which acid substance is Sulphate of Indigo, or Soluble Indigo) prepared by adding gradually Powdered Indigo 1 to Nordhausen Sulphuric Acid 5 or Oil of Vitriol 8,—the vessel being kept surrounded by cold water.

Indigo Soluble. *Fr. Cx.* has *Syn.* SODIUM INDIGO-DI-SULPHONATE, INDIGO CARMIN, CERULEINUM.

$Na. SO_3. C_6H_5 < \begin{smallmatrix} CO \\ NH \end{smallmatrix} > C=C < \begin{smallmatrix} O \\ NH \end{smallmatrix} > C_6H_5. SO_3. Na = 462.88$
(466.224 *I. Wts.*)

Completely soluble in warm but only slightly in cold water. There is obviously a little misunderstanding here. Soluble Indigo as mostly understood is the acid substance not the sodium salt.

The Sodium Salt is formed as a precipitate on neutralising Soluble Indigo with a Sodium Salt. It has to be washed with a solution of the same salt,—to remove excess of Sulphate of Indigo. The product is pressed and dried and is then soluble in water.

Indigo-Carmine Solution 4%.—4 Cc. are injected into the muscles and elimination commences in 20 minutes,—the maximum is in 30 minutes later and ceases in 2 hours. Cystoscopic examination of the urethral openings and the urine gives by depth of colour indication of renal functional power.—*L. i./07,793.*

20 Cc. of 0.4% Solution used, *i.e.*, 0.08 Gm. injected intramuscularly,—Indigo Carmine should appear in the urine in 10 to 12 minutes if functional capacity in order.—*B.M.J. i./08,89.* It is suggested that the 0.08 Gm. should be dissolved in a less quantity of water.—*W.H.M.*

To diagnose peptic activity of the gastric juice a pill of Methylene Blue is enclosed in catgut in the form of a so-called desmoid pocket and swallowed by the patient after dinner. As soon as the catgut is dissolved Methylene Blue escapes and dyes the urine, the time required to effect that result furnishing a measure of the condition of the gastric secretion.

Methylene Blue has also been used in place of Ehrlich's diazo-reaction to indicate the presence or absence of typhoid, measles, smallpox, or phthisis; these diseases cause the urine to assume a green colour when 4 drops of 0.1% solution are added to 4 or 5 Cc. urine.—*M. 1905.*

The Phloridzin Test consists in injecting 5 mgr. of phloridzin (*q.v.*) subcutaneously in 20 to 30 minims of water. Glucose should normally appear in the urine in half-an-hour.—*M.A. 1904,461,462.*

For determining the diseased side of the kidneys this test is frequently more delicate than the others.—*L. i./07,797*

For kidney examination the technique of Caspar's method which consists in the subcutaneous injection of 1 Gm. of 1% Phloridzin Solution and observation as to (a) excretion as sugar by a healthy kidney or (b) non-excretion at all or more slowly and to less extent (diseased) is described. This test as a rule exceeds the carmine blue test in delicacy, especially where pyelitis is present.—*B.M.J. ii./08,998.*

0.01 Gm. of phloridzin injected into the buttock will cause excretion of glucose 10 to 15 minutes afterwards. In extensive disease of the kidney the excretion is delayed or absent. In health it may also be delayed 30 minutes.—*B.M.J.E. ii./09,22.*

In bilharzial disease.—B.M.J., ii./04,1694. Bilharziosis of the vermiform appendix.—L. i./06,072.

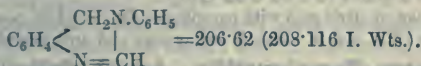
Soudan Red III. AMINOAZOBENZENE-AZO-BETANAPHTHOL.

$C_{22}H_{16}N_4O$. A brown powder for colouring fats, also in histological work for staining.

***Kephaldol.** *Dose.*—30 grains (2 Gm.). A German proprietary said to be made from Puenetidin, Salicylic and Citric Acids. Antipyretic, stated to be free from evil after-effects.

A combination of Phenacetin 50%, Sodium Salicylate 32%, Quinine 4%, Citric Acid 5%.—B.M.J. ii./08,1376. P.J. ii./08,164, says Salicylic Acid 32%, 'and some sodium.'

***Orexine Tannate.** (Old name, Cedrarine.) Phenyl-dihydro-Quinazoline Tannate. P. Jap. The base has formula :—



Dose.—4 to 8 grains (0.26 to 0.52 Gm.) in cachets.

An insoluble greyish powder, somewhat soluble in alcohol 90%. Introduced to act as an appetiser. Useful for sea and railway sickness. **Incompatible** with iron preparations. Tablets 4 grains with chocolate are made.

Phenacetinum. (*Off.*) Acetphenetidinum, U.S. FR. CX.

$C_6H_5O.C_6H_4.NH.COCH_3$ 1 : 4 = 177.8 (177.79 U.S. Wts.) (179.114 I. Wts.). P. Austr.

Dose.—5 to 10 grains (0.32 to 0.65 Gm.), in cachets, tablets, or suspended in mucilaginous fluids. P. Hung. max. single dose 15 grains. Max. during 24 hours 45 grains approx.

An acetyl compound of Phenetidin, $C_6H_4(NH_2)OC_2H_5 = 136.1$ (137.098 I. Wts.) (the ethylic ether of paramidophenol). It is analogous to acetanilide (antifebrin). White, shining, laminar crystals, M.P. 135° C B.P. (134-135° C. U.S.), tasteless, **soluble** sparingly in water, 1 in 20 of alcohol (90%), in sulphuric acid without colour (B.P. and U.S.).

Cold saturated solution treated with bromine water should not become turbid (absence of acetanilide, B.P. & U.S.) 0.1 Gm. boiled one minute with 3 Cc. of sodium hydroxide solution 1 in 2, and the solution cooled and shaken with 5 Cc. of chlorinated soda solution, a clear yellow liquid is produced (absence of acetanilide, U.S.).

Does not liquefy with sodium salicylate, but phenazone does, *e.g.*, Phenacetin 10 grains, Caffeine Citrate, 2 grains, Sodium Salicylate 5 grains, is not incompatible.

Determination of Phenacetin or Acetanilide in complex mixtures.—Am. JI. Ph. April, 1907; P.J. i./07,521.

Uses.—Reduces temperature and soothes pain; rarely causes rash or cyanosis. Successful in rheumatism, neuralgia, migraine, and hysteria. Useful in some cases of pyrexia of phthisis. In first stage of influenza relieves headache and mitigates aching of limbs.

Doses of 4 to 8 grains reduce temperature in cases of pyrexia, but effects are only of short duration.

In broncho-pneumonia, if any coal tar body is ordered, this should be selected, 1 to 3 grains every 2 to 4 hours.—M.P.J. Jun. 16/09,601.

Useful to control pains in tabes dorsalis.—L. i./10,355.

Effervescent Phenacetin.

Dose.—1 drachm (4·0 Gm.) or more.

In two strengths, 5 and 10 grains in 1 drachm respectively.

Tablets, 4, 5 and 10 grains. Also 4 grains with Caffeine 1 grain, also $2\frac{1}{2}$ grains with Sulphonal $2\frac{1}{2}$ grains. *Dose.*—1 or more.

Phenacetinum cum Caffeina Effervescens.

Dose.—1 to 2 drachms.

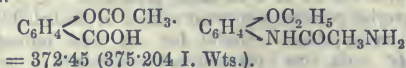
Contains 5% Phenacetin and $2\frac{1}{2}$ % Caffeine Citrate.

***Citrophen.** $\text{C}_3\text{H}_4\text{OH} \left(\begin{smallmatrix} \text{CO NH} \\ \text{OC}_2 \text{H}_5 \end{smallmatrix} > \text{C}_6\text{H}_4 \right)_3, 3\text{H}_2\text{O} = 598\cdot92$ (603·358 I. Wts.).

Dose.—3 to 8 grains (0·2 to 0·52 Gm.).

A combination of citric acid with paraphenetidin, in white powder, soluble in water (1 in 180), less in alcohol, antipyretic and anti-neuralgic.

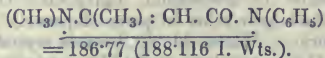
Amido - acet - Paraphenetidin Acetyl - Salicylate. *Syn.* ASPIROPHEN.



Dose.—15 grains (1 Gm.) 5 to 8 times *pro die*. Children 8 grains.

White crystalline powder sparingly soluble. Antipyretic, febrifuge, antirheumatic.—Ph. Zeit. 1906,808; Am. Jl. Ph., 1906,579.—*cf.* B.M.J. i/07,940.

Phenazonum. (*Off.*) U.S. *Syns.* ANALGÉSINE, ANTIPYRINUM, P. Austr. Ph. Ned. PHENYLDIMETHYL-ISO-PYRAZOLONE. Commonly known as ANTIPIRINE.



Dose.—5 to 20 grains (0·32 to 1·3 Gm.) in cachets, tablets, or solution. U.S. *Average dose.*—4 grains.

In white crystalline bitterish scales or powder. Gives a deep red colour with solution of ferric chloride, nearly discharged by diluted sulphuric acid.

Soluble 1 in $1\frac{1}{4}$ of water, about 1 in 1 of alcohol and chloroform, and 1 in 40 of ether.

Flavoring.—Glyl Menthae Piperitæ, Glyl Rosæ, Syl Vanilla; Syrupus Limonis, Syrupus Aurantii.

Uses.—It is an analgesic, febrifuge, and hæmostatic, reduces the temperature of fevers, and the pyrexia of pneumonia, plenrisy, phthisis, and erysipelas. In doses of 4 to 15 grains it relieves locomotor ataxy, migraine, facial neuralgia, rheumatism, and sea-sickness. Hypodermically for lumbago, sciatica, angina pectoris, biliary and renal colic, and dysmenorrhœa. A skin rash of purple patches has at times been observed after its use, and in the past some poisonous effects were reported; the urine is not discoloured.

Peppermint water or essence disguises its taste. It may be administered as an enema if contra-indicated by the mouth.

Antidotes.—Administer brandy or ether, atropine, strychnine or oxygen. Warmth to the feet and body.

Incompatible with spirit of nitrous ether, or other nitrites in the presence of free acid, an apparently inert bluish-green iso-nitroso-antipyrine being formed; also with the cinchona alkaloids, forming a precipitate which is soluble in weak acids.—*Vide* also p. 93.

Further, with phenol, tannic acid, iodine, or mercuric chloride (precipitates); amyl nitrite, ammonia alum, hydrochloric acid, ferric chloride, ferrous and ferric sulphates, cupric sulphate, or nitrous acid, cause discolourations; with calomel, as a highly toxic product may result; sodium bicarbonate decomposes it with production of an odour resembling acetic ether; orthoform produces a pasty mass. In general it is best to administer antipyrine alone.—B. & C.D. ii./o4,559.

Liquefactions occur on rubbing it with butyl-chloral hydrate or sodium salicylate, but solutions with the latter keep without perceptible change if dilute. Liquefaction also occurs on mixing with β -naphthol.

Effervescent Antipyrine contains 5, 10 or 15 grains in a drachm.

Dose.—One teaspoonful or more.

Injectio Antipyrin Hypodermica.—1 grain contained in 2 minims.

Dose.—8 to 30 minims (0.48 to 1.8 Cc.). Sterules, Hypodermic contain 4 grains (0.26 Gm.). The pain it causes may be lessened by the addition of cocaine, as in—

Ⓐ **Injectio Antipyrin et Cocainæ Hypodermica**, containing 1 grain of Cocaine Hydrochloride in 150 minims of above. **Dose.**—8 to 30 minims (*vide* also Liquor Cocainæ et Antipyrin).

Ⓑ **Sterules, Hypodermic** contain 4 grains Antipyrine with Cocaine Hydrochloride $\frac{1}{10}$ grain. The latter may be increased.

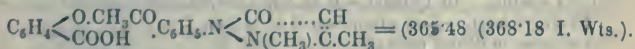
Tablets of Antipyrine contain 2½ and 5 grains each. **Dose.**—1 to 4 or more. Also 3 grains and Caffeine 1 grain.

Chorea may be relieved as also the pains of locomotor ataxy, and its local use in solution may stop epistaxis.

In whooping-cough, as sedative in gastro-intestinal irritation in children, and in enuresis—small doses.—M.A. 1908,5.

In ordinary cases of tabes dorsalis the pains are usually controlled by Phenazone.—L. i./10,355.

***Acetopyrin.**—*Syn.* ANTIPYRIN ACETO-SALICYLAS.



Dose.—7½ to 15 grains (0.5 to 1 Gm.).

A white crystalline powder, soluble 1 in 160 only of water, but soluble about 1 in 3½ of Alcohol 90%. Analgesic, antipyretic, and anti-arthritis, used in rheumatism, sciatica, hemicrania, influenza, etc., is without injurious heart action.

Acidum Picrolonicum.



=262.26 (264.104 I. Wts.).

Is allied to Antipyrin (compare formula).

Precipitates almost all alkaloids yielding insoluble salts: picrolonates, e.g., Morphine picrolonate $\text{C}_{17}\text{H}_{19}\text{NO}_3\text{.HN (C}_{10}\text{H}_7\text{O}_5\text{N}_3\text{)O}_2$.

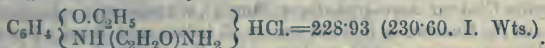
Melting point of the precipitates is high which may be used as proof identity and purity.—Am. Jl. Ph. Feb./08,69.

***Ferropyrin.** $\text{Fe}_2\text{Cl}_6 \text{ 3(C}_{11}\text{H}_{12}\text{N}_2\text{O)} = 882.65 \text{ (888.808 I. Wts.)}.$

Dose.—3 to 8 grains (0.2 to 0.5 Gm.).

vomiting.—B.M.J. ii./09,1264. In whooping cough a tablet every two hours for children 4 years o.d.—B.M.J.E. i./10,3.

Phenocoll Hydrochloridum, Hydrochloride of Amido-acet-para-phenetidin, a derivative of Phenacetin.



Dose.—7 to 15 grains (0.5 to 1 Gm.).

A white crystalline powder with sharp saline taste. *Soluble* about 1 in 16 of water.

Combined with piperazin in effervescent form (*q.v.*) is specific in rheumatoid arthritis. Also beneficial in neuralgia arising from sudden cold. Also for headaches and pertussis ($\frac{1}{2}$ grain hourly). Successful in malaria; as a prophylactic.

***Salocoll.**—*Syn.* PHENOCOLL SALICYLATE. *Dose*—similar to the latter. Is less soluble. An antipyretic, antineuralgic, and antirheumatic.

Pyoktanin. A trade name for Methyl-Violet. In green crystalline powder, *soluble* 1 in 75 of water, 1 in 20 of alcohol 90%. A mixture of the hydrochlorides of penta and hexa methyl-para-rosanilines, $\text{C}_{19}\text{H}_{12}(\text{CH}_3)_5\text{N}_3\text{HCl} = 390.85$ (393.714 I. Wts.) and $\text{C}_{19}\text{H}_{11}(\text{CH}_3)_6\text{N}_3\text{HCl} = 404.76$ (407.730 I. Wts.). Dilute solutions have been locally injected and applied for malignant growths. A yellow variety of Pyoktanin, an Auramine $\text{C}_{17}\text{H}_{21}\text{N}_3\text{HCl} = 301.48$ (303.666 I. Wts.). *Soluble* 1 in 80 of water and 1 in 105 of Alcohol 90%.

Thallinæ Sulphas.

$[\text{C}_9\text{H}_9(\text{OCH}_3)\text{NH}]_2\text{H}_2\text{SO}_4 + 2\text{H}_2\text{O} = 456.94$ (460.346 I. Wts.). *Dose*.—3 to 5 grains (0.2 to 0.32 Gm.).

In whitish crystals, melting at 212°F . *Soluble* 1 in 7 of water.

Uses.—Is antipyretic internally. Nine grains have proved fatal. Injection of 1 to 2% aqueous solution is useful in gonorrhœa.

Bougies of Thalline Sulphate. Contain 1 or 2 grains in each (gelatin), $2\frac{1}{2}$ or 4 inches long.

'Collapsubes,' with catheter attachment, of Thallin, Ointment 5% with Cocaine Hydrochloride 2% are prepared for the treatment of gonorrhœa.

Antrophores, or spiral spring bougies coated with gelatin, and medicated with 5 (or weaker $2\frac{1}{2}$)% of Thalline, have been used successfully for gonorrhœa. Are recognised in P.G. iv. For others, *vide* Index.

COCÆ FOLIA.

Ⓐ "Coca, any preparation or admixture of, containing 1 or more per cent. of Coca alkaloids.

Ⓑ "Coca, any preparation or admixture of, containing more than 0.1 per cent., but less than 1 per cent. of Coca alkaloids."

History of Coca. The plant originally named "Khoka" meaning "the tree of trees" first became known in Europe through the writings of Garcilaso Inca de la Vega, a student of Peruvian history, who died in 1616. Joseph de Jussieu in 1750 was the first to send specimens of the plant to Europe. —P.J. i./09,28; L. i./09,485,

Cocæ Folia (*Off.*). *Syn.* CUCA.

Dose.— $\frac{1}{2}$ to 2 drachms (2 to 8 Gm.).

The dried leaves of *Erythroxylum Coca* (*off.*) and its varieties (*Linacæ*) FR. CX. Two varieties are met with, North Peruvian or Truxillo variety, *Erythroxylum Coca* var. *novo-granatense* (Morris), of a pale green colour, small and thin, and the Huanuco or Bolivian variety, *E. bolivianum* (Burck), thought to be a distinct species, which are larger, broader, and thicker, and better therapeutically; of a dull olive colour. The characteristic inner curved lines from base to apex are on this more marked.

The leaves contain the crystalline alkaloid Cocaine, *q.v.* A content of 0·5% of this base has been suggested as a standard. They are said to be most active when freshly dried, and are much used by the natives in Bolivia and Peru, miners, travellers, and others.

Much of the Coca coming in now (cultivated in Ceylon, etc.) contains above 1% Ether-soluble alkaloids. A normal average may be taken as 0·5%. —Umney, C.D. ii/o8,492. ii/o9,579.

For new B.P. it has been advised to restrict to Bolivian variety of South American or to Ceylon growth.

C.R. 1208 advises name '*Erythroxylum Coca*' and recommends monograph to be rewritten and that the leaves shall yield not less than 0·5% Alkaloid.

Coca-Chewing Gum is prepared containing in each piece (weighing 45 grains) 2 grains of extract (= about $\frac{1}{75}$ grain of Coca Alkaloids).

Assay of Coca (U.S. 0·5% ether-soluble alkaloids).

10 Gm. of the leaves (in No. 60 powder) is treated with a mixture of chloroform, ether, and ammonia. The percolate (and successive washings with the same mixture) are transferred to a sufficiency of sulphuric acid. Ammonia is added to alkalinity, and the liquid is shaken out with ether in three repeated quantities. The ether solution is then evaporated to dryness, and dissolved in a measured volume of N/10 sulphuric acid, which is finally backtitrated with N/10 potash in the customary manner, employing cochineal and the factor 0·03 to ascertain the percentage of ether-soluble coca alkaloids. (1 Cc. N/10 acid = 0·03 Gm. cocaine approx.) P. Helv. requires 0·7%.

Percolate until exhausted as indicated by Mayer's Reagent and use special tube to avoid transferring ethereal liquid.—Am. Jl. Ph. 1905,463; 1906,455. Cæsar and Lorentz's method.—C.D. 1/o8,21.

Elixir Cocæ.—6 parts are equivalent to 1 of the leaves.

Dose.—1 to 4 drachms (3·5 to 15 Cc.) in water is a palatable preparation. Standardised to 0·075% Coca Alkaloids.

❶ Extractum Cocæ.

Dose.—2 to 15 grains (0·13 to 1 Gm.), in pills or pastils. Made with alcohol 60% standardised to 2·0% Coca Alkaloids, (1 = about 4 of leaves).

❷ Powdered Extract of Coca is supplied commercially, strength 2·5% Cocaine.

❸ Extractum Cocæ Liquidum (*Off.*).

Syn. EXTRACTUM ERYTHROXYLI FLUIDUM, U.S.

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.). 1 = 1 of leaves exhausted with 60% alcohol. Might be reduced to 45 or even 30% alcohol and would be more miscible. P.J. ii/o9,142.

If freed from wax, it is miscible with water and more palatable. A standard of 0·5% of Coca Alkaloids would be desirable. P. Helv. 'at least 0·7% alkaloids.'

Flavoring.—Syl Vanillæ, Glyl Coriandri; Elixir Saccharin.

Ⓐ **Fluidextractum Cocæ, U.S., Dose.**—30 minims. Standard 0.5 Gm. ether-soluble alkaloids in 100 Cc.

In the U.S. assay three extractions should be made with both the ether and the acid liquid. Titrate c. N/20 solutions. C.D. ii./08,493.

Infusum Cocæ.—1 in 50 of boiling water.

Is a refreshing beverage with a slice of lemon.

Ⓐ **Pastillus Cocæ Extracti.**—2½ grains (0.15 Gm.) of the extract in each.

Dose.—One every two or three hours.

Useful for loss of voice due to weakness or relaxation of the vocal cords.

Ⓐ **Vinum Cocæ.**—About 1 of Leaves in 8 of Sherry.

Dose.—¼ to ½ ounce (7 to 15 Cc.) diluted with wine or water. Checks vomiting of irritable stomach.

This is strongly *medicated*; it must contain half a grain of alkaloid in the ounce, or it cannot be sold without a licence. Weaker preparations, containing about 1 in 20 or 30 of a sweet red wine, are sold by wine merchants.

We understand that one well known much advertised brand is made 1 in 16 and calculating on leaves as of 0.5% strength, this would mean ⅙ grain Cocaine in 1 ounce and as the patient may take a wineglassful thrice daily he is taking a grain of Cocaine *pro die*.

U.S. has Fluidextract of Coca 65, Alcohol (U.S.) 75, Sugar 65, Red Wine to 1,000. The sugar is unnecessary. This contains 0.0325% Coca alkaloids and does not of course comply with I.R. Regulations.

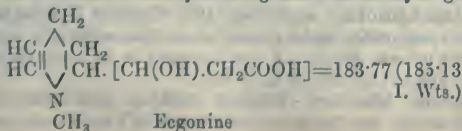
Uses of Coca.—Coca has been praised as a nervine and muscular tonic, preventing waste of tissue, appeasing hunger and thirst, relieving fatigue, aiding free respiration, and as being useful in various diseases of the digestive and respiratory organs; it is recommended for indigestion, gastralgia, gastrodynia, nausea, sickness, distaste for food, is given to relieve pain, nausea, vomiting or discomfort caused by excess in either eating or drinking or by pregnancy, and as a cure for morphine and alcohol craving. In using it for this in America it is said in some cases to have produced 'Coca Craving.' The leaves are sometimes smoked to relieve asthma; and used generally for the stimulant and narcotic effect of tobacco and alcohol.

Ⓐ **Cocaina (Off.).** FR. CX. Syn. METHYL-BENZOYL-ECGONINE.

$C_9H_{13}(CH_3)(C_6H_5CO)NO_3=300.93$ (303.178 I.Wts.)

Dose.—⅓ to ½ grain (0.0032 to 0.032 Gm.), in a pill or tablet.

This important alkaloid, obtained from Coca, was first isolated by Niemann in 1860. It is imported crude from Lima, and purified in Europe. It crystallises in shining monoclinic prisms, and is almost insoluble in water. Constitutionally it is ecgonine with the hydrogen



atoms in the carboxyl and hydroxyl groups replaced by a methyl and benzoyl group respectively; produces an anæsthetic effect on the tongue.

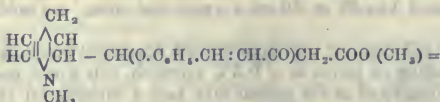
For further details consult Gordon Sharp.—P.J. i./09, 184.—‘Coca and Cocaine studied historically’—*Vide* also *ibid.* p. 356 for the synthesis of the racemic modification corresponding—physiologically and chemically—to natural cocaine by Willstätter.

For a résumé of the chemistry of this and other local anæsthetics, see Fourneau, *Int. Cong.*, 1909.

Soluble 1 in 10 of 90% alcohol, about 1 in 100 to 150 of liquid or soft paraffin; 10 to 20% of olive oil will assist solubility, freely so in chloroform, ether (about 1 in 4), oil of cloves, and many other volatile oils, and 1 in 10 of castor, and other fixed oils, 1 in 2 of anhydrous lanolin (warmed); 1 in 80 of petroleum spirit. Almost insoluble in water. Insoluble in glycerin.

A Cocaine Salt in solution may be estimated by precipitating Cocaine periodide with decinormal iodine.—P.J. i./01, 553, 602; ii./01, 223, 254.

The four alkaloids Cocaine, Truxilline $C_{11}H_{23}NO_4 = 326.75$ (329.194 I. Wts. (previously called *Cocamine* or *Isatropylcocaine*), Cinnamyl-cocaine



326.75 (329.194 I. Wts.), and Tropa-cocaine $C_{17}H_{19}NO_4 = 317.35$ (324.162 I. Wts.) are known to exist in coca leaves.

Cocaine, truxilline and cinnamyl-cocaine being ecgonine derivatives yield ecgonine, acids, and methyl alcohol on hydrolysis. This fact is of importance commercially as the amorphous residue remaining after extracting as much as possible of the crystalline cocaine can be converted into ecgonine, and this by treatment with benzole anhydride and methyl alcohol can be converted synthetically into cocaine.

Although formerly care was taken in the extraction to preserve the Cocaine now-a-days manufacturers rely on the ecgonine content. After isolation in the crude the ‘Cocaine’ is treated so to reintroduce the methyl and benzoyl group. Process for ecgonine estimation has been devised.—*Am. Jl. Ph.* Feb. ’08. p. 74.

Methods of assay.—P.J. ii./03, 784; C.D. ii./03, 800; P.J. ii./05, 724.

Suppositories, bougies, buginaria and pessaries are sometimes ordered to be made with Cocaine (base) as it is soluble in fats and oils; in our opinion the hydrochloride is better. The same applies to all alkaloids,—soluble salts should be employed for these purposes.

Antidotes.—Toxic effects are best counteracted by amyl nitrite, nitroglycerin, digitalis, strychnine, or ammonia, with strong coffee by mouth or enema, and ether hypodermically (5 minims). Anaesthesia by chloroform and ether may be required to prevent respiratory spasms.

Toxicology.—Is converted into ecgonine in the organism. Methods of detection.—Y.B.P., 1902, 60.

① **Bougies of Cocaine.** $\frac{1}{2}$ grain (0.032 Gm.) or more, with cacao-butter. Useful in urethral affections.

② **Cocaine-Lanolin**, containing 10% Cocaine Hydrochloride, is a special preparation useful for dental cavities containing hypersensitive dentine prior to filling. A small amount to be carefully sealed in the cavity and left for two or three days.

③ **Cocaine - Menthol - Phenol.**—Equal parts liquefy and form a paste for inserting into tooth cavities; stops the pain almost immediately.

- ① **Cocaine in Clove Oil, 5%.** Relieves toothache and earache.
- ① **Collodium Cocainæ.** 2% in flexible collodion. Allays itching, and is a cure for inflamed chilblains.
- ① **Emplastrum Cocainæ.**—1 dissolved in 50 of melted lead plaster. Useful for intercostal neuralgia, sciatica, tender corns, bruises, &c.
- ① **Nebula Cocainæ Oleosa.**
Cocaine Base 1, Oleic Acid 4, Liquid Paraffin to 20. May be made stronger, but this 5% strength should prove sufficient in most instances. Furthermore 12 grains of the base will dissolve in 1 ounce of almond oil.
In cauterising laryngeal growths a solution of the base in olive oil to anæsthetise the tracheal mucous membrane is useful; it allays the irritating cough so troublesome in these operations.—L ii./07, 1452.
- ① **Oleatum Cocainæ, U.S.** Cocaine 5, Alcohol 5, Oleic Acid 50, Olive Oil *q.s.* to 100. Much less Oleic Acid would do; it has an objectionable odour.
- ① **Oleum cum Cocaina.**
A 2% solution, more or less, if ordered, in almond oil, is mostly used. This is useful for earache. For the eye a 2% solution in **Castor Oil** is used, may be combined with Homatropine (*v.p.* 172); for catheters, a solution in equal parts castor and almond oils is useful, it is viscid.
- ① **Guttæ Cocainæ Oleosæ, St. G. H.** Cocaine 8 grains, Castor Oil 1 ounce.
- ① **Unguentum Cocainæ (Off.).**—Cocaine 1, Oleic Acid, by weight, 4 (1 grain=2 drops), heat gently to dissolve, add Lard 20. Useful where absorption is required, as in facial neuralgia, shingles, eczema, erysipelas, urticaria, and pruritus (R.O.H. has Cocaine 1, Soft Paraffin 50; heat to dissolve).
- ① **Vaselinum Cocainæ.** Is made with Cocaine (base), 1, 2, 4, and 10%. The 1 or 2% are suitable for eye work, and the 4 and stronger percentages are useful for catheterisation, burns, and for intense sensitiveness of parts, pruritus, &c.
- ① **Cocainæ Citras.**
 $[C_{17}H_{21}NO_4]_2C_3H_4OH.(COOH)_3 = 792.48 (798.42 \text{ I. Wts.})$.
Dose.— $\frac{1}{20}$ to $\frac{1}{2}$ grain (0.0032 to 0.032 Gm.).
In deliquescent white crystals; used by dentists.
- ① **Cocainæ Formas.**
 $C_{17}H_{21}NO_4.H.COOH = 346.60 (349.194 \text{ I. Wts.})$.
Dose.— $\frac{1}{20}$ to $\frac{1}{2}$ grain (0.0032 to 0.032 Gm.).
Prepared by combining Cocaine 303 with 46 of pure Formic Acid.
Crystalline needles, *soluble* about 1 in 40 of water, and about 1 in 2 of alcohol 90%. Slightly soluble in chloroform and ether. Insoluble in olive oil or in vaseline.
- ① **Cocainæ Hydrochloridum (Off.).** P. HELV., P. JAP., P. HUNG., P. SVEC., and other Pharmacopœias.

$C_{17}H_{21}NO_4HCl = 337.12$ (339.646 I. Wts.). To be anhydrous.—F.I.*

Off. Dose.— $\frac{1}{20}$ to $\frac{1}{2}$ grain (0.0032 to 0.032 Gm.), but more may be given, in solution, pill, or pastil.

Fr. Cx. has *maximum single dose*, $\frac{3}{4}$ grain; maximum during 24 hours, $2\frac{1}{4}$ grains approx. P. HUNG. Single $\frac{1}{2}$ grain; during 24 hours also $2\frac{1}{4}$ grains approx.

Shining, lamellar crystals, with bitterish taste. One part of Cocaine base = 1.12 of the Hydrochloride.

Soluble 2 in 1 of water, also in alcohol and in glycerin, insoluble in ether, fats, and oils. It will crystallize with 9.5% of water of crystallization, but the anhydrous salt is official.

Incompatible with ammonium carbonate, (soluble in excess), carbolic acid, mercuric and mercurous chlorides. It is also precipitated by borax.†

It should not only be in good crystals, but should, by the following modification of **MacLagan's Test**, yield a distinctly crystalline precipitate of pure Cocaine within three minutes—when 1 grain of it dissolved in 2 ounces of distilled water, and six to eight drops of solution of ammonia, B.P., are added and well stirred. If more than 4% of amorphous alkaloid (principally Truxilline) be present, there will be only a cloudiness. The precipitate re-dissolves after twenty-four hours or more, the Cocaine being converted into methyl alcohol and benzoyl-ecgonine. Truxilline is highly toxic. (CODEX also gives this test and states the same.)

Cocaine in Dental Extractions

(P) Dental Anæsthetic (Martindale) is used as a local anæsthetic for extraction. It contains less than 1% of Cocaine Hydrochloride and Iodine in the requisite chemical combination together with hæmostatics. It is believed to be harmless in action.

Dose.—*The injection is made alongside the teeth to be extracted. The amount used varies with the number of teeth to be removed. In view of the fact that $\frac{1}{2}$ grain of Cocaine should not be exceeded (B.M.J. i./05,168), 50 minims may be considered a maximum. The usual dose may be put at 10 to 25 minims. As much as 120 minims have been employed by dentists without evil effect, but this quantity is not recommended by us.*

On the other hand 1 grain of Cocaine in $\frac{1}{2}$ to 1% solution is considered safe, though a limit dose.—B.M.J. i./07,848. (As much as 20 minims of 10% solution,—10 minims either side of the tooth at 5 minutes interval = 2 grains of Cocaine Hydrochloride approximately was recommended.—B.M.J. i./07,604,—but this must be considered excessive.)

The **Dental Anæsthetic** has been very extensively used without untoward result, excepting the following:—

A case of Cocaine poisoning (alleged) with it was before the Courts in Nov. 1909,—some toxic symptoms having been produced by the injection of 20 minims

*Decomposition due to trace of water on keeping.—Y.B.P. 1907,43.

†When borax and cocaine hydrochloride are prescribed together a weight of Boric Acid equal to that of the borax should be ordered at the same time to prevent precipitation.—Y.B.P. 1903,270.

In dispensing White Precipitate with cocaine hydrochloride in the form of an ointment, dissolve the cocaine salt in a drop or two of water. Rub the white precipitate down with a little almond oil, mix, and add the remainder of the ointment base—e.g., soft paraffin.—Y.B.P. 1903,271.

one day followed by 50—70 minims the next day (= less than a grain Cocaine Hydrochloride in 2 days in all) for the removal of about sixteen teeth. Medical evidence went to show that Cocaine for teeth extraction was dangerous. There was a history of influenza just preceding the dental operation and fatty degeneration of the heart. The injection was made by an unlicensed dental operator. One may bear in mind that the British Pharmacopœia gives $\frac{1}{2}$ grain as an ordinary hypodermic dose.

The Dental Anæsthetic contains nothing of the nature of Adrenalin, but a small dose of the 1 in 1,000 solution may be added at the time of use if excessive hæmorrhage be feared, or it may be injected afterwards in severe operations to arrest primary or secondary hæmorrhage. See also Hæmorrhage, Dental Drugs to arrest. Therap. Index.

Some operators make a practice of spraying the cavity after removal of the tooth, with a little 20 volume Hydrogen Peroxide solution.

A Cocaine ($\frac{1}{2}$ grain in 15 minims for a dose = 1% approx.) and Adrenalin combination (5% of the 1 in 1,000 solution) useful.—B.M.J.i./07,895.

Danger of Cocaine in dental extraction—a general anæsthetic is safer.—B.M.J. i./07,964.

The following injections are recommended by a distinguished Dental Surgeon :—

Cocaine Hydrochloride 3 grains. Solution of Adrenine (1 in 1,000) 1 drachm, Solution of Hamamelis 7 drachms, also Eucaïne 6 grains, Phenol 5 grains, Solution of Hamamelis 1 ounce.—P.J./ii,09,96. No doses stated. 20 minims of the former contain $\frac{1}{2}$ grain Cocaine Hydrochloride.

A Bill before the Departmental Committee at the Home Office, making the administration of either general or local (injected) anæsthetics by other than registered medical men or persons under their immediate supervision, or by a registered dentist in the course of dental surgery, or by a bona fide student acting under his supervision, a punishable offence. Enquiries in 48 provincial towns with an aggregate population of 2,138,100 showed 480 available registered dentists, or a ratio of 1 to every 4,451.4 persons.—B.M.J.ii./09,1283, L.ii./09,1266.

Notes on Tooth Extraction.—Place the fingers in the sulcus between cheek and gum, and stretch the cheek away from the gum sufficiently to render the mucous membrane taut at its attachment or reflection. It is thin and firm enough under moderate traction to be punctured easily, choosing a spot opposite the point of operation at about $\frac{1}{2}$ in. from the jaw, the parts are loose enough to allow 10 or 20 minims to be injected without its escaping after removing the needle. The gum should not be punctured as it is too adherent to the bone, and fluids diffuse in it with difficulty; and with many punctures there is increased risk of sloughing, besides being too painful to some. Complete local anæsthesia is obtained by puncturing thus, and using $\frac{1}{2}$ grain of Cocaine Hydrochloride in 10 minims of lukewarm boiled water. An ordinary needle preferred to the dental short one as the hand blocks the view.—Percy Farnivall, British Journal of Dental Science.

A 1% solution should be used, 15 to 20 minims of which gives the best results. Congestion always follows the use of Cocaine, and in most preparations Adrenalin (which is also vaso-constrictor) is added to prolong the insensibility and localise the anæsthetic. The injection should be made slowly and as few pricks with the needle as possible. Never push the needle too deep, for injury of the periosteum of the bone with the needle point may be one source of trouble. Rapid injection must be avoided, and never inject into any but healthy tissue. If the gum is septic, cleanse round the tooth to be extracted with some antiseptic on cotton-wool. Use a thoroughly sterilised syringe in good working order. In injecting there should be resistance to the pressure on the piston. Reinsert the needle if resistance is not met with. If the fluid goes into the gum too easily, it may be due to passage into loose cellular tissue, and this sometimes causes after-swelling. There should be little danger of cellulitis, sloughing, or necrosis if the above instructions are followed out. Employ an antiseptic mouth-wash, an astringent may be necessary.—C.D.ii./09,734.

***Alvatunder.**—The label on an ounce bottle says :—

“Formulæ :—Cocain Hydro. 5 grains, Acid Carbolic Liq. 1 gtt., Tinct. Iodine Decol. 1 gtt. Solvents *q.s.*” We assume this to refer to 1 ounce, but cannot undertake the responsibility of stating whether this preparation is (H) or (P). It should be noted that the label on the 2 oz. bottle has the same wording.

(H) **Aurinaria Cocainæ Hydrochloridi.**—EAR CONES, contain $\frac{1}{10}$ grain in each with gelatin.

(H) **Guttæ Cocainæ Hydrochloridi, R.O.H.,** 1 in 50. St. M.’s H. has $2\frac{1}{2}\%$. G.N.C. has Cocaine Hydrochloride 9 grains, Chlorbutol 1 grain, Water to 1 ounce.

(H) **Guttæ Cocainæ Cum Adrenina, Gt. Orm. H.**

Cocaine Hydrochloride 5 grains, Adrenin Solution 1 in 1,000, to 100 minims.

(H) ***Injectio Cocainæ Hypodermica (Off.)†**

Salicylic Acid $1\frac{1}{2}$, Boiling Distilled Water *q.s.* to produce 1,000 when cooled, and Cocaine Hydrochloride 100 added. *Dose.*—2 to 5 minims (0.12 to 0.3 Cc.).

Fr.Cx. 1% directed to be heated in the bottle surrounded by boiling water for $\frac{1}{4}$ hour, or in a steriliser at 110°C. for 10 minutes.

A solution up to the strength of 50 % may be prepared in salicylic acid solution of the above strength, which is nearly saturated.

Can Cocaine Hydrochloride Solutions be sterilised by boiling, with impunity?

Statements to the effect that Cocaine would be decomposed in solution on boiling (*c.f.* B.M.J. i./09,783) probably depend on the alkalinity of the glass,—there is no change if silica vessels are used. A temperature of 100°C. on the water-bath in glass vessels causes only the barest trace of decomposition.—P.J.ii./08,36; ii./09,124.

The new edition of the Fr.Cx. evidently disagrees with the statement as to decomposition (*vide* above).

Merck (M.1907) instituted a number of experiments on the subject. Chemical research of a 2% Solution sterilised $\frac{1}{2}$ hour in an autoclave, at 110°C. , or by ordinary boiling for the same length of time, showed that about 0.6% of the alkaloid was damaged. In other words, that the 0.02 Gm. contained in 1 Cc. was spoilt to the extent of 0.0001 Gm.—an amount which is theoretically of no importance. Physiologically (on the eye) the effects obtained with even 0.2% solution when sterilised at 110° and 100°C. were equal to those of similar solutions not sterilised. Traces of Benzoyl-Ecgonine which are formed do not set up

* As the Act is worded at present it could be contended that preparations of Cocaine in any strength are (D).

† **Hypodermic Syringes** are—1. Metal or vulcanite mounted (capacity 15 or 20 minims), with glass barrels. 2. “All glass.” 3. All metal, graduated in 20 minims. 4. Antitoxin capable of thorough sterilisation, capacity 3, 5 and 10 cubic centimetres, in plated metal cases. The tightness of the piston is adjustable. 5. Syringes with bent, blunt needle having wide lumen for injection of sterilised paraffin in plastic operations. The name “Pravaz” is given to Syringes of, as a rule, 1 Cc. capacity. A Pravaz-Syringe does not otherwise deviate from the hypodermic syringes generally in use.—B.M.J.ii./08,779.

irritation, as even a solution 1% Benzoyl-Ecgonine is non-irritant. After 6 months the sterilised solutions were equally efficacious. *Surgeons may therefore use sterilised solutions with perfect safety.*

The subject, before we were cognisant of Merck's results, received our careful attention :—

We supplied S. Stephenson with 2 solutions 2% strength, one boiled with the Cocaine in, and made up to strength again, and the other made with ordinary aseptic precautions, but not boiled with the Cocaine in it. He reports :—"These solutions labelled simply 'A' and 'B,' without any further indication, were tried on 10 eyes belonging to 5 persons. I could make out no difference as regards powers of producing local anæsthesia of conjunctiva and cornea between them. I am decidedly of opinion that such boiling as is sufficient for sterilisation does not impair the anæsthetic action."

① **Hypodermic Tablets** $\frac{1}{10}$, $\frac{1}{8}$, $\frac{1}{6}$, $\frac{1}{4}$, and $\frac{1}{2}$ grain of the hydrochloride in each.

① **Lamellæ Cocainæ, Discs of Cocaine (Off.); R.O.H.**

Discs of gelatin, each containing $\frac{1}{30}$ grain of Cocaine Hydrochloride are for ophthalmic use. These should be prepared in an atmosphere carefully rendered aseptic. Also prepared ① containing $\frac{1}{10}$, $\frac{1}{100}$ and $\frac{1}{200}$ grain in each, and in combination with ① Atropine (v.p.169), ① Homatropine (v.p.172), and ① Physostigmine (v.p.536).

① **Nebula Cocainæ Hydrochloridi, C.L.T.E.**—Cocaine Hydrochloride 48 grains, Saturated Boric Acid Solution 1 ounce.—Crystallises out. W.H.M.

① **Liquor Cocainæ et Antipyrin.**—Cocaine Hydrochloride 5, Antipyrin 5, Phenol 1, Water to 100. Used for painting the interior of the larynx during the operation of thyrotomy, and applied to the nostrils on cotton wool for small operations, e.g., with the cautery.—C. Nourse. Also found useful for general anæsthetic purposes.

① **Pastillus Cocainæ Hydrochloridi.** $\frac{1}{10}$ grain (0.0065 Gm.) in each (or more if ordered). Useful in allaying throat irritation and hoarseness. Also made ① $\frac{1}{15}$ grain with Morphine $\frac{1}{30}$ grain. Useful for coughs.

① **Pastils of Cocaine,** $\frac{1}{80}$ grain, with Antipyrin 3 grains, are prepared. They are useful in the treatment of asthmatic affections.

① **Pilula Cocainæ Hydrochloridi.** $\frac{1}{4}$ grain (0.013 Gm.) in each (or more, if ordered), with milk sugar.

① **'Solubes' Cocaine Hydrochloride*** contain 1 and 5 grains for lotions, also $1\frac{1}{2}$ and $2\frac{1}{2}$ grains. Those weighing $1\frac{1}{2}$ grain produce a 1% solution on dissolving in 2 drachms of water, and those weighing $2\frac{1}{2}$ grains with 1 drachm of water produce 4% solution.

① **Injectio Cocainæ et Nitroglycerini.**

Dose.—Up to 15 minims (0.9 Cc.)=($\frac{1}{2}$ grain Cocaine Hydrochloride).

Cocaine Hydrochloride 5 grains, Nitroglycerin Solution (1%) 10 minims, Sterile Distilled Water to 150 minims.

* **Sprays** for Cocaine Solutions should have fine aperture for the jet, which should be of metal.

Nitroglycerin in this way is valuable in counteracting any evil effects of cocaine.—F.N., 1909 (Modified).

⑩ **'Sterules,' Ophthalmic** are prepared containing Cocaine Hydrochloride solution 10 grains to the ounce (2.3%).

For general purposes ⑩ **Large 'Sterules'** (tube form) are prepared containing 10 minims of Cocaine Hydrochloride Solution 5% and 10% strength, *vide* also Index for **Sterules, Hypodermic**.

⑩ **Hypodermic 'Sterules' of Cocaine Hydrochloride** $\frac{1}{3}$ grain, with Adrenalin $\frac{1}{1000}$ grain are prepared under the designation **Conephrin** for painless dental extraction.—(*c.f.* p. 828).

⑩ **Suppositories and Pessaries** $\frac{1}{2}$ grain (0.032 Gm.), or more. C.H.W. has Suppositorium Cocainæ Vaginale, 2 grains. Cocaine hydrochloride in 2 drachms theobroma basis.

⑩ **Compound Suppository** of Cocaine $\frac{1}{8}$ grain with Morphine $\frac{1}{2}$ grain for many purposes, *e.g.*, painful hæmorrhoids, is useful.

⑩ **Tabellæ Cocainæ**, Cocaine Tablets, $\frac{1}{8}$, $\frac{1}{10}$, $\frac{1}{12}$, and $\frac{1}{20}$ grain with chocolate. The usual dose is $\frac{1}{20}$ grain.

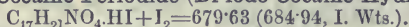
Dose.—1 every quarter-, half-hour or hour, quickly eaten and swallowed Useful for sea-sickness, (chloroform or alcoholic) and sickness of pregnancy.

⑩ **Syrupus Cocainæ**. Hypodermic injection of Cocaine Hydrochloride 22 minims, Syrup of Orange Flower to 1 ounce. *Dose*.—1 drachm = $\frac{1}{4}$ grain.

⑩ **Trochisci Cocainæ Hydrochloridi**. $\frac{1}{12}$ grain (0.0054 Gm.) in each. T.H. has $\frac{1}{10}$ grain.

⑩ **Cocaine Hydrobromide** also ⑩ **Hydriodide** and ⑩ **Sulphate** (deliquescent), are in slight demand by dentists and others. *Dose*—as for the hydrochloride.

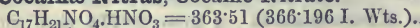
⑩ **Cocaine Periodide (Di-iodo-Cocaine Hydriodide)**.



Black crystals with the same dose has been tried for vomiting in pregnancy.

⑩ **Cocainæ Lactas**. *Dose*.— $\frac{1}{20}$ to $\frac{1}{2}$ grain (0.0032 to 0.032 Gm.), White, non-crystalline mass easily soluble in water. Has been employed as substitute for the hydrochloride, *e.g.*, for injections in painful ulcerations within the bladder.

⑩ **Cocainæ Nitras, Cocaine Nitrate**.



Dose.— $\frac{1}{20}$ to $\frac{1}{2}$ grain (0.0032 to 0.032 Gm.).

In large colourless crystals, readily soluble in water. Is compatible with silver nitrate, and if used previously in solution lessens the pain caused by the latter salt.

⑩ **Cocaine Nitrite** is also prepared for use in an anti-asthmatic spray (*v.p.* 750), but it is not a stable salt.

⑩ **Cocainæ Phenas**. *Syn.* Cocaine Carbolate.

Dose.—In pill, $\frac{1}{20}$ to $\frac{1}{2}$ grain (0.0032 to 0.032 Gm.).

A slightly soluble pasty compound, used by dentists and given for gastralgia.

Strongly antiseptic and may be used on cut surfaces, as its coagulating effect on albumen prevents too rapid action.

Ⓔ **Cocainæ Salicylas**, $C_{17}H_{21}NO_4 \cdot C_6H_4.OH.COOH = 437.94$
(441.226 I. Wts.).

Dose.— $\frac{1}{30}$ to $\frac{1}{2}$ grain (0.0032 to 0.032 Gm.). Is in minute snow-white crystals, slightly deliquescent; it forms a solution which keeps well. *Soluble* 5 in 1 of water, $2\frac{1}{2}$ in 1 of alcohol 90%. In spasmodic asthma, the hypodermic injection of a full dose at the beginning relieves the attack.

Uses of Cocaine and its Salts.

Besides rendering the superficial structures of the eye anæsthetic, Cocaine is a mydriatic, and paralyses the accommodation. When applied to a mucous membrane it blanches the part, and simultaneously anæsthesia occurs. The application of an ointment of the pure alkaloid, made with lard, to a surface will remove the pain of eczema, erysipelas, facial neuralgia or shingles, and the irritation of urticaria or pruritus. Burns and scalds should first be brushed over with a 4% aqueous solution of the hydrochloride, and the pure alkaloid combined with Carron oil (*Linimentum Calcis*), petroleum cerate, or boric acid ointment, afterwards applied on cotton wool or lint. For fissured nipples, or stings and bites of insects an aqueous solution may be applied. The irritability of inflamed mucous surfaces, as in hay-fever, influenza, coryza, bronchitis, spasmodic asthma, laryngitis, and pharyngitis, is much relieved by the spray of a watery solution of a cocaine salt. Spasmodic and painful affections of the vagina, causing dyspareunia and vaginismus, may be minimised by vaginal injections of a quarter of a grain of cocaine in 1 per cent. oily solutions. In dentistry, it is useful in toothache. The pure alkaloid, being only slightly soluble in water, is less liable to be washed away by the saliva. If a little be inserted in the cavity of a carious tooth and covered with a plug of wool soaked in chloroform or mastiche (*v.p.* 234) all pain is obtunded for a considerable time. A strong solution in oil of cloves is also useful. In extraction the Dental Anæsthetic (*v.p.* 260) will be found effectual. A strong aqueous solution of the hydrochloride may be painted on the surrounding gum as an alternative or supplement.

Solutions of cocaine hydrochloride have been employed topically in excision of the tonsils, cauterizing the turbinated tissue of the nose, painting chancre previous to the application of nitric acid or other caustics, opening abscesses, removing polypi, and many cases of iridectomy and operation for cataract, squint, and the removal of foreign bodies from the eye. For the eye sterile aqueous solutions of the hydrochloride of cocaine of mostly 2, or up to 4% are used, and for other purposes from 4 to 20 or even 50%; of the weaker solutions it is necessary to repeat the application three to five times, at intervals of three to five minutes. Normal saline solution may be used as a vehicle for the ophthalmic solution with advantage. No operation should be commenced within at least ten minutes of the first application. Injurious effects, either local or constitutional, rarely follow its use.

Cocaine is a stomachic, useful after excess either in eating or drinking, in distaste for food, in sea-sickness and vomiting of pregnancy or from other causes.

Rectal and prostatic pains are relieved by $\frac{1}{2}$ -grain suppositories. A rectal injection checks diarrhœa and dysentery.

① Camphor 5, Chloral 5, Cocaine Hydrochloride 1, warmed, form an oily liquid which cures toothache.

Cocaine is regarded as a general protoplasmic poison. It stops the movement of spermatozoa and white corpuscles. Has a special affinity for nervous tissue.

For vomiting after narcosis a dose of $\frac{1}{4}$ to $\frac{1}{2}$ grain subcutaneously, but must be given at once.—M./o8,185.

Sea-sickness may be overcome by internal use of the following:—Cocaine Hydrochloride 0.2 Gm., Iodine Tincture 30 drops, Water to 150 Cc.—Dose, 1 tablespoonful 2 to 4 times daily.—M./o7,83.

Whooping Cough often well treated by Cocaine by the mouth, dose being on the basis of 1 grain *ter die* for an adult.—L.i./o9,35.

Also of value by painting the external auditory meatus and membrana tympani with a pigment. ② *Pigmentum Cocainæ et Hydrargyri Perchloridi*. Cocaine Hydrochloride 28 grains, solution of Mercuric Chloride 20 drops, Glycerin 4 drachms, Water 4 drachms, after syringing ears twice or thrice daily with Boric Acid lotion.—L., i./o9,35.

Experience of use of Cocaine in labour (33 cases), Suppositories ($\frac{1}{4}$ grain), tampons soaked in 10% solution useful in various cases, but with exception of 7 cases there was a varying amount of post-partum hæmorrhage difficult to control. This increased tendency to hæmorrhage attributed to the Cocaine.—B.M.J., ii./o9,356.

Sufferers from cancer tolerate large doses of Cocaine. It is questioned whether there is some natural affinity between the two. If diagnosis doubtful, and on administration of Cocaine no improvement, would consider growth not malignant. It may be viewed as a diagnostic agent. In cases cited Cocaine was given internally and externally.—B.M.J., i./o9,274.

For eye work Cocaine is still the sovereign local anæsthetic.—M.1907.

For hay fever, Tilley warns against its use—may quickly generate Cocaine craving.

Local Infiltration Anæsthesia is produced by solutions of cocaine (and eucaïne, *q.v.*) used by subcutaneous injections made along the lines of proposed incisions, and then into deeper parts before cutting them, and into the sheaths of nerve trunks to annul sensation in parts of limbs, &c. Its action commences in three minutes, increases for ten to twenty minutes, and mostly disappears within half an hour. The anæsthesia may be prolonged by applying an Esmarch's bandage when possible above the site of injection; this has also the advantage of lessening the risk of toxic symptoms, as the delay of cocaine (and eucaïne) in the tissues renders it innocuous, either by fixing it there or destroying it locally. Cocaine and Adrenalin have been used together—the addition of the Adrenalin (*q.v.*) arresting the bleeding. (Steriles of the two combined are prepared.)

For infiltration a 0.01% solution of Cocaine with 3 to 5 drops of Adrenalin solution 1 in 1,000 to each 100 Cc. is sufficient.

The use of Cocaine and Adrenalin has been advocated for anæsthetising the urethra by swabbing with a plug of cotton wool soaked with 1 Cc. of a 1% solution of Cocaine Hydrochloride to which 3 drops of a 1 in 1,000 solution of Adrenalin have been added.

10 Cc. of 1 in 200 Cocaine Hydrochloride Solution with 10 minims of Adrenalin Solution 1 in 1,000.—B.M.J.E. ii./o4,60.

Lumbar Puncture Anæsthesia.—Anæsthesia for major operations is produced by intraspinal injections of a $\frac{1}{2}$ % solution, sometimes

with a trace of morphine added; general effects not manifest but local below puncture very marked. Subarachnoid injection produces uterine contraction, and may induce labour.—L. i./01,645. It has been followed by a higher death rate than administration of either Chloroform or Ether.—M.A. 1903.

Bier of Bonn in 1898 first injected Cocaine in this manner into an assistant, and afterwards had the operation performed on himself.

Operations performed always low down, *i.e.*, below the level of the umbilicus, anæsthesia extending upwards, as a general rule, to within two fingers breadth below the mammæ, but three cases of mammary cancer have been removed by the method, and one resection of the elbow for tuberculosis in a patient *æt.* 18—the doses being $\frac{1}{2}$ grain (0.03 Gm.) in the first three, and $\frac{2}{3}$ grain (0.04 Gm.) in the last case. To ensure diffusion Trendelenburg's position was maintained for ten minutes after injection, but anæsthesia was not complete. In some hundreds of cases during seven years not a single case of bad ultimate effects of Cocaine on the nerve centres. Tuffier's method is safe from ten years up to extreme age. Stovaine was also employed with, on the whole, greater advantage. The latter, however, causes urine retention.—L. ii./08,1214; *vide* also Stovaine.

Cocaine Ionisation, *see* Iontophoresis.

Poisoning by Cocaine Hydrochloride 3 grains injected into the urethra in retention of urine.—B.M.J. ii./06,868.

Goitre removed under Cocaine, series of cases.—L. i./07,1143.

A 10% solution on wool to rigid os uteri in first stage of labour produces rapid dilatation.—B.M.J. ii./98,1374.

Ⓐ Tropacocaine.—*Syn.* BENZOYL-PSEUDO-TROPINE.

Obtained from Java Coca. The Hydrochloride $C_8H_{14}NO.C_6H_5CO.HCl$ = 279.54 (281.63 I.Wts.), is freely soluble in water and is a powerful anæsthetic; aqueous solutions keep well; in the eye causes neither ischæmia nor irritation of hyperæmia. 3% solution recommended; anæsthesia quicker than with Cocaine, but more transitory; the action may be kept up by adding a drop from time to time. Mydriasis occurs occasionally but is slight. Injection into gums in large doses only affected pulse for 10 minutes, and did not affect respiration.

Tropacocaine Hydrochloride solutions can be boiled with impunity.

Like Cocaine, it appears to contract dilated blood vessels. Three drops of 5% solution are sufficient for anæsthetising the eye for ordinary purposes, *e.g.*, removing foreign body.—B.M.J. i./09,640.

Infiltration has relieved lumbago and sciatica.—M.A. 1904,614.

Sciatica (severe). Tropacocaine 1 Cc. of 5% solution injected into the neural sac in the lumbar region—the nerve exposed by incision and forcibly stretched with the finger. Complete cure and not the slightest recurrence of pain.—B.M.J. i./08,23.

Ⓟ Tablets (Hypodermic) of Tropacocaine Hydrochloride contain $\frac{1}{2}$ grain.

Intraspinal Anæsthesia by Tropacocaine.

Five to 8% solutions in 1 Cc. dose are employed for intraspinal injection prior to operating in hernia, fistula, hæmorrhoids, and amputations.

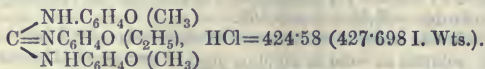
Spinal analgesia, 1,853 cases with Tropacocaine. 2% solution employed, injected whilst patient in a stooping position, but placed in Trendelenburg's position immediately after. In operations on the pelvis and lower extremities dose 1 grain (0.07 Gm.); above that region (0.12 Gm.) in operations on the neck 2 grains (0.14 Gm.). As a rule no undesirable symptoms resulted.—L. i./09, 1349.

Tropacocaine in 1% solution has also been used.

Dose, as average, $1\frac{1}{2}$ grains (0.08 Gm.). The usual practice is to withdraw a few Cc. of the cerebro-spinal fluid before injecting the anæsthetic. By raising the hips the injected solution can be made to ascend the spinal canal. By placing the patient on his side the anæsthesia can be localised. If the anæsthetic be allowed to reach the base of the neck the phrenic nerve is involved, and hence the method was thought impracticable for the head and neck. Jounnesco introduced Strychnine, which acts as powerful stimulant on the respiratory centre in the brain, sufficient to permit of such operations.—Na. Nov. 25/09, p. 99.

For this purpose Stovaine, *vide* p. 273, has been accused of producing injurious effects on the kidneys, from which Tropacocaine and Novocain are more free.—See also B.M.A. Discussion on Spinal Anæsthesia, p. 276.

***Acoine.** Di-para-anisyl-mono-phenethylguanidine Hydrochloride.



A white crystalline powder, soluble 6 in 100 of water. 1% has been used as a local anæsthetic and for subcutaneous injection in eye surgery and 1 in 1,000 for infiltration anæsthesia.

2% solution in normal saline is used as an anæsthetic in dentistry.

Employed as anæsthetic in *Injectio Hydrarggri Cyanidi et Acoin. q.v.*

Incipient cataract is treated with Potassium Iodide Injections 1% (stronger have been employed—B.M.J.E.i./08,80), beginning with $\frac{1}{2}$ Cc., increasing to 1 Cc. A drop of 1% Acoine solution should be added to 1 Gm. of the solution. If pain begins afterwards some drops of Acoine Oil 1% to be instilled over the site of the injection. The oil is probably Arachis Oil.—B.M.J.ii./08,779.

Eucainæ Hydrochloridum. *Syn.* ★EUCAIN HYDROCHLORIDE.

$\text{C}_{15}\text{H}_{21}\text{O}_2\text{N.HCl} = 281.54 \text{ (283.646 I. Wts.).}$

Trimethyl-benzoxypiperidin Hydrochloride.—P. Helv. Saltsurt Beta-Eukain.—P. Dan.

Dose.— $\frac{1}{10}$ to $\frac{1}{2}$ grain (0.0065 to 0.032 Gm.) or more. The hydrochloride of Benzoyl-vinyl-diaceton-alkamine.

Am. Jl. Ph. Mar. 07, p. 113, gives the following formula:— $\text{C}_5\text{H}_7\text{N (CH}_3\text{)}_3\text{(C}_6\text{H}_5\text{COO). HCl.}$

A synthetic compound allied to Cocaine, in small white opaque crystals, **soluble** about 1 in 30 of water (Crystals may deposit on cooling which can be redissolved without harming the salt). 2% solutions are used in ophthalmic work. They may be boiled without decomposing the salt.

Sterules, Hypodermic contain Eucaine Hydrochloride $\frac{1}{4}$ and $\frac{1}{2}$ grain. For dental extraction.

Eucaine Lactate.

$C_{15}H_{21}O_2N.CH_3CHOH.COOH = 334.72$ (337.226 I Wts.). Dose.— $\frac{1}{16}$ to $\frac{1}{2}$ grain. (0.0065 to 0.032 Gm.).

A white crystalline salt.

Soluble about 1 in 5 of water and about 1 in 8 alcohol (90%).

For ophthalmic work and in dentistry employ 2 to 3%; for infiltration 0.1% with Sodium Chloride 0.8%; for regional anæsthesia 2.5%; nose, throat and ear 10 to 15%. Solutions can be boiled.

Slower in action than cocaine, less toxic, and anæsthesia more prolonged, while the heart is not affected, nor the pupil dilated.

For tetanus and poisoning by strychnine 3% solution used.—L. ii./05, 887.

Sciatica cured by injections.—B.M.J.E. i./05, 44.

Urethral Injection. 1 to 2% solutions may be used to relieve pain.

Sterules (Hypodermic) of Eucaine Lactate $\frac{1}{4}$ grain.

Incompatible with salicylic acid. Eucaine salicylate may be thrown out of solution.—P.J. i./05, 267.

Local Infiltration Anæsthesia by **Eucaine** is suitable for very short operations.

Powders are prepared for producing the 2 in 1,000 solution of eucaine for infiltration, containing eucaine 3 grains (0.2 Gm.) and sodium chloride 2 grains (0.8 Gm.) to produce 3½ ounces (100 Cc. approx.) of solution.

The solution is boiled for a few minutes just before use. A special syringe is employed. A small flask of Jena glass marked on the neck for 100 Cc. is convenient for accuracy and for boiling. In operation 50 Cc. or more of the solution is injected all round the region to be dealt with.

Eucaine and Adrenalin combined should be used for the more serious operations.

Professor Barker employed 10 minims of adrenalin solution (1 in 1,000) added to the 100 Cc. of the boiled eucaine solution. This quantity is usually sufficient for an operation, but occasionally as much as 200 Cc. have been used (=6 grains of eucaine, which is considered a maximum dose). The adrenalin produces a localised anæmia, and so checks hæmorrhage. It also restrains the toxic effects of the eucaine. (This solution is isotonic with the blood. The dose of cocaine capable of killing a rabbit is harmless if combined with adrenalin.)—B.M.J. ii./04, 1683.

Removal of thyroid tumours. After injecting 100 to 150 Cc. of the above solution, allow at least $\frac{1}{2}$ hour to elapse before operating. The toxicity of the eucaine is reduced by the adrenalin.—Barker, Pr. Sept. 07, p. 329, *et. seq.* Morphine at the outset may be desirable.

Nebula Eucainæ Hydrochloridi.

Eucaine Hydrochloride 10 grains, Sodium Sulphate 4 grains, Distilled Water to 1 ounce.

Ophthalmic Lamels contain $\frac{1}{100}$ and $\frac{1}{50}$ grain of Eucaine Hydrochloride.

'**Solubes' Eucaine Hydrochloride**, 1 and 5 grain, for producing solutions for injection.

In addition to the above powders for producing infiltration solutions,

'**Solubes'** are prepared, each containing Eucaine 0.05 Gm. and Sodium Chloride 0.2 Gm., to be dissolved in 25 Cc. of sterile water to make the solution.

***Eudrenine**. The name given to a concentrated Solution of Eucaine and Adrenalin. Each Cc. contains Eucaine $\frac{1}{6}$ grain (0.01 Gm.), and Adrenalin $\frac{1}{2000}$ grain (0.03 mgr.). Dose $\frac{1}{2}$ to 1 Cc. hypodermically, e.g., in dentistry, &c. Dilution with 4 volumes of normal Saline Solution, forms the above injection for Local Infiltration Anæsthesia.

Adreucaine is a similar preparation to the above.

Sterules, Hypodermic of this solution contain Eucaine $\frac{1}{2}$ grain and Adrenalin $\frac{1}{2000}$ grain to 8 minims, $\frac{1}{2}$ Cc., for dental and surgical use. For tooth extraction the contents of one (or two) sterules are injected into the gums ten minutes before operating.

Compressed Tablets of Eucaine are also made containing $\frac{1}{10}$ grain (0.0064 Gm.) for internal administration.

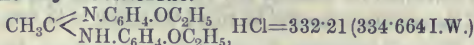
Schleich's Solutions were three (*vide* Schmerzlose Operationen, Schleich, Berlin, 1900). His \textcircled{D} No. II. containing Cocaine Hydrochloride 5, Morphine Hydrochloride 1, Sodium Chloride 10, water 5,000, is believed to have been finally approved of. His \textcircled{D} No. I. contained twice as much Cocaine and \textcircled{D} No. III. one-tenth amount of Cocaine and quarter of the Morphine.

Summing up of anæsthetic methods.—B.M.J.E. II./05, 28.

Unguentum Eucainæ.

Eucaine Hydrochloride 1, Olive Oil 2, Hydrus Wool Fat 7. For pruritus, Menthol 2% may be added.

Holocaine Hydrochloride.



The hydrochloride of para-diethoxyethenyl-diphenylamidine in small colourless shining crystals.

Soluble 1 in 55 of water. **Incompatible** with Alkalis.

As an anæsthetic in ophthalmology. 2 to 5 eye drops of 1% solution—prompt and lasting—but not adapted for hypodermic use.—L. i./97, 1466.

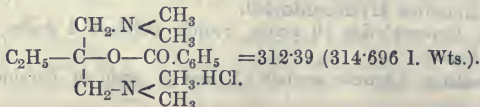
'**Sterules'** of Holocaine Hydrochloride Solution 1% are prepared.

***Nirvanin**.



Diethylglycocoll-para-amido-ortho-hydroxybenzoic methyl ester hydrochloride an anæsthetic in small white prisms readily soluble in water. Is very slightly toxic, 7 grains having been injected without injury. Effect is more prolonged than cocaine. Used mostly in 0.2 to 0.5% solution: 5% in dentistry.

***Alypin**. *Syn.* Benzoyl-tetramethyl-diamino-ethyl-di-methyl-carbinol-Hydrochloride.



Dose (Internally).— $\frac{1}{20}$ to $\frac{1}{2}$ grain (0.0032 to 0.032 Gm.).

Crystalline powder melting at 169° C. *Soluble* in water 1 in 1 and 1 in 4 Alcohol 90%.

Solutions 0.025 to 0.5% or up to 10% (strong solutions keep well, but weak ones may become cloudy; may be sterilised by boiling), efficient in eye work,—2% strength produces insensibility of cornea in sixty seconds. Non-toxic. It produces no mydriasis nor disturbance of accommodation.

For lumbar anaesthesia has been used in $\frac{1}{2}$ to 1 Cc. injections of 2% solution.

Schleich for infiltration has used 0.01 to 0.1% solution with same quantities of Cocaine Hydrochloride in 0.2% Sodium Chloride Solution.

In dentistry 1 to 2 Cc. of 1 to 2% solution sufficient. 1 or 2 drops of Adrenalin solution may be added.

As anæsthetic (10% solution) for use with the galvano-cautery—B.M.J. ii./09, 197.

In sickness and post-operative vomiting internally it acts like Cocaine.

With Chromic Acid and Cobalt Nitrate behaves similar to Cocaine and Eucaine and precipitates with usual alkaloidal reagents and caustic and carbonated fixed alkali and with ammonia.—B.M.J. i./07, 87.

Alypin Nitras. Is compatible with silver nitrate.

Has vasodilator action, not constrictor like Cocaine.—B.M.J.E. ii./08, 4.

Alypin Tablets, $\frac{1}{2}$ grain, dissolved in 1 Cc. water produce a 2% solution suitable for use in dentistry and minor surgery, and for eye work (also made with Suprarenin Borate 1/5,000 grain).

Tablets, $\frac{1}{2}$ grain, dissolved in 1 Cc. produce a 5% solution suitable for local anaesthesia and for nose, ear, throat and urinary tract (also made with Suprarenin Borate 1/2,000 grain).

Tablets, $\frac{3}{4}$ grains, dissolved in 1 Cc. produce a 20% solution for anaesthetising surfaces by local application (also made with Suprarenin Borate 1/2,000 grain).

★**Orthoform.** Methyl-para-amino-meta-oxybenzoate.

$C_6H_3.OH.NH_2.CO_2CH_3 = 153.95$ (155.082 I. Wts.).

'**Orthoform, New,**' now mostly in demand, is the Methyl ester of Meta-amido-para-oxybenzoic Acid (Methyl-amino-oxybenzoate P. Helv.)

Dose.— $1\frac{1}{2}$ to 3 grains (0.1 to 0.2 Gm.) for cancer and painful ulceration of the stomach.

A white crystalline powder, possessing local analgesic and antiseptic properties. Is slightly soluble in water, in alcohol 90% 1 in 7, and forms a Hydrochloride $C_6H_3.OH.NH_2.CO_2CH_3.HCl = 190.14$ (191.580 I. Wts.), soluble about 1 in 9 of water; action of base is more prolonged.

A 10% aqueous solution of the hydrochloride is used, or 10 to 20% with lanoline or paraffin ointment or collodion solution of pure orthoform, or this as a dusting powder may be employed to alleviate pain in sores or burns, but has little action unless there is a breach of surface.

Relieved whooping cough.—M. 01, 45.

Laryngeal tuberculosis relieved by insufflation.—L. ii./06, 1280; L. ii./08, 1029 B.M.J. ii./09, 197.

Ulcerated conditions of pharynx and larynx relieved by insufflations of Orthoform.—B.M.J. ii./09, 197.

Insufflatio Orthoformi cum Resorcin, C.L.T.E. Resorcin 2 drachms, Orthoform to 1 ounce.

★**Rhinoculin Cream.**—An ointment containing a non-poisonous local anæsthetic, useful in hay fever.—L. ii./09, 503.

★**Novocain.** P. Svec. *Syn.* Para-Amido-Benzoyldiethyl-Amino-Ethanol Hydrochloride.

$C_6H_4(NH_2)[CO_2.C_2H_4N.(C_2H_5)_2]HCl = 270.66$ (272.598 I. Wts.).

Dose subcutaneously.— $\frac{1}{2}$ to 1 grain (0.013 to 0.065 Gm.).

A colourless crystalline salt, melting at 150° C. Soluble 1 in 1 of

water. In Absolute Alcohol 1 in 30 nearly (by experiment). A cocaine substitute. 0.25 to 2% solutions are for hypodermic use.

Incompatible with Alkalis, Tannin, Calomel, Potassium dichromate, Potassium Permanganate and Silver Salts. With the latter use Novocain Nitrate. *s.a.*

A powerful local anæsthetic, but is very transient. One drop of a 5% solution produces, when applied to the conjunctiva, an anæsthesia sufficient for superficial operations.—B.M.J.E. i./06,12.

Dislocations reduced by 0.5% Solution injected directly into the joint and around ligaments and periarticular tendons.—B.M.J.E. ii./09,6.

A poor substitute for cocaine.—B.M.J. ii./09,120.

Vein Anæsthesia. Bier injects after employing constricting bandages. The anæsthetic fluid pervades muscles, subcutaneous tissues, nerves and bone. 0.5% Novocain in Normal Saline used. The vein is exposed under Schleich's infiltration anæsthesia *q.v.* before applying the bandages.—B.M.J.E. ii./08,30; B.M.J. ii./09,810.

Anæsthetic action, according to Brandt, is less than that of Cocaine, but Adrenalin (or the synthetic) increases it.—F.N. 1909.

Novocain-Suprarenin.—The following solutions are prepared with addition of Suprarenin—the synthesised active principle of the Suprarenal Capsule.

(A.) FOR INFILTRATION ANÆSTHESIA.—Ampoules contain 25 Cc. each of the following (“1%”) Solution (which is isotonic with the blood)—

Novocain 0.125 Gm., Suprarenin Borate 0.00016 Gm., Sodium Chloride 0.225 Gm., Water to 25 Cc.

(B.) FOR ANÆSTHESIA OF NERVE CENTRES AND LARGER NERVE TRUNKS.—Ampoules contain 5 Cc. each of solution (“2%”) (isotonic).

Novocain 0.1 Gm., Suprarenin Borate 0.00045 Gm., Sodium Chloride 0.045 Gm., Water to 5 Cc.

(C.) FOR MEDULLARY ANÆSTHESIA.—Ampoules contain 3 Cc. of “5%” Solution (isotonic).

Novocain 0.15 Gm., Suprarenin Borate 0.000325 Gm., Water to 3 Cc.

A Solution for medullary anæsthesia is also supplied in Ampoules containing 10 Cc. of “1%” Solution, *i.e.*,—

Novocain 0.1 Gm., Suprarenin Borate 0.00045 Gm., Sodium Chloride 0.045 Gm., Water to 10 Cc.

(E.) FOR DENTAL PURPOSES.—Ampoules contain 1 Cc. of “2%” Solution (isotonic).

Novocain 0.02 Gm., Suprarenin Borate 0.000075 Gm., Sodium Chloride 0.009 Gm., Water to 1 Cc.

NOVOCAIN SUPRARENIN SOLUTION 2%.—A further formula for Dental purposes. 1 Cc. of the Solution contains—

Novocain 0.02 Gm., Suprarenin Hydrochloride 0.000067 Gm., Sodium Chloride 0.009 Gm., Thymol 0.0006 Gm., Water to 1 Cc.

Novocain Tablets corresponding to the “A,” “B,” “C” and “E” Solutions are supplied.

Use of the "A" Solution.—B.M.J. i./07,675.

An account of Novocain.—L. ii./06,1160; B.M.J.E. i./07,55.

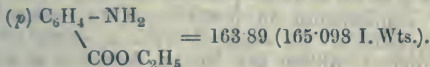
Anæsthetic power equal to cocaine. Toxicity and general destructive power on tissues very much less.—B.M.J. i./09,783.

Infiltration Anæsthesia has been practised by 200 Cc. of 0.5% Solution in Normal Saline—a maximum dose—this is sufficient to anæsthetise the area for most operations. 50 to 75 Cc. is enough for a moderate size elbow. 150 Cc. for a knee.

Novocain with Strychnine is employed for producing spinal analgesia (*see also* Tropicocaine and Stovaine).

Novocain with Mannitol is also used (2% each).

***Anæsthesine.**—*Syn.* ETHYL ESTER OF PARA-AMIDO-BENZOIC ACID.



Dose.—5 to 10 grains (0.32 to 0.65 Gm.), in powder or cachets.

Is almost insoluble in water, soluble 1 in 8 of alcohol 90%, also in Olive Oil, Ether, and Chloroform. Has a numbing taste.

To relieve hyperæsthesia of the stomach and dyspepsia; local insufflations for pharyngeal and laryngeal affections, bougies for urethritis 3 grains, and suppositories 10 grains, for hæmorrhoids. Ointments 10% for burns, eczema, and intertrigo.

Local use relieves the pain of inoperable cancer.—B.M.J.E. ii./03,32.

Pneumococic (and tuberculous) infection of the throat—in a case of, difficulty in swallowing greatly relieved by applications of anæsthesine dissolved in Palm Oil—in form of a spray.—B.M.J. i./09,1527.

***Stovaine.**—*Syn.* BENZOYL-ETHYL-DIMETHYL-AMINOPROPINOL HYDROCHLORIDE. Ph. Ital. $\text{C}(\text{CH}_3)(\text{C}_2\text{H}_5)\text{CH}_2\text{N}(\text{CH}_3)_2\text{O.CO.C}_6\text{H}_5.\text{HCl} = 254.72 \text{ (256.652 I. Wts.)}$.

Dose.—*Per os* and hypodermically $\frac{1}{3}$ to $\frac{2}{3}$ grain (0.02 to 0.05 Gm.) for lumbar anæsthesia. *Dose*, from $\frac{1}{3}$ to $1\frac{1}{2}$ grains (0.02 to 0.1 Gm.).

Maximum dose.—2 grains (0.13 Gm.).—B.M.J. ii./05,95.

In small white crystals. **Soluble** (by experiment) in water about 1 in 13, in alcohol 1 in 3. Anæsthetic, bactericidal and vaso-dilating, comparatively non-toxic. It is stated not to cause nausea, vertigo, cephalalgia, or syncope.

Intraspinal Anæsthesia with Stovaine.

A. Stovaine-Glucose Solutions (*mainly*).

"The ideal solution for anæsthesia should be of such strength as to be of the same osmotic tension as the blood serum. It should neither produce shrinking nor swelling of the blood or tissue cells by osmosis." Such a solution, according to Barker, is the following:

"No. 1." Compound (Barker's)—Stovaine 10, Glucose 5, Water 85. Sp. Gr. 1.0300, but *vide infra*.

Other compounds employed are—

Chaput's Compound.—Stovaine 10, Sodium Chloride 10, Water 80. Sp. Gr. 1.0831, and Bier's Compound.—Stovaine 4, Sodium Chloride 0.11, Epirenin Borate 0.01, Water to 100. Sp. Gr. 1.0058, have also been used.—B.M.J. i./07,665.

To make the dosage clearer in manipulation the Surgeon should note the following approximations:—

0·04 Gm. ($\frac{3}{8}$ grain) of Stovaine=0·4 Cc. (6 minims approx.) of Barker's or Chaput's Solution=1 Cc. (15 minims) of Bier's Solution.

0·05 Gm. ($\frac{3}{4}$ grain) of Stovaine=0·5 Cc. (8 minims approx.) of Barker's or Chaput's Solution=1·25 Cc. (20 minims) of Bier's Solution.

0·06 Gm. (1 grain) of Stovaine=0·6 Cc. (10 minims approx.) of Barker's or Chaput's Solution=1·5 Cc. (25 minims) of Bier's Solution.

0·07 Gm. ($1\frac{1}{8}$ grain) of Stovaine=0·7 Cc. (12 minims) of Barker's or Chaput's Solution=1·75 Cc. (30 minims) of Bier's Solution.

Sterules of all the above are prepared, sterilised at 110° C.

Barker communicated to B.M.J. i./08,244, results of 100 cases of Spinal Anæsthesia. He employed 1 Cc. injections of 5% Stovaine with 5% Glucose—without any Adrenal derivative of any kind. The Sp. Gr. of this solution is 1·0230.

Using this solution—of relatively greater density than that of the Liquor Spinalis (which is 1·0070)—a small dose of the Anæsthetic drug can be employed—the severest operations can be performed. By carefully adjusting the curves of the spine beforehand to suit the purpose in hand either a high or low anæsthesia can be produced by gravitation. In the amputation of a limb, for example, the lower of the two (whilst the patient lies on his side) can be anæsthetised whilst the upper remains entirely unaffected by the drug. The lowering of the head in any operation is not favoured. The best results are obtained by not altering the level of the body after injection, excepting in cases of the labouring class advanced in life, where the spinal column may be almost rigid—here the pelvis may have to be raised. Usually 5 to 10 Cc. of cerebro-spinal fluid is withdrawn before injection. Any alteration of posture may be made providing the relative levels of head and pelvis remain as before.

A large number of cases employing Barker's Stovaine-Glucose Solution. The equivalent of 0·06 Gm. Stovaine found to be sufficient for nearly all purposes. As a rule anæsthesia was established in 5 to 7 minutes for the groins and 8 to 10 for the epigastrium. Consequent phenomena on analgesia are detailed. There is almost always pyrexia (rarely higher than 101° F.). In no case sign of post-operative shock. Stovaine and the method is highly spoken of. The complete paper (by McGavin and Gwynne Williams) should be consulted by those further interested. Longest period of analgesia (using 8 cgr.) was 2 hours, largest total dose 0·135 Gm. Highest analgesia—to clavicles.—Pr. Aug. '09,165.

For results of 5,350 cases of Spinal anæsthesia (with 5 deaths) consult Therapeutic Gazette, Aug. 1907.

Intraspinal anæsthesia with Chaput's Solution. Some remarkable operations. The injection is usually made between the third and fourth lumbar vertebræ. 0·6 Cc. is frequently sufficient, but the needle is so arranged that, if necessary, further injection can be administered during the operation.—B.M.J. ii./07,869.

50 cases with Barker's Solutions—method safe in careful hands.—L. i./08,1058.

50 cases with 15 minims intraspinal doses of Solution composed of Stovaine 5 grains, Glucose 5 grains, water to 100 minims. The severest abdominal operations conducted.—L. ii./08,711.

Tuffier's Solution consists of Stovaine 10% in Normal Saline Solution.—L. i./06,227.

Lumbar puncture for anæsthesia, diagnosis and treatment. About $2\frac{1}{2}$ drachms of the rachidian liquid removed, and 0.02 Gm. and upwards of Stovaine in 10% Solution injected. Anæsthesia lasts $\frac{1}{2}$ hour.—M.P., Oct. 13/09,402.

B. Stovaine-Dextrin Solution (TYRBELL GRAY).

This Solution contains Stovaine 3%_o, with Dextrin, Suprarenin, &c. Employed at the Great Ormond Street Hospital for Sick Children.

"Sterules" 1.5 and 2 Cc. (= 0.045 and 0.06 Gm. Stovaine) of the Solution are prepared.

The diminished toxicity of Stovaine is due to the fact that it is very slowly diffusible. This property is accelerated by administering it with diffusible fluids. Dextrin is a suitable addition, it being readily soluble, and innocuous to the tissues. It appears to play a considerable part in controlling vomiting and retching. It also delays absorption, so that no cases of Stovaine poisoning were observed by its use.

Normal Saline is also used in strength isotonic with cerebro-spinal fluid for it has been shown that though the diffusibility of Dextrin-Stovaine Solution is above that of cerebro-spinal fluid when estimated in relation to water, yet when introduced into cerebro-spinal fluid changes take place which make its diffusibility considerably less than laboratory experiment, indicate.

Pain, even after the most severe operations, so slight that it was rarely, if ever, necessary to give hypnotics. Food, except where contraindicated, can be given immediately after the operation if wanted. No death occurred.—L. ii./09,913,991.

A case of enterectomy under spinal anæsthesia of Stovaine and Dextrin—in an infant seven months old—recovery.—L. i./10,364.

(P) C. Stovaine-Strychnine Solution (JONNESCO).

(i.) For Higher Dorsal Injection.

For ages 1 to 5 years, Stovaine 0.01 Gm., Strychnine Sulphate $\frac{1}{2}$ mgr.

Ages 5 to 15 years, Stovaine 0.02 Gm., Strychnine Sulphate $\frac{1}{2}$ mgr.

Ages 15 years and upwards, Stovaine 0.03 Gm., Strychnine Sulphate $\frac{1}{2}$ mgr.

(ii.) For Dorsal-lumbar Injection.

Ages 1 to 5 years, Stovaine 0.02 Gm. to 0.03 Gm., Strychnine Sulphate 1 mgr.

Ages 5 years and upwards, according to age, Stovaine 0.03, 0.04, 0.06, 0.08, or 0.1 Gm., Strychnine Sulphate 1 mgr.

The higher doses to be used with caution.

All the above to be dissolved in water to 1 Cc. The amount of liquid injected never exceeding 1 Cc. at a time.

Sterules of all the above strengths are prepared.

It should be noted, however, that the original instructions were to make the solution freshly at the time of use by introducing the required amount of the anæsthetic (not sterilised) into a sterilised tube. The Strychnine Solution is made separately, and in it the anæsthetic is dissolved in the

tube. We have been unable to trace any interaction or decomposition in the "Sterules" of the combined solution.

Through fear of the Stovaine interfering with action of the heart and lungs, operations have been confined to parts below the waist line, but the employment of Strychnine in conjunction is believed by Jonnesco to render such operations safe.

Tropacocaine or Novocain are equally efficacious if Strychnine be added.

In cases where anæsthesia of the face, skull or neck is desired Jonnesco, discarding pre-existing fears as to its safety, places his patient, almost directly after the injection, in a horizontal or head down position. The addition of the Strychnine is thought to render the procedure safe. The Strychnine is claimed to act more quickly than the Stovaine, and to stimulate the bulbar centres so effectually that the subsequent paralysing action of the Stovaine cannot do harm.

There are needs for caution in accepting this new anæsthetic method. It may prove of great utility in naval, military and emergency work to render possible operations single-handed.—L. ii./09, 1684.

Tuberculous glands in submaxillary region operated upon by Jonnesco at Seamen's Hospital by aid of 0.03 Gm. Stovaine and 0.0005 Gm. Strychnine Sulphate injected between two vertebrae at base of neck—the 2nd and 3rd dorsal spines in the median line. Patient felt no pain.

Another case was carcinoma of the stomach. 0.10 Gm. Stovaine with 0.001 Gm. Strychnine Sulphate employed, Analgesia lasted 1½ hours, and patient was none the worse.

Another case, a boy of 14, operated on for chronic suppuration in the mastoid antrum. Required general anæsthetic ultimately.—B.M.J. ii./09, 1396, 1542.

British Medical Association discussion on Spinal Anæsthesia.

(1) as to which Anæsthetic the safest. (2) Whether addition of Adrenalin advantageous or otherwise, and (3) whether addition of Strychnine to Stovaine or other anæsthetic is of value.

Chiene is of opinion that Adrenalin is a disadvantage. He has used Tuffier's Solution (*v. antea*) in doses of 1½ Cc. in a child of 5 years, to 8 Cc. in adults.

Stovaine 0.02 to 0.04 Gm. has been used with Strychnine 0.5 to 1 mgr. in a number of cases.

Chiene injects with the patient sitting up with back arched. Others prefer the lateral and the Trendelenburg positions. Spinal anæsthesia has also been combined with Scopolamine-morphine Injection. Utility of this is questioned.

Bier advises local in preference to spinal anæsthesia.

Dudley Buxton discussed the matter from the Anæsthetist's point of view, and points out that general anæsthesia is safer.

Novocain stated to be less reliable than Stovaine.

Another speaker favoured Tropacocaine after having given up Stovaine.

Suggestion was made to use a little weak Cocaine Solution in advance, by so doing spinal anæsthesia is perfectly painless. For nervous patients, or when shock is anticipated.—B.M.J. ii./09, 789.

None of the anæsthetics are entirely satisfactory.—B.M.J. ii./09, 785 *et seq.*

Barker describes method of examining urine and liquor cerebri for Stovaine eliminated (extraction with Ether and testing the Hydrochloric Acid solution of the base with dilute Iodine Solution,—the brick-red precipitate is indicated with so small a quantity as 1 in 150,000. *N.B.*—It is important to drive off the Ether from the Hydrochloric Acid Solution, otherwise precipitate will be given whether Stovaine is there or not). Liquor Iodi more delicate than Mayer's Reagent.

The investigation showed that long after the analgesic effect of Stovaine (1 to 2 hours) had subsided, the base of Stovaine remains in the cerebro-spinal fluid,—even to 24 hours. Stovaine (Hydrochloride) is apparently the anæsthetic substance, which is split up by the alkaline fluid.—B.M.J. ii./09,789 *et seq.*

Untoward Results with Stovaine.

Ocular paralysis has occurred after lumbar anæsthesia with ; Tropacocaine safer.—M.A. 1908,19.

For spinal anæsthesia Stovaine is stated to have deleterious effect on the kidneys, several cases of acute nephritis having been reported as result. Tropacocaine and Novocain (*q.v.*) stated to be better in this respect.—Na. Nov. 25, '09, p. 99.

Gangrene of the skin after 2/3 Cc. of 10% solution with 0.5 Cc. of Adrenalin Solution.—L.ii./08,1229.

Examination of nervous system of 13 persons who died after injection of Stovaine into the lumbar canal.—B.M.J. ii./08,524.

Paralysis after intraspinal injection of 5% solution.—B.M.J.E.ii./08,3.

Spinal Stovainisation. Dose.—0.05 to 0.10 Gm. An excellent mode of inducing anæsthesia. The only serious drawback is urinary retention lasting for one to several days. This only occurs exceptionally with Cocaine.—L. ii./08,1214.

Spinal analgesia—general considerations—pros and cons stated.—Annus Medicus. L. ii./09,1900.

For use of Stovaine with Adrenalin *v.* Adrovaine, p. 829.

Ⓐ Stovaine Solution. For Internal Use. Dose.—For persistent vomiting 5 to 10 minims every 2 hours without either food or drink. Later 3 to 5 minims before a meal :—

Stovaine 15 grains, Atropine Sulphate $\frac{1}{2}$ grain, Morphine Hydrochloride 3 grains, Chloroform Water 1 ounce.

Compresses 5 to 10%, Gargle 0.5% (flavoured).

Glyco-Gelatin Pastils $\frac{1}{2}$ grain (0.0032 Gm.) Stovaine Snuff for coryza 1 to 5% with Bismuth Carbonate and Milk Sugar are used.

Stovaine Ointment for painful wounds and hæmorrhoids :—

Stovaine 3 grs., Adrenalin Solution 90 minims, Paraffin Ointment 1 ounce.—P.J. ii./04,809; B.M.J.E. i./05,92.

In ophthalmic surgery 4% solution is a good local anæsthetic.—“Ocular Therapeutics,” M.P., Aug. 1905.

A number of amino-alkyl esters were prepared with a view to their possibly being suitable for use as Cocaine substitutes. Though several had considerable anæsthetic properties, some were too irritating, and others had relatively high general toxicity.—C.D.ii./08,691.

Ⓐ CODEINA (Off.). U.S. Ph. Ned. Fr. Cx.

$C_{17}H_{18}(CH_3)NO_2, H_2O=314.84$ (317.194 I. Wts.).

Dose.— $\frac{1}{4}$ to 2 grains (0.016 to 0.13 Gm.).

Fr. Cx. has *maximum single dose* $\frac{3}{4}$ grain, maximum during 24 hours 3 grains approximately.

An alkaloid from opium or from morphine, in nearly colourless trimetric

crystals. Soluble 1 in 80 of water (U.S. 1 in 120 at 25° C.), very soluble in diluted acids, in alcohol 90% 1 in 2, in chloroform and in excess of aqueous ammonia, but insoluble in excess of potash solution. It is a methylic ether of morphine,—monomethyl-morphine.

Flavoring.—It has a slightly bitter taste, *vide* Morphine.

Uses.—In moderate doses is a hypnotic, and in small doses frequently it allays cough in phthisis. In diabetes it lessens the amount of sugar in the urine, beginning with a $\frac{1}{4}$ grain thrice daily. A useful sedative in chronic cystitis with enlarged prostate.

For cough following nasal catarrh $\frac{1}{2}$ to 1 grain often gives relief.—Tilley.

Thebaine can be converted into codeine by treatment with bromine—loss of one CH_3 group while a bromine atom attaches itself to the adjacent carbon—this base is reduced with hydrogen forming codeinone, obtainable from codeine by oxidation and capable of conversion into codeine by reduction.—B. & C.D. 1./06,303; Chem.Zeit., 06,253; P.J. 1./06,551.

Ⓟ Codeine and Glycerin Jelly. *Dose.*—1 drachm = $\frac{1}{8}$ grain Codeine approximately.

Codeine 72 grains, Citric Acid 720 grains, Refined Gelatin 6 ounces, Glycerin 36 ounces, Oil of Lemon 1 drachm, Balsam of Tolu and Distilled Water of each *q.s.* Boil the Tolu in water as ordered in B.P. for making syrup of tolu; of the liquor so prepared take 30 ounces; in 25 ounces of it soak the gelatin, heat till it is dissolved, and add the glycerin. In the remaining 5 ounces of liquor dissolve the Codeine and citric acid, add the solution to the above, add also the oil of lemon, stir well together, and pour into bottles to 'set.' Useful in chronic laryngitis, phthisical cough, &c. Also in ulcer of the stomach.

Ⓟ Pastillus Codeinæ, I.H. $\frac{1}{8}$ grain in each.

Ⓢ Pilula Codeinæ Composita.

Codeine $\frac{1}{4}$ grain (increased to 2 grains if necessary), Extract of Nuxvomica $\frac{1}{4}$ grain, Extract of Lettuce $\frac{1}{4}$ grain or more. To make one pill, to be taken two or three times a day, for diabetes.—**Ⓟ Pilula Codeinæ Composita, G.H.**, is Codeine $\frac{1}{4}$ grain, Extract of Cascara Sagrada 2 grains, Kaolin $\frac{1}{2}$ grain, Soap to 4 grains.

Ⓟ Tablets, Compressed, of Codeine $\frac{1}{4}$ and $\frac{1}{2}$ grain.

Ⓟ Trochisci Codeinæ contain $\frac{1}{8}$ grain (0.008 Gm.).

Ⓢ Codeinum Hydrochloricum, P. AUSTR.

$\text{C}_{18}\text{H}_{21}\text{NO}_3 \cdot \text{HCl}, 2\text{H}_2\text{O} = 368.91$ (371.678 I. Wts.).

Dose.— $\frac{1}{4}$ to 2 grains (0.016 to 0.13 Gm.). P. HUNG. has max. single dose $\frac{3}{4}$ grain. In white crystalline powder, soluble in water 1 in 20.

Ⓢ Codeinæ Phosphas (Off.). P. JAP. (FR. CX. + 2H₂O).

$[\text{C}_{17}\text{H}_{18}(\text{CH}_3)\text{NO}_3 \cdot \text{H}_3\text{PO}_4]_2 \cdot 3\text{H}_2\text{O} = 842.2$ (848.482 I. Wts.); or $\text{C}_{18}\text{H}_{21}\text{NO}_3 \cdot \text{H}_3\text{PO}_4 \cdot 2\text{H}_2\text{O} = 430.0$ (U.S. Form and Wts.) (433.234 I. Wts.).

Dose.— $\frac{1}{4}$ to 2 grains (0.016 to 0.13 Gm.). FR. CX. has maximum single dose $1\frac{1}{8}$ grain; max. during 24 hours 5 grains approximately.

In granular snow-white crystals, soluble 1 in 4 of water. Contains 69.05% of anhydrous alkaloid (on salt + 2H₂O), and is most suitable for hypodermic injection, 1 grain in 6 minims.

Ⓢ **Codeinæ Sulphas, U.S.** ($C_{18}H_{21}NO_3)_2H_2SO_4, 5H_2O = 780.66$ (780.65 U.S. Wts.); (786.45 I. Wts.). *Average dose* $\frac{1}{2}$ grain.

Given with advantage in sciatica, $\frac{1}{2}$ to 1 grain.

Ⓟ **Syrupus Codeinæ (Off.).**

Dose.— $\frac{1}{2}$ to 2 drachms (1.8 to 7 Cc.).

Codeine Phosphate 40 grains, Distilled Water $\frac{1}{4}$ ounce; dissolve, and add Syrup 19 $\frac{3}{4}$ ounces.

Ⓟ **Tablets, Compressed, of Codeine Phosphate** contain $\frac{1}{4}$ grain.

Ⓟ **Linctus Codeinæ, G.H.** *Dose.*—1 to 2 drachms.

Syrup of Codeine 1, Syrup of Virginian Prune, 1.

St. Th. H. has same strength of Codeine, but different vehicle.

Ⓟ **Syrupus Picis cum Codeina, v. p.** 554.

Ⓢ **Methyl-Codeine-Bromide. Syn.** EUCODEINE.

$C_{17}H_{19}CH_3NO_3 \cdot CH_3Br = 391.22$ (394.122 I. Wts.).

Dose.— $\frac{2}{3}$ grain (0.05 Gm.). Is less toxic than codeine.

COLCHICUM, U.S.

Syn. MEADOW SAFFRON. COLCHICUM AUTUMNALE. (*Liliaceæ*.) Both Corm and Seeds are (*Off.*).

For the preparation of Colchicum the seed and not the corm should be used.—F.I. C.R. 1903.—Corm should be omitted.

The corms are said to be $\frac{1}{2}$ weaker in quantity of alkaloid.—Y.B./02,17; about 0.3 to 0.8% is found in both.—P.J. i./04,5,248.

Historical Study of Colchicum. The name Colchicum is derived from Colchis, a district in Asia Minor, now known as Mingrelia and Abasia. It is doubtful whether *C. Autumnale* was used by the ancients, but in any case the drug seems to have been rich in Colchicine. The earliest mention of it was in 1650 B.C.—P.J. ii./09,5. L. ii./09,512.

Cowley and Catford found that Acetic Acid was nearly equal to Proof Spirit for extracting Colchicum Corm. and Seeds.—P.J. ii./09,142.

Colchici Cormus, U.S. 0.35% Colchicine.

Average dose.—4 grains.

U.S. Assay—A weighed quantity of drug in No. 60 powder is shaken with a mixture of ether, chloroform, alcohol and ammonia. A measured quantity of the filtrate is then evaporated to dryness and the residue is dissolved in ether. A small quantity of water is added and the ether evaporated. The aqueous solution, after further purification, is treated with chloroform and the chloroform evaporated, the residue dissolved in alcohol and the residue from evaporation of this solvent is again taken up with ether and water. The ether is evaporated and the aqueous solution treated with repeated quantities of chloroform and evaporated, again dissolved in alcohol which is evaporated and weighed.

Professor La Wall wishes the man who invented this process had to use it continually to earn his living.—Am.Jl.Ph., Feb./08,76.

Vide also notes under Fluidextract.

Colchici Semen. U.S. 0.45% Colchicine.

Average dose.—3 grains.

Assay—Method similar to above.

C.R. 1908 provides suggested assay process. Seeds to yield 0.5%.

Ⓟ **Tinctura Colchici Seminum (Off.).** 1 in 5 of alcohol 45%.

Dose.—5 to 15 minims (0.3 to 0.9 Cc.).

U.S. 1 in 10 of alcohol (94.9% volume) and water in proportion of 675 and 250. Standardised to 0.04% Colchicine.

F.I. requires 10% Fr. Cx.—Max. Single Dose—25 minims, and max. during 24 hours 100 minims approx.—and P. Belg. have this strength, as also P. Hung.

According to the C.R. this 10% would have to be 100 Gm. to 1000 Gm. of alcohol 70%. 89 Gm. in 1,000 Cc. would be preferred in Britain, which would be the same strength. The new tincture would be nearly half the strength of the present, and the dose might have to be correspondingly increased.

A standard of 0.1% Colchicine suggested.—P.J. i./04,5.

Larger equivalent doses of the corm (powdered) than of the tincture often better in gout.—B.M.J. ii./04,1460; C.D. ii./05,1052.

50% alcohol is the best solvent for the drug.—Farr & Wright, B. & C.D.i./06,275.

Ⓐ **Tinctura Colchici Florum Recentum** (Squire).

Dose.—10 to 30 minims (0.6 to 1.8 Cc.).

Fresh Colchicum Flowers 2, Alcohol 90% 1. Prepared by 7 days' maceration. Standardised to contain 0.06% Colchicine.

Ⓐ **Vinum Colchici** (Off.). 1 of Corm in 5 of Sherry.

Dose.—10 to 30 minims (0.6 to 1.8 Cc.).

Is given in mixtures with alkali and magnesium sulphate. U.S. has Fluid extract of Colchicum Seed 10, Alcohol 15, White Wine 75.

Flavoring.—It is not objectionable to the taste.

Ⓐ **Liquor Antirheumaticus Compositus**.

Dose.—30 minims (2 Cc.).

Colchicum Wine 15, Spirit of Æther 5, Camphor 2, Compound Tincture of Lavender to 30. A preparation used on these lines in Denmark contains Ammoniacum in addition.

Ⓐ **Extractum Colchici** (Off.). The inspissated juice of fresh Corms.

Dose.— $\frac{1}{4}$ to 1 grain (0.016 to 0.065 Gm.).

U.S. orders to be made from dried corm with acetic acid and water, and to contain 1.4% colchicine. Fr. Cx. extracts seeds with 70% alcohol, not standardised. Max. single dose $\frac{3}{4}$ grain, max. in 24 hours 3 grains approx.

Uses.—The physiological action of colchicum is said to consist in removing the gouty swelling and congested state of the joints by increasing the activity of the circulation, and so eliminating the obnoxious metabolic products of the disease.—M. 02,46.

Frequently given in pill with ipecacuanha and mercury.

To abolish the vomiting and diarrhoea often primarily produced (by increase of peristalsis) a small quantity of atropine may be given with it.

In gout sometimes of value.—L. i./07,1647.

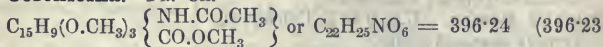
Ⓐ **Powdered Extract of Colchicum** of commerce contains 2.5% colchicine.

Ⓐ **Fluidextractum Colchici Seminis**, U.S.

Dose.—3 minims. Standardised to 0.4% Colchicine.

In the U.S. Assay the aqueous solution of colchicine should be filtered through cotton-wool and washed once with 10 Cc. of petroleum ether to extract the last traces of fat. The alkaloid extracted by chloroform should be entirely soluble in water.—C.D. ii. 08,493.

Ⓐ ***Colchicina**. Fr. Cx.



U.S. Wts.) (399.21 I. Wts.). (Hertel gives formula $\text{C}_{17}\text{H}_{23}\text{NO}_6$.)

Dose.— $\frac{1}{100}$ to $\frac{1}{32}$ grain (0.00065 to 0.002 Gm.) in a pill.

Fr. Cx. has *maximum single dose* $\frac{1}{32}$ grain; max. during 24 hours $\frac{1}{16}$ grain approximately.

* NOTE.—Some would regard this and preparations of Colchicum as non-poisonous.

This active principle is a yellowish crystalline powder, **soluble** in water, alcohol and chloroform, slightly soluble in ether. It is a weak base, most of its salts being decomposed by water. Of use in acute gout, rheumatic gout, asthma, cerebral congestion, and uræmia.

Toxic action. It affects the gastro-intestinal mucous membrane, causing severe pains in the bowels, of the nature of colic, vomiting, diarrhœa, intense thirst, and violent burning in the throat, œsophagus, and stomach. —L. i./o3.1254.

Antidotes.

Evacuate the stomach. Give water and demulcents—white of egg, oil, barley water. Apply heat to feet. Stimulants.

On heating its aqueous solution with 2% Sulphuric Acid it is converted into Colchicine, or demethylated colchicine.

⑩ Colchicine Salicylate.—*Syn.* Colchi-sal.

$C_{22}H_{25}NO_6 \cdot C_6H_4OH.CO_2H = 533.25 (537.258 \text{ I. Wts.})$.

Dose.— $\frac{1}{80}$ grain (0.001 Gm.).

A yellowish powder, soluble in water.

To prepare this salt mix Colchicine 20, with Salicylic Acid 7, moisten with water so as to combine and evaporate carefully.

⑪ Capsules of Colchicine Salicylate.

Contain $\frac{1}{100}$ grain Colchicine dissolved in methyl salicylate. Used in rheumatism and gout. *Dose.*—One every two hours.

COLLODIUM.

Collodion (Off.).—*Syn.* CONTRACTILE COLLODION. P. Helv. without strength.

Pyroxylin 1, Alcohol (90%) 12, Ether (Sp. Gr. 0.735) 36. Keep from naked light. Pure ether answers better. In preparing, solution is more rapid by adding the pyroxylin to the alcohol and afterwards the ether. Acetone is also a good inexpensive solvent, but the disadvantage is that the film is opaque. U.S. has Pyroxylin 4, Ether 75, Alcohol 25.

Fr. Cx.: Pyroxylin 5, 95% Alcohol 20, Ether (0.724 @ 15°) 75.

B.P.C. has Collodium Acetoneum, Pyroxylin 5, Clove Oil 2, Amyl Acetate 25, Benzol 20, Acetone to 100. U.C.H. adopts this. Another formula: Pyroxylin 5, Camphor 1, dissolve in Acetone 90, and make up to 100. Evaporates more slowly than ordinary collodion, but makes stronger film.—Am. Jl. Ph., 1906, 470.

Pyroxylin (dinitrocellulose $C_6H_8(NO_2)_2O_3 = 250.26 (252.084 \text{ I. Wts.})$) is prepared by the action of nitric and sulphuric acids on cotton. It is freely soluble in Methyl Alcohol, Acetone, Amyl Acetate, Glacial Acetic Acid, and Ether mixed with an equal volume of either Ethyl or Methyl Alcohol.—P.J. ii./o6, 657. In making gun cotton (trinitrocellulose $C_6H_7(NO_2)_3O_5 = 294.96 (297.086 \text{ I. Wts.})$, the mixture of acids contains a larger proportion of nitric acid and the time of action is longer. This body is insoluble in a mixture of Alcohol and Ether.

Pyroxylinum, U.S. gives double the molecular formula— $C_{12}H_6(ONO_2)_4O_6 = 500.48 \text{ U.S. Wts.}$

Some comparative experiments which we conducted with a view if possible of improving on 'Collodion,' gave the following:—

EXPERIMENTS.

(1) **Collodium Aceto-Æthericum.**—Pyroxylin 5, Acetic Ether *q.s.* to 100.

(2) Acetone alone in B.P. proportion, *i.e.*, Pyroxylin 10 with Acetone 480.

(3) As No. 2 with 5% Camphor.

RESULTS.

The odour is a slight objection, otherwise the best substitute so far found. Does not pucker the skin anything like so much as the B.P. preparation. Is simple in making. Consistence excellent.

Is not more irritating in use than Collodion (*Off.*) Adheres closely and is transparent.

Too thin. Dries opaque and is not tenacious.

Is too thin. Addition of Camphor has the effect of making the solution more liquid. Same remarks as above.

See *E.P.* xiii. p. 311 for other formulæ.

① **Anodyne Colloid.**—*Syn.* AMYL COLLOID.

Amyl Hydride (*v.p.* 523) $\frac{1}{2}$ ounce, Absolute Alcohol $\frac{1}{2}$ ounce, Aconitine 1 grain, Veratrine 6 grains, Collodion to 2 ounces.

For neuralgia, sciatica, lumbago, all muscular pains, &c. The amyl by its rapid volatilization often produces almost instantaneously the desired result; but should the pain continue the alkaloids can be brought into activity by applying a piece of moist spongio-piline over the collodion film.

***Celloidin.**—Pyroxylin purified by solution in alcohol and ether (in which it is again soluble). Is used to imbed microscopical specimens and in surgery to close wounds. A solution in acetone is called Filmogen. Photoxylin is a similar preparation.

Celloidin Solution.

Celloidin 1, Methylated Ether Sp. Gr. 0.720, $3\frac{1}{2}$, Absolute Alcohol $3\frac{1}{2}$ all by weight.

Rubber Glove Substitute.

Celloidin 5, Ether 48, Alcohol $46\frac{1}{2}$, Castor Oil $\frac{1}{2}$. Dip the hands in the solution—it soon dries, forms a flexible covering.

To remove, wash with equal parts of alcohol and ether.

* 'New Skin' is a somewhat similar preparation.

Collodium cum Oleo Crotonis.

Croton oil 1 part mixed with 7 parts, more or less as required, of Flexible Collodion, forms a useful counter-irritant; a thin layer painted on quickly dries, and its action is limited to the spot to which it is applied.

Collodium Flexile (*Off.*).

Contractile Collodion 48, Canada Turpentine 2, Castor Oil (by weight) 1; makes a more elastic film than Contractile Collodion. U.S. is similar.

Pyroxylin dissolved in acetic ether adheres closely and is pliable. See our experiments under Collodion.

Collodium Elasticum, P. Austr., Ph. Ned. Collodion 98, Castor Oil 2. *FR. CX.* has Collodion (*FR. CX. q.v.*) 95, Castor Oil 5.

Formalised Gelatin has been used instead of Collodion with good result (*v.p.* 335).

Collodium Iodi.

Iodine 1 (more or less if required) to 15 Flexible Collodion, sustains the action of the iodine and the film protects the part. Recommended for ringworm, alopecia, chilblains and frostbite.

Collodium Salicylicum.

Salicylic Acid 1, Flexible Collodion ($\frac{3}{4}$ strength) 5. For use on exposed parts like the next preparation.

Collodium Callosum.

Salicylic Acid 8, Extract of Indian Hemp 1, Flexible Collodion ($\frac{3}{4}$ strength) 60. A rapid and painless solvent for corns and warts. Collodium Acidi Salicylici, L.H. is similar.

Collodium Salicylicum cum Zinci Chlorido.

Salicylic Acid 2, Zinc Chloride 1, Collodion 15. Forms a clear solution. This and the above have proved useful in epithelioma.

(P) Mercuric Chloride to the extent of 1 in 30 or more of Salicylic Collodion may be used to warts.

Collodium Salicylicum et Lacticum.

Salicylic and Lactic Acids, of each 10, Collodion 80. Lactic Acid, being destructive to morbid growths is said to increase its efficacy.

Collodium Stypticum.—*Syn.* Styptic Colloid.

Absolute Alcohol 16, Benzoin $1\frac{1}{2}$. Dissolve, filter, and add Tannic Acid 16, Gm Cotton $1\frac{1}{2}$, Purified Ether to 100. Mix, set aside three days, and decant. Useful in checking various forms of hæmorrhage when it can be brought in contact with the bleeding surface. U.S. has a similar form.

COLOCYNTHIDIS PULPA.**Bitter Apple.**

Dose.—2 to 8 grains (0.13 to 0.52 Gm.).

The dried pulp or pith of the fruit of *Citrullus Colocynthis* (*Cucurbitaceæ*) freed from the seeds. Has a markedly bitter taste, is free from starch, and contains only about 3 to 5 % fixed oil, whereas the seeds contain 15 % or more. Is imported from Smyrna (the best), Austria, France, and Spain.

Antidotes.—(A teaspoonful and a half proved fatal.) Spirit of Camphor 10 drops on sugar or in milk every $\frac{1}{4}$ hour, Laudanum 30 minims (by rectal injection if not able to swallow). Stimulants, demulcent drinks, apply warmth.—Murrell.

Uses.—A drastic cathartic. Dangerous in large doses,—is a frequent ingredient in aperient pills. For formulæ see Index, "Pills."

Extractum Colocynthidis Compositum. (Off.).

Dose.—2 to 8 grains (0.13 to 0.52 Gm.).

Colocynth Pulp 6, Extract of Barbados Aloes 12, Scammony Resin 4, Curd Soap in shavings 4, Cardamom Seeds in fine powder 1, Alcohol 60%, 160. Macerate the Colocynth in the Alcohol 4 days, press out the tincture; distill off the Alcohol and add the Extract of Aloes, Scammony Resin and Soap. Evaporate to a firm Extract and add the Cardamoms at the end of the process.

U.S. has Purified Aloes 50, Colocynth Extract 16, Soap 14, Scammony Resin 14, Cardamom 6, Alcohol 10. In fine powder.

Extractum Colocynthidis. U.S. *Average dose*, $\frac{1}{2}$ grain. Made with Diluted Alcohol (U.S.) from seed-free pulp, and reduced to powder. The yield is about 40 or 50%.—Caspari.

Pilula Colocynthidis Composita (*Off.*).

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Colocynth Pulp 1, Barbados Aloes 2, Scammony Resin 2, Potassium Sulphate $\frac{1}{4}$, Oil of Cloves $\frac{1}{4}$, Water *q.s.*

Pulvis pro Pilula Colocynthidis Composita consists of the above less the water. Is more convenient for dispensing.

Pilula Colocynthidis et Hyoscyami. (*Off.*)

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Compound Colocynth Pill 2, Hyoscyamus Extract 1.

Tinctura Colocynthidis, P.G.

Dose.—3 to 15 minims (0.18 to 0.9 Cc.). (Maximum single dose, 1 Gm.; maximum daily dose, 3.0 Gm.). Strength 1 in 10 alcohol (90%).

Constituents of Colocynth.—L. i./10,662; C.D. i./10,150.

Colocynthin. $C_{56}H_{84}O_{23}$ (Walz) = 1116.2 (1124.672 I. Wts.). The active principle, a glucoside, of Colocynth in the form of an amorphous yellow powder. Has been employed as a hypodermic purgative.

Dose.—15 minims of a 1% solution in Glycerin, approximately $\frac{1}{8}$ grain.

Cucumis Trigonus (*C. pseudo-colocynthis*, Royle). Common in the Bombay Presidency, contains colocynthin or body closely allied.—Naylor, P.J. ii./07,117.

CONDURANGO CORTEX, P.G.

Dose.—In powder, 15 to 60 grains (1 to 4 Gm.).

The bark of *Gonolobus Condurango* (*Asclepiadaceæ*), from Peru. Is bitter and acrid.

Uses.—Alterative, a supposed specific for cancer, syphilis, and dyspepsia, and with hydrochloric acid in enuresis, is a stomachic and stimulant.

Extractum Condurango Liquidum, B.P.C. 1901. 1=1. Bark in 60 powder exhausted with 60% alcohol. *Dose.*—10 to 60 minims.

Alcohol 45% is a good menstruum.—P.J. i./01,747.

Infusum Condurango. 1 in 20 of hot water.

Dose.— $\frac{1}{2}$ to 2 ounces (15 to 60 Cc.).

Vinum Condurango, P. G. 1 in 10 Sherry. (Fluidextract of Condurango 1, Malaga 9, P. Austr.)

Dose.— $\frac{1}{2}$ to 1 ounce (15 to 30 Cc.).

CONIUM.

Hemlock (*Off.*).

French—Ciguë. *German*—Gefleckter Schierling.

Both the dried unripe fruits and the fresh leaves and young branches of *Conium maculatum* (*Umbelliferae*), collected when the fruit begins to form, are official.

Dose.—2 to 8 grains (0.13 to 0.52 Gm.). B.P. does not give.

U.S. *Average dose*.—3 grains. *Fr.Cx.*—*Max. single dose* 4 grains, max. during 24 hours 12 grains approximately.

Leaves may be omitted in next B.P. and fruits used for preparations.

Assay Method, U.S. Standard 0.5% conine. Conium, 10 Gm. in No. 60 powder is shaken with ether, alcohol and ammonia. An equivalent volume of the liquid is decanted into sulphuric acid, and the ether evaporated from this solvent. Alcohol is added, and the ammonium sulphate formed is then allowed to deposit. Sodium carbonate is then added, leaving the liquid, however, distinctly acid. The liquid is concentrated and the fat removed with ether. The solution is made alkaline with sodium carbonate and washed with successive portions of ether. The ether solution is treated with a few drops of hydrochloric acid, and the solution evaporated at a temperature not exceeding 60° C. and the residue weighed—the factor 0.777 for multiplication (conversion of hydrochloride into base) gives ultimately the proportion of conine.

This process is not at all satisfactory. The ammonium sulphate does not separate completely, and the neutralization with sodium carbonate requires great care. The process given in the 1901 "B.P.C. Formulary" is much more satisfactory.—C.D. ii./08,493.

Characters and Color-Reactions of Conine, Conhydrine, Pseudoconhydrine, Coniceine, and a new Conine isomer.

Coniine Hydrochloride, Silky needles soluble 1 in 4 in water, 1 in 5.2 Absolute Alcohol.—P.J., ii./09,34.

Conhydrine stated to have an odor resembling the urine of mice. It is crystalline—either in plates like cholesterine, or in needles.

Pseudoconhydrine (isomeric with Conhydrine) has reactions similar to the latter.

Coniceine is optically inactive. The Hydrochloride is hygroscopic.

Color Reactions have been experimentally obtained with all the above and are fully recorded. Of sixteen colours, two show differences between Coniine and the two Conhydrines, and one shows difference between Conhydrine and Pseudoconhydrine. A green color with Antimony Trichloride distinguishes Coniine from the Conhydrines, the latter giving only a faint yellow.

There is no 'dry' reaction characteristic of Coniine.—P.J., ii./09,34.

Reactions of Coniine alkaloids in solution.—P.J., ii./09,70, *et. seq.*

Solutions of Coniine Salt and Conhydrine Salt may be distinguished by means of Uranium Nitrate. To the solution of the alkaloid add Sodium Carbonate then a little Alcohol and CS₂ and boil, then excess of water, some drops of Uranium Nitrate Solution and shake with Toluol. (a) Red color in Toluol = Coniine. (b) Faint yellow or no color in Toluol = Conhydrine or Pseudoconhydrine. The work is summarised.—P.J., ii./09,103, in which is given a scheme for differentiating Coniine, Nicotine, Lobeline, Sparteine, the Conhydrines, Coniceine, and a new isomer.

Test to distinguish between Coniine, Nicotine and Sparteine.—P.J. ii./05,333.

Conium fruit contains 0.36 to 0.91% of Coniine. A standard of 0.5% is suggested.—P.J. i/04,5. The fruit contains more than the leaves.

Ⓒ Coninæ Hydrobromidum. *Fr.Cx.*

$C_8H_{17}N.HBr = 206.57$ (208.074 I. Wts.).

Dose.— $\frac{1}{4}$ grain, increased to 2 grains (0.02 to 0.13 Gm.).

The hydrobromide of the liquid alkaloid Ⓒ Conine (α -n. Propyl-piperidine) *Syn.* Cicutine, $C_8H_{17}N = 126.22$ (127.146 I. Wts.) obtained from hemlock. It was synthesised by Ladenburg. The base is soluble in alcohol, 1 in 80 in water, also in chloroform and acetone. *Dose*.—Similar to that of the salt. Colourless crystalline prisms, soluble in water, 1 in 2, nearly.

Incompatibility.—Conium preparations are incompatible with alkalis and preparations containing tannin.

Antidotes.—Stomach tube and emetic. Give tannic acid and wash out the stomach again. Stimulants are needed and employ artificial respiration.

Uses.—Conium and conine hydrobromide act as direct sedatives to the respiratory centre; in poisonous doses death is caused by asphyxia. Employed with advantage in all spasmodic affections, especially for whooping-cough and asthma; in neuralgia, epilepsy and as sedative in acute mania.

Ⓟ **Injectio Coninæ Hydrobromidi Hypodermica.** 1 grain in 20 minims. *Dose.*—1 to 3 minims (0·06 to 0·18 Cc.).

Ⓟ **Pessus Coninæ** (Hosp. for Women, Soho Square). Conine $\frac{1}{2}$ minim, Gelatin Mass 20 grains.

Ⓟ **Pilula Coninæ Hydrobromidi.**
Conine Hydrobromide $\frac{1}{3}$ grain (0·02 Gm.) in each.

Ⓟ **Tinctura Conii** (*Off.*).
Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Conium Fruit No. 40 powder, 1 in 5 of Alcohol 70% by percolation. A standard content of 0·1% of Conine is suggested.—P.J. i./04,5.
Might be made with 60% alcohol.—P.J. ii./09,142.

Ⓟ **Extractum Conii Liquidum, B.P.C.**
Dose.—5 to 15 minims (0·3 to 0·9 Cc.).

Conium Fruit 100 in No. 40 powder is exhausted with alcohol 60% containing 1·25% of acetic acid (*Off.*), the last portion of percolate concentrated and mixed with the first 85 previously set aside so as to produce 10 of Liquid Extract containing 1% of alkaloidal hydrochlorides.

Flavoring.—Hardly requires any.

Ⓟ **Fluidextractum Conii, U.S.**
Average dose.—3 minims (0·2 Cc.).

Standardised to 0·45 Gm. Conine in 100 Cc.

Notes on the assay method, *vide* Conium, p. 285,

Ⓟ **Extractum Conii, Fr. Cx. Extrait de Ciguë.** *Dose.*—Maximum single $\frac{3}{4}$ grain (0·05 Gm.) approximately.

A firm Extract produced by extracting the powdered fruits with 70 alcohol at 35° C., evaporating the liquor and treating the residual extract with water, evaporating the aqueous extractive, rejecting the portion not dissolved,

Ⓟ **Succus Conii** (*Off.*). *Dose.*—1 to 2 fluid drachms (3·5 to 7·0 Cc.). Fresh Juice 3, Alcohol (90%) 1. Useful in chorea.

Ⓟ **Unguentum Conii, Conium Ointment** (*Off.*).

Conium Juice 88, evaporated under 140° F. to 11, Hydrous Wool Fat 83. Mix.

Anhydrous Wool Fat gives better results as by the following method:—Evaporate the Conium Juice 2 ounces to $\frac{1}{2}$ ounce weight and incorporate with Anhydrous Wool Fat $\frac{1}{2}$ ounce in a warmed mortar.—C.D. i./05,709.

In place of Succus Conii use an equivalent of Liquid Extract of Conium say 1 part to 9 of Hydrous Wool Fat.—P.J. ii./08,250.

The official ointment does not keep well and total alkaloid varies from 0.01 to 0.06 per cent. The following is a further suggestion:—

Liquid extract of Conium	...	...	...	4.0
Anhydrous Wool Fat	...	...	...	13.0
Soft Paraffin	...	...	...	26.0
Thymol	...	...	...	0.16

Evaporate liquid extract to 1 by weight, and incorporate (1) the wool fat, and (2) the paraffin in which the thymol has been previously dissolved by heat. The finished preparation will contain 0.1 per cent. of the alkaloids of conium-fruit, and 1 in 250 Thymol.—C.D. i./09,111.

Gives relief in pruritus ani, and for painful fissures. B.M.J. ii./08,632.

CONVALLARIA MAJALIS (*Liliaceæ*).

Lily of the Valley.—(Entire plant).

U.S. has dried rhizome and roots.

Two glucosides have been obtained from the plant; Convallarin $C_{21}H_{32}O_{11}$ (Walz) = 641.62 (646.496 I. Wts.) a purgative, dose 3 to 4 grains; and Convallamarin $C_{23}H_{44}O_{12}$ (Walz) = 508.49 (512.352 I. Wts.) a heart tonic, dose $\frac{1}{2}$ to 2 grains.

Convallamarin is a cardiac stimulant and diuretic and has been used in preventing arrest of circulation in chloroform narcosis.

The juice of the plant found to contain 0.45% Convallamarin and 0.12% Convallarin.—P.J. ii./04,967.

Tinctura Convallariæ, B.P.C.

Dose.—5 to 20 minims (0.3 to 1.2 Cc.); 1 of flowers in 8 of Alcohol 60%.

Uses.—An old remedy for dropsy, being a powerful diuretic, and in organic heart and renal affections.

Extractum Convallariæ. An aqueous extract.

Dose.—2 to 8 grains (0.13 to 0.52 Gm.).

Convallaria extract 1 grain with Convallaria powder 1 grain, make a pill.

Fluidextractum Convallariæ, U.S.—Average dose—8 minims. 0.5 Cc.).

1 = 1 of dried rhizome and roots. Flowers preferred to roots, as latter contain little glucoside.—P.J. ii./99,622.

Glyco-Gelatin Pastils of Convallaria contain 2 minims of tincture. They dissolve slowly and are hence very useful for prolonged cardiac action.

COTO CORTEX.

Dose, in powder, 1 to 8 grains (0.065 to 0.52 Gm.) 4 to 6 times a day. Imported from Bolivia. Paracoto bark is exported in place of true Coto bark—N.O. probably *Lauraceæ* or *Monimiaceæ*.

Uses.—For cholera, and especially the diarrhoea of phthisis and night sweats, and for gout and rheumatism. It is rich in resins which give it a pungent taste.

To distinguish true from false Coto bark.—P.J. ii./05,580.

Incompatible with Misturr. Cretæ.

Extractum Coto Liquidum. 1 = 1 of bark.

Dose.—2 to 6 minims (0.12 to 0.35 Cc.).

Tinctura Coto, B.P.C.

Coto Bark, bruised 1, Alcohol (90%) *q.s.* to 10.

Dose.—10 to 30 minims every 2 hours, with mucilage and syrup to suspend.

Mistura Anti-choleraica. *Royal Coll. Phys.*, 1892 (Lii./92,682) Form II.

Aromatic Sulphuric Acid 15 minims, Compound Tincture of Camphor 30 minims, Compound Tincture of Chloroform, Tincture of Coto, of each 20 minims, Syrup of Orange Flower 1 drachm, Peppermint Water to 1 ounce. *Dose.*—1 ounce every 3 or 4 hours. This preparation has been found invaluable. Form I will be found in the Xth Edition p. 105.

(P) Diarrhœa and Cholera Mixture. (Board of Health.)

Aromatic Confection 9 grains, Aromatic Spirit of Ammonia 9 minims, Tincture of Catechu 30 minims, Compound Tincture of Cardamoms 18 minims, Tincture of Opium 3 minims, Chalk Mixture to 1 ounce (= 1 dose).

The following (C.D. ii./07,357) are also of great benefit for diarrhœa and are used in Norway :—

(P) Mixtura Thielemanni. Syn. TINCTURA ANTICHOLERICA THIELEMANI. THIELEMAN'S KOLERADRAABER.

Average Dose.—30 minims (1·8 Cc.). Dissolve Peppermint Oil 3 in Alcohol 22 and add to Sydenham's Laudanum (Vinum Opil Crocatum *q.v.*) 10, Ipecacuanha Wine 25, Tincture of Valerian (1 in 5 of Dilute Alcohol) 40.

Tinctura Anticholeraica Conradi.—CONRAD'S KOLERADRAABER.

Dose.—Over 20 years, 40 drops; over 5 years, 1 drop for each year. Must not be given to a child under 5 years.

(P) Tincture of Opium (as Off.) 1, Tincture of Cascarilla and Camphorated Spirit of Ether of each 2, Bitter Tincture of Rhubarb 5.

[Æther Spirituosus Camphoratus is Camphor 3, Spirit of Ether (1 in 4) 17].

Cotoin.

Dose.— $\frac{1}{2}$ to 2 grains (0·032 to 0·13 Gm.) every 2 or 3 hours in pill or diluted mucilage.

A bitter principle, in yellow crystalline powder, slightly soluble in water, soluble in alcohol. Melting point, 130° C. The dust is irritating to the nostrils.

Fortoin.—*Syn.* METHYLENEDICOTOIN.

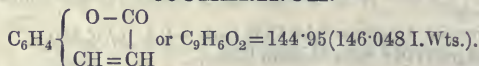
Dose.—4 grains (0·25 Gm.).

A formaldehyde compound of Cotoin. A crystalline powder insoluble in water, sparingly soluble in alcohol. Soluble in chloroform. Is decomposed by alkalis. Used for dysentery and phthisical diarrhœa.

Paracotoin. From Paracoto Bark.

Dose.— $1\frac{1}{2}$ to 3 grains (0·01 to 0·02 Gm.) in chronic and acute stomachic catarrh and Asiatic cholera.

Slightly soluble in alcohol and water.

COUMARINUM.

ORTHO - OXYCINNAMIC ANHYDRIDE. COUMARIC ANHYDRIDE.

A neutral crystalline principle with aromatic odour and burning taste,

may be obtained from Tonka or Tonquin beans, the fruit of *Coumaruna odorata*, and is found in the Woodruff, but is now manufactured synthetically from Salicylic Aldehyde by the action of Acetic Anhydride in presence of Sodium Acetate.

Soluble in alcohol, ether and oils, but not to any extent in water. Sublimes unchanged. One part will disguise the odour of 50 of iodoform.

Vide also Acidum Coumaricum.

Ⓒ CREOSOTUM (Off.). FR. CX.

Kreosotum, P. Austr. P. Helv. P. Dan.

Dose.—1 to 5 minims (0·08 to 0·3 Cc.), increased to 30 or even 60 minims, in capsules, or in cod liver, almond, or olive oil, or emulsified.

Soluble in alcohol, chloroform, ether, glacial acetic acid, fats and oils, and 1 in about 150 of water.

Two kinds of genuine Creosote are met with in commerce—one from Pinewood, which is anhydrous and mixes perfectly with oil of turpentine, consisting chiefly of creosol $C_6H_3\cdot CH_3\cdot OCH_3\cdot OH$: 1, 3, 4=137·04 (138·08 I. Wts.) homopyrocatechin - methyl - ether (Morson's 'Creosote' is representative of this class). Glycerin is miscible with Morson's Creosote in all proportions up to 2 of Glycerin to 1 of Creosote. Upon further addition of glycerin the mixture becomes turbid. Morson's Creosote does not cause collodion to gelatinise; the other variety is principally from Beechwood, which contains Guaiacol, $C_6H_4\cdot OCH_3\cdot OH$ = 123·13 (124·064 I. Wts.) and is more soluble in water. The latter is made official with Sp. Gr. not below 1·079.

Ⓒ Creosote. FR. CX. consists of about $\frac{1}{2}$ its bulk Creosol, the other $\frac{1}{2}$ consisting of Guaiacol with some cresylols, phlorol, or ortho-ethylphenol, etc. Easily soluble in alcohol, ether, anhydrous glycerin, chloroform, also in caustic potash and soda solutions, and in acetic acid (glacial). It distils between 200 and 220°C. U.S. (Revised) now omits glycerin test.

Ⓒ Genuine Beechwood Creosote yielded 39% Monophenols, 26·48% Guaiacol, 32·14%, Creosol $C_6H_3\cdot CH_3\cdot OCH_3\cdot OH$ and homologues, Pinewood Creosote about the same but 20·3% Guaiacol and 37·5% Creosol and homologues—all boiling between 200 and 210°C.—Am. Jl. Ph. 1899, pp. 409-413.

Allen, Vol. II, part 2, p. 283 (1900) gives for Beechwood Creosote (200 to 210° B.P.), Phenol 5·2, 1:2 Cresol 10·4, 1:3 and 1:4, Cresol 11·6, 1:2 Ethylphenol 3·6, 1:3:4 Xylenol 2·0, 1:3:5 Xylenol 1·0, Phenols various 6·2, Guaiacol 25·0, Creosol and its homologues 35·0. He states that it is rare to find even 20% Guaiacol nowadays.

It is dextrorotatory (not *levo* B.P.), or is inactive (Umney).

Morson's Beechwood Creosote mixes to form a clear liquid with glycerin in all proportions. Such a clear solution exposed to the air, however, becomes turbid. Creosote, unlike phenol, mixed with an equal volume of collodion does not gelatinise.

C.R.1908 suggests 'four volumes mixed with 4 volumes of 95% Glycerin forms a clear mixture which on adding 1 volume of distilled water becomes opalescent, a layer of creosote not less than the original volume separating on standing.'

Flavoring.—Emulsified, Glyl or Syl Pini excellent, Syl Lavandulæ and Syl Amygdalæ Amaræ are also good; Mistura Amygdalæ Composita, or Essentia Menthæ Piperitæ.

Uses.—Locally as a caustic. It is one of the most powerful deodorisers, antiputrescents, and antiseptics. It is used internally to correct fetor, given to check sickness, for diabetes, added to cod-liver oil for phthisis (it is unsurpassed for this), and applied externally in various skin diseases, and is put into the cavities of carious teeth. *Hypodermically* was administered in 10% solution in sterilised almond oil.

Checks gastric fermentation and is an intestinal antiseptic in some forms of diarrhœa.

For irritable trachea and congested larynx, causing troublesome cough, the inhalation of creosote from an oro-nasal or 'ozonic' inhaler is useful.

Incompatible with silver oxide (*q.v.*). Also with calcined magnesia and slaked lime.

Aqua Creosoti, U.S. *Syn.* LIQUOR CREOSOTI. *Average Dose.*—2 drachms. Creosote 1 in 100 water freshly prepared.

Mistura Creosoti (Off.).

Dose.— $\frac{1}{2}$ to 1 ounce (15 to 30 Cc.).

Creosote 1, Spirit of Juniper 1, Syrup 30, Distilled Water to 480.

Haustus Creosoti (Vic. Park) contains 3 to 30 minims in an ounce dose.

Oleum Morrhuæ cum Creosoto.

Dose.—1 to 4 drachms (3.5 to 15 Cc.). Contains $1\frac{1}{2}\%$.

In ulcerative colitis, Creosote 3 minims, with Cod Liver Oil 1 drachm thrice daily—Castor Oil having been previously given—increased by 1 drachm daily, until on the 4th day 12 minims with $\frac{1}{2}$ ounce respectively are taken combined, until termination of the disorder. This treatment is superior to all others.—L. i./09, 500.

***Pautauberge's Solution.**

A proprietary article containing Calcium Hydrochloro-Phosphate with Creosote.

Dose.—A tablespoonful (containing 2 minims of Creosote and 8 grains of the above salt).

Perles of Creosote. 1 or 3 minims in each, with oil, also **Capsules**, 3 and 5 minims, or more, with oil.

(P) **Creocarb Capsules.** Contain Beechwood Creosote 3 minims and Phenol $\frac{1}{4}$ gr. In the treatment of phthisis.

Pilula Creosoti (Martindale).

Dose.—2 to 6 grains (0.13 to 0.4 Gm.).

Creosote 1, Curd Soap, in powder 1. Digested on a water-bath in a wide-mouth stoppered bottle. Japanese soldiers carry creosote as prophylactic against dysentery.—B.M.J. i./04, 1327.

Spiritus Creosoti.

Dose.—1 drachm. Creosote 1, Alcohol 90% 40. Lessens cough and expectoration in chronic bronchitis and phthisis.

Unguentum Creosoti (Off.).

Creosote 1, Hard Paraffin 4, Soft Paraffin, white, 5.

Unguentum Creosoti Forte, B.S.H.

Creosote 6 drachms, Yellow Wax 180 grains.

Melt, and stir till cold. Used in psoriasis. Caution.—Should not be applied to the belly, face, or flexor surfaces of the limbs.

Ⓟ Vapor Creosoti, T.H.

Creosote 80 minims, French Chalk 30 grains, Water to 1 ounce. C.L.T.E. has Creosote 40 minims, Light Magnesium Carbonate 20 grains, Water to 1 ounce.

A teaspoonful in a pint of water at 140° F. Useful in chronic congestion of the larynx and trachea, and in ozæna, fetor of breath and syphilitic throats.

Abscess of lung. Creosote internally in doses up to $\frac{1}{2}$ drachm, together with inhalations of Creosote and Iodine.—L. i./07, 1021.

Case of poisoning by creosote—two doses of over $\frac{1}{2}$ drachm taken within a short time. Recovery with no ill after effects.—B.M.J.E. ii./92, 4.

Oro-nasal Inhalations.—Creosote, or a mixture of equal parts of Creosote and Phenol, is employed to medicate respirators for phthisis.

It is more sedative in its action if mixed with an equal volume of spirit of chloroform, 5 to 15 or 20 minims dropped on the cotton wool at one time.

Solutio Creosoti Composita, Brompton H.

Creosote 1, Spirit of Menthol (20%) 1, Spirit Chloroform 1; for inhalation.

Creosote Carbonate, P. Austr.—Syn. *CREOSOTAL. A light-brown nearly odourless liquid, Sp. Gr. 1.165, insoluble in water, soluble in oils; is prepared from beech creosote by passing Carbonyl Chloride into it in Sodium Hydroxide solution—the liquor separating is washed with weak alkali and then with water. It contains the carbonates of guaiacol and creosol. Has been used in tuberculosis, bronchitis, and pneumonia. Breaks up in the alkaline intestinal juices. *Dose.*—5 to 20 grains (0.32 to 1.3 Gm.), or considerably increased. The manufacturers state $\frac{1}{2}$ to 5 teaspoonful thrice daily.

Capsules of Creosotal contain 5 and 10 minims.

Creosote Valerianate.—Syn. EOSOTE.

Dose.—4 to 12 grains (0.26 to 0.8 Gm.).

An oily liquid, soluble in alcohol, glycerin and ether; checks gastric fermentation and used for phthisis epidermically. Is not so toxic or corrosive as creosote.

Capsules, each containing 7 minims, are prepared.

Oleocreosote, a brown, oily liquid, an oleic ether of creosote, of which it contains about one-third, is said to be easily assimilable. Antiseptic and disinfectant. *Dose.*—10 to 30 minims (0.8 to 1.8 Cc.) in capsules.

***Creosoforme**, a combination of creosote with formaldehyde, in greyish powder, is found to be a methylene derivative (of guaiacol).

***Guaiacform (Geoform)**, a combination of guaiacol with formaldehyde is a brownish-yellow powder. Antiseptic. Soluble in 90% alcohol, but not in water.

Guaiacol. $C_6H_4 \left\{ \begin{array}{l} OCH_3 \\ OH \end{array} \right\} = 123.13$ (124.064 I.Wts.).

Dose.—1 to 5 minims (0.06 to 0.3 Cc.). U.S. has average dose 8 minims. This approximates the *max. single dose* of the Fr. Cx.

A colourless refractive liquid, a constituent of beech-wood creosote (*c.f.* p. 290) but is also made synthetically from pyrocatechin in colourless crystals, melting at 83 to 91° F. *The crystals should be only dispensed when so ordered.* The crystals are P. Belg.

Solubility.—Both forms are soluble in alcohol, ether, fats, oils, and glycerin, and slightly in water, with taste and odour resembling creosote.

Uses.—In phthisis, particularly in incipient stages, may be prescribed in capsules (Guaiacol Carbonate), or cordial, *e.g.*: Guaiacol 13·5, Tincture of Gentian 30, Alcohol (90%) 250, and Sherry to 1,000; two teaspoonsful two or three times a day in water—or in Mistura Guaiacol, *vide infra*.

Antiseptic and antipyretic. It is sometimes rubbed into or painted on the skin, covered by oiled silk; begin with 10 minims and increase to 30 or more; do not cover more than the space of the palm of a hand at a time. Useful for phthisis and typhoid.

Mistura Guaiacol, G.H.

Guaiacol 4 minims, Alcohol (90%) 40 minims, Glycerin 30 minims, Oil of Cinnamon 1 minim, Water to 1 ounce.

Perles of Guaiacol contain 1, 2 or 3 minims, dissolved in oil. Capsules 2 and 5 minims, *best made with Guaiacol Carbonate* we find.

Pilula Guaiacol 1 to 3 grains (crystal) require $\frac{1}{4}$ grain Compound Tragacanth Powder with Glucose Syrup to mass.

Capsules of Guaiacol (Carbonate) 1 grain, with Iodoform 1 grain and Almond Oil 5 minims, are prepared for use in phthisis; also of Guaiacol $\frac{3}{4}$ grain, with Cod Liver Oil, 5 minims.

Injections of Guaiacol 5%, and Iodoform 1%, in sterilised olive oil, *v.p.* 124, have been recommended in tuberculosis; said to lessen cough and expectoration, diminish number of bacilli in sputum, favour cicatrization of cavities, and lessen fever and night-sweats, but Guaiacol so used is not free from danger.

Dose.—One, increased to three syringefuls (1 Cc. each) but better *per os*.

Durant's Injection. Guaiacol 5, Iodine 1, Potassium Iodide 10, Sterile Olive Oil 100. Injected in pulmonary phthisis.—B.M.J.E. ii./04,96.

In osseous tuberculosis good results by Durant's method of injection. Red blood corpuscles, hæmoglobin and globulin increased.—B.M.J.E. ii./05,28.

Vapor Guaiacol Compositus.

Guaiacol and Terebene of each 2, Menthol and Thymol of each 1, Spirit of Chloroform 3. Inhale 5 to 10 minims from an inhaler night and morning. Employed in phthisis.

Unguentum Guaiacol. Guaiacol 1, Lanolin Ointment (or other suitable basis) 5, useful in orchitis and mumps. In multiple serositis of tuberculous origin.—L. i./07,1018.

Rheumatoid arthritis is well treated with Guaiacol 1, Iodine Tincture 7 to be painted on the joints twice daily with a mixture internally of Ammonium Chloride 15 grains, Iodine Tincture 5 minims, Carbolic Acid 2 grains thrice daily.—B.M.J., i./08,64.

Pruritus vulvæ treated by ointment containing Guaiacol, Zinc Oxide and Menthol.—B.M.J.E. ii./08,23.

Pigmentum Guaiacol.—Guaiacol 1, Olive Oil 1, Dissolve.

In eye diseases, *e.g.*, interstitial keratitis, irido-cyclitis, vitreous opacities, sympathetic ophthalmia and optic neuritis, Guaiacol found to be a more certain diaphoretic than Pilocarpine. The 'combined treatment' is carried out as follows:—

The ordinary alternative mixture of Mercuric Chloride $\frac{1}{8}$ grain, and Potassium Iodide 5 grains is given thrice daily; sometimes Grey Powder 1 grain is given in a pill thrice daily instead, with a mixture containing Potassium Iodide and Tincture of Nux Vomica. The urine is examined and the Mercury is omitted if any albumen be found. The patient is kept in bed between blankets with hot water bottles, then 1 drachm of the Pigment is smeared, not rubbed, either in the axilla or over the epigastrium. If this does not suffice then 2 drachms are used, and in rare cases 3, but mostly 1 drachm is enough. The part is covered with oil silk and a pad of wool is applied over the skin. A hot drink is now given, and profuse general perspiration begins in from one to two hours and lasts for about five hours. It is difficult to make some patients perspire, and in these cases a hot bath beforehand assists, and hastens diaphoresis. In one patient some irritation of the skin was produced by the Guaiacol, but this was practically well in a week on ceasing the treatment; but the skin was too irritable to stand the application on the same place two nights in succession.

Generally twelve applications are made, and then treatment is stopped for a few days, and begun again if considered necessary. As a rule the patients are kept in bed the whole time.

Guaiacol was found to be a far more certain diaphoretic than Pilocarpine, and does not produce the after depression of the latter, while results are equally good.—B.M.J. ii./09,203.

This treatment had been tried for reduction of temperature, but had been discarded owing to difficulty of limiting its action. Never used in more than 30 minim doses.—B.M.J. II./09,418.

Guaiacol Benzoas, Guaiacol Benzoate.—*Syn.* ★BENZOSOL.

The benzoyl-ester of guaiacol. $C_6H_4.OCH_3.O.CO.C_6H_5 = 226.38$ (228.096 I. Wts.).

Dose.—4 to 12 grains (0.26 to 0.8 Gm.) in cachet.

Manufacture, method of, *vide* Schmidt.

In small crystals, almost tasteless and odourless, nearly insoluble in water.

Incompatible with alkalis. Useful in incipient phthisis (especially the diarrhoea of), and in diabetes mellitus. **Tablets**, 5 grains. *Dose.*—1 or 2.

Guaiacol Camphorate.—*Syn.* GUAICAMPHOL.

$[C_6H_4.OCH_3.O]_2(CO)_2C_8H_{14}$ or $C_{24}H_{28}O_6 = 409.12$ (412.234 I. Wts.).

Dose.—5 to 10 grains in cachets or 5-grain tablets.

Soluble only very slightly in alcohol, insoluble in water; for night-sweats and diarrhoea of phthisis.

Guaiacol Carbonas, U.S., Fr. Cx. P. Austr., Ph. Ned., P. Belg., P. Helv. P. Hung. P. Svec.—*Syn.* ★DUOTAL.

$CO \begin{cases} O.C_6H_4.OCH_3 \\ O.C_6H_4.OCH_3 \end{cases}$ or $C_{15}H_{14}O_5 = 272.05$ (274.112 I. Wts.).

Dose.—3 to 8 grains (0.2 to 0.52 Gm.), gradually increased in cachets or capsules. (The Capsules keep well).

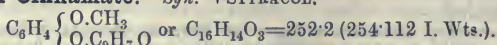
Made by action of carbonyl chloride on sodium guaiacolate.

A white minutely crystalline substance, tasteless, and with slight odour, soluble in alcohol about 1 in 200, but soon crystallises out again with drop of temperature, insoluble in water. Given in phthisis, improves appetite,

increased weight, and lessened cough, expectoration, and night-sweats, also in typhoid and for bronchitis and rheumatoid arthritis.

Tablets, 5 grains (0.32 Gm.).

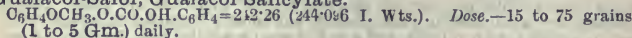
Guaiacol Cinnamate.—*Syn.* ★STYRACOL.



Dose.—5 to 15 grains (0.32 to 1 Gm.).

In white granular crystals, insoluble in water. For intestinal phthisis and vesical catarrh. Said to split up into its constituents in the system.

Guaiacol-Salol, Guaiacol Salicylate.



In white shining crystals, insoluble in water. Useful in phthisis and as an intestinal antiseptic.

Guaiacol Valerianas. *Syn.* ★GEOSOT.

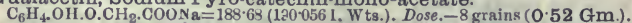


Dose.—2 to 5 minims (0.12 to 0.3 Cc.) in capsule.

Has the odour of valerianic acid. Useful in tuberclosis and chlorosis.

Capsules unfortunately do not keep well. Experiments were made with a number of different formulæ. The writer employs Guaiacol Carbonate and Valerianic Acid in Almond Oil—these keep satisfactorily.

Gualacetin, Sodium Pyro-catechin-mono-acetate.

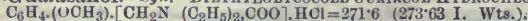


A white powder, insoluble in water, used for tuberculosis. Said to cause no gastric disturbance.

★**Histosan.** A combination of guaiacol and an albumin. In powder form.

Dose.—3 to 7½ grains. Also in syrup.—B.M.J.E.i./06,12. In phthisis, bronchopneumonia, and bronchitis.—B.M.J.E.ii./08,24.

★**Guaiasanol.** *Syn.* DIETHYLYLYCOCOLL GUAICOL HYDROCHLORIDE.

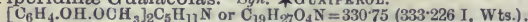


Dose.—10 to 60 grains (0.65 to 4 Gm.).

Soluble in water. Checks tuberculous diarrhœa. Is a deodoriser for œœna, nose, mouth and cancerous wounds; 1 in 2,000 solution used for antiseptic irrigation of the bladder.

Incompatible with alkalis.

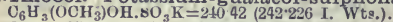
Piperidinæ Guaiacolas. *Syn.* ★GUAIPEROL.



Dose.—5 to 30 grains (0.32 to 2 Gm.).

In granular colourless crystals with slight creosote odour, soluble 1 in 30 of water, freely in alcohol; solutions are decomposed by mineral acids and alkalis. Useful in phthisis; may be given in solution flavoured with chloroform or syrup of orange.

★**Thiocol.** Potassium-guaiacol-sulphonate. P. Hung.



Dose.—15 grains (1 Gm.) three daily.

In odourless white crystals, soluble in water, 1 in 6, slightly in alcohol. Contains about 60% of guaiacol.

Has been recommended in phthisis. Large doses may be given in bronchitis and pneumonia, also for intestinal catarrh.—M. P. 1907, Sept. 18, p. 320.

Monotal.

Dose.—60 to 75 grains (4 to 5 Gm.).

A guaiacol derivative.

In neuralgia, as antipyretic. In orchitis of gonorrhœal origin. Antiseptic and antiphlogistic.—B.M.J.E. ii./09,8.

CUBEBA, U.S. (*Off.*)

Dose.—30 to 60 grains (2 to 4 Gm.) in cachets.

The dried unripe full-grown fruit of *Piper Cubeba* (*Piperaceæ*). The genuine—imported from Java—give a crimson colour with sulphuric acid, and are free from mace-like taste and odour.—P.J. 1892, 771, 121.

The average yield of Olco-Resin is 20%.—Umney, C.D., ii./09,579.

Spurious fruit on the market probably *P. Ribesoides*.—C.D.ii./05,797.

Cigarettes of the powder are useful for catarrh and excessive bronchial secretion. It is sometimes added to Ferrier's Snuff, *q.v.*, and is an ingredient of the American specialty, ★ Brown's Troches. These contain also Conium, Acacia and Licorice—Murrell. Cubebs contain:—

Oleum Cubebæ, (*Off.*), U.S. *Dose*.—5 to 20 minims (0.3 to 1.2 Cc.).

Colourless, pale green or greenish yellow oil, with camphoraceous odour and taste characteristic of Cubebs. Sp. Gr. 0.910 to 0.930. Soluble 1 in 20 in alcohol 90%.

OLEUM CUBEBAE (*P. Off.*).—Sp.Gr., as above, O.R., -25° to -40°; R.I., 1.486 to 1.494. At least 80% should distil between 250° and 280° C.

Cubebin, $\text{CH}_2\langle\text{O}\rangle\text{C}_6\text{H}_3\text{C}_3\text{H}_4\text{OH} = 176.74$ (178.08 I. Wts.), in small white needles, and Cubebic Acid, $\text{C}_{14}\text{H}_{16}\text{O}_4(\text{P}) = 246.26$ (248.128 I. Wts.), a non-crystalline resin, occurring in white powder, which has been recommended for gonorrhœa, in doses up to 15 grains (1 Gm.).

Oleo-resina Cubebæ (B.P. 1885).

Dose.—5 to 30 minims (0.3 to 1.8 Cc.).

U.S. by alcohol extraction. Deposits on standing: the waxy crystalline matter is to be rejected.

Capsules of Cubeb Oil contain 10 minims. For combinations *v.p.* 500. Used in bladder and urethral troubles.

Fluidextractum Cubebæ, U.S.

Average dose.—15 minims (0.9 Cc.) 1=1, Alcoholic Percolate.

Suppositoria Cubebæ, 10 grains each for astringent effect.

Tinctura Cubebæ, 1 in 5 Alcohol (90 %), (*Off.*). *Dose*.— $\frac{1}{2}$ to 1 drachm. In chronic bronchitis as an expectorant, taken in linseed tea.—L. i./90,569.

Flavoring.—Syl Aurantii Amari, Gyl Pivi; Extractum Glycyrrhizæ Liquidum.

Trochisci Cubebæ, T.H. Marked 'C.B.' $\frac{1}{2}$ gr. each, (U.S. $\frac{1}{3}$) with fruit paste. *Dose*.—1 every 3 or 4 hours.

Vapor Cubebæ cum Limone, T.H. Cubeb Oil $\frac{1}{2}$ drachm, Oil of Lemon 10 minims, Light Magnesium Carbonate 20 grains, Water to 1 ounce. Has stimulating effect in chronic bronchitis.

CUPRUM.

Cu = 63.12 (63.57 I. Wts.).

For purifying water, Kraemer found that strips of copper foil placed in water containing colon and typhoid bacilli completely destroyed same in less than four hours. Considered a safe domestic method. A piece of copper foil $3\frac{1}{2}$ inches square in a quart of water six hours or so is all that is necessary.

He also gives a table of figures showing the amount of copper normally present in a number of substances in mgr. per kilo:—Belladonna contained 4,200, Henbane 3,600.—Am. Jl. Ph., June 05, 274.

Antidotes to Copper Salts.—Stomach-pump, emetics, white of egg and milk. Hot fomentations to the stomach, barley water, morphine or laudanum to relieve pain.

Incompatibles.—Alkalis and alkaline carbonates, also preparations containing tannin and iodides.

Chemical relationships of the copper fungicides.—*Nature*, Mar. 3, 1910, p. 13.

Cupri Acetas Neutrale, $(\text{CH}_3\text{COO})_2\text{Cu}$, $\text{H}_2\text{O} = 198.16$ (199.634 I. Wts.).

Dose.— $\frac{1}{12}$ to $\frac{1}{2}$ grain (0.0054 to 0.032 Gm.).

Dark green crystals. Applied to ulcers acts as a stimulating caustic.

Soluble 1 in 15 approximately of water; only slightly in alcohol.

In tuberculosis has been given with Sodium Phosphate 1 grain, Tragacanth Mucilage $\frac{1}{2}$ ounce, or as:—

Pilula Cupri Acetatis, $\frac{1}{2}$ grain in each with Sodium Phosphate 1 grain, Liquorice Powder and Glycerin *q.s.*

The fatal dose *per os* is said to be 154-184 grains, and 154 to 308 grains of the Sulphate. Attempted abortion with Fehling's Solution.—*B.M.J.E.* i./07,88.

Cuprocitrol. A speciality consisting of a 5 and 10% ointment of copper citrate for use in ophthalmic treatment.

Cupri Subacetis. *Syn.* Verdigris, Aerugo.

Is usually of indefinite composition, principally $[(\text{C}_2\text{H}_3\text{O}_2)_2\text{Cu} + \text{CuO} + 6\text{H}_2\text{O}] = 366.56$ (369.284 I. Wts.) and only partly soluble in water. Occurs in greenish partly crystalline powder.

Linimentum Æruginis. *Ph. Lond.*

A decoction of verdigris, vinegar and honey is employed in veterinary work.

St. G. H. has **Gargarisma Æruginis** 1 grain in the ounce with honey and glycerin.

Cupri Citras.

$\text{C}_6\text{H}_4\text{Cu}_2\text{O}_7 + 2\frac{1}{2}\text{H}_2\text{O} = 357.56$ (360.212 I. Wts.).

Unguentum Cupri Citratis, described shortly as 'Cuprung,' is supplied 5, 10, 15, 20 and 25% strength for use on the eyes.

Cupri Oxidum.

$\text{CuO} = 79$ (79.57 I. Wts.).

Is supplied commercially as 'precipitated' by adding Caustic Alkali to Cupric Sulphate solution, washing and drying, also 'granulated' by heating to partially fuse.

Cupri Sulphas (*Off.*) U.S.

$\text{CuSO}_4, 5\text{H}_2\text{O} = 247.86$ (249.72 I. Wts.).

Average Dose.— $\frac{1}{4}$ to $\frac{1}{2}$ grain (0.016 to 0.032 Gm.); *Off.*—as astringent $\frac{1}{4}$ to 2 grains (0.016 to 0.13 Gm.); as emetic 5 to 10 grains (0.32 to 0.64 Gm.).

Blue Crystals. **Soluble** in water 1 in $3\frac{1}{2}$, in glycerin 1 in 2 (but may crystallise out again); insoluble in alcohol.

Uses.—Given internally in very small doses for severe diarrhœa and cholera, usually combined with opium (*R.F.H.* Pill $\frac{1}{2}$ grain of each), and has also been tried as rectal injection. **Rapid emetic** for narcotic poisoning, three or four grains in water every few minutes until vomiting occurs. Also suitable for acute phosphorus poisoning.

Locally in eye affections as stimulant and for gleet.

Actinomycosis and blastomycosis have been treated by internal administra-

tion and irrigation with 1% solution. In syphilis a mixed treatment with copper sulphate and potassium iodide may prove useful.

Membranous colitis in children, well treated by injection of solution 3 or 4 grains to the ounce with a little opium added.—L. i./06,94.

In dry skin affections, and in tubercular tendencies, $\frac{1}{10}$ grain doses thrice daily, appear to act like arsenic, and are sometimes better tolerated.

In pyorrhœa alveolaris the gums are 'packed' with copper sulphate, and the patient directed to swab the gum with saturated solution of tannin in Eau de Cologne; the tartar is frequently removed.—Smale and Colyer.

Copper salts are bactericidal, *e.g.*, for purifying water.—L. ii./05,1933.

Erosion in chronic edometritis treated by scarification and bathing with copper sulphate solution, 30 grains to the ounce.—B.M.J. ii./09,1031.

Trachoma best treated with this drug, though time honoured.—B.M.J. ii./09,327,975.

Has also been used by Ionisation, *c.f.* p. 420.

Guttæ Cupri Sulphatis, R.O.H. 2 grains to the ounce. Suitable as a lotion for glæc.

Copper Points, contained in turned wood holders, are useful for eye and intra-uterine medication.

For styes epilate the lashes affected and use a lotion of copper sulphate 1 in 200, ten to thirty times a day. The lashes will grow again.—Pr. Sept., 1907,440.

Cupri Chloridum, $\text{CuCl}_2 + 2\text{H}_2\text{O} = 169.26(170.522 \text{ I. Wts.})$. Dose— $\frac{1}{4}$ to 2 grains (0.016 to 0.13 Gm.). Is a stronger antiseptic than copper sulphate for the treatment of water supplies. A solution containing 1 of copper in 5,000 will kill *B. Typhosus* in slightly over an hour and *B. Coli* in an hour. (*Staphylococcus Pyogenes Aureus* is killed in less than two hours by a 1 in 7,000 copper sulphate solution.—Journal of Sanitary Institute, vol. xxv., 1904).

Lapis Divinus, R.O.H. **Cuprum Aluminatum P.G.**

Potassium Alum, Copper Sulphate, and Potassium Nitrate, of each 1 part are fused together. Camphor equal to $\frac{1}{10}$ of the whole previously mixed with an equal weight of Alum is added and incorporated, and the mixture run into moulds to form pointed sticks. (G.H. has less camphor.)

P. Jap. adds Camphor 1 to 10 each of the other ingredients previously fused.

CYPERUS ROTUNDUS

(*Cyperaceæ*), SINGHALESE Kalandura.

A rushlike plant, carminative, stomachic, and carminative hepatic stimulant. A very popular remedy in Ceylon. An infusion of the tubers of the plant mostly employed. Increases flow of saliva when chewed. On the intestinal membrane it is astringent and styptic. The natives use it for epistaxis. It is useful in dysentery, bronchitis, tonsillitis, and all forms of fever, both alone and in combination with other drugs.—B.M.J. i./07,327. We found the root to contain a considerable quantity of Volatile Oil of odour strongly resembling Sandal Wood Oil.

Extractum Cyperi Rotundi Liquidum. Dose.—17 to 60

minims (1 to 3.5 Cc.) 1 = 1 prepared by Alcohol Extraction. This preparation brings out the Santal-like smelling constituent.

Flavoring.—Syl Pini; Extractum Glycyrrhizæ Liquidum.

Mistura Cyperi Rotundi. Dose.— $\frac{1}{2}$ to 1 ounce (15 to 30 Cc.).

Liquid Extract of Cyperus 1, Glycerin 1, Aromatic Syrup 2, Infusion of Linseed 4. Has been tried in gonorrhœa. The taste is unpleasant.

Gelatin Capsules of Cyperus are prepared containing 5 minims of the Liquid Extract above.

DAMIANA.

The leaves of *Turnera diffusa* var. *aphrodisiaca* and other species (*Turneraceæ*) are recommended in the United States as possessing aphrodisiac properties. Useful in melancholia. Said to be tonic and diuretic.

Contains bitter substances, resins, and volatile oil.

Has also been fictitiously called “Bohadschia” (Aphrodisiaca).

Extractum Damianæ Liquidum, B.P.C. 1 = 1.

Leaves in 60 powder exhausted with alcohol 60%.

Dose.— $\frac{1}{4}$ to 1 drachm.

Flavoring.—Glyl Pini, Syl Rosæ, Syl Lavandulæ; Syrupus Zingiberis.

Extractum Damianæ.

Dose.—2 to 10 grains (0.13 to 0.65 Gm.). Is prepared by concentration of the above.

Ⓟ **Mistura Damianæ Composita.**

Dose.—1 to 2 drachms (3.5 to 7.0 Cc.).

Sodium Hypophosphite 5 grains, Calcium Hypophosphite 5 grains, Liquid Extract of Damiana $\frac{1}{4}$ drachm, Liquid Extract of Nux Vomica 2 minims, Chloroform Water to 2 drachms.

Ⓟ **Pilula Damianæ Composita.**

Extract of Damiana 2, Phosphorus $\frac{1}{100}$, Extract of Nux Vomica $\frac{1}{8}$. Liquorice Powder *q.s.* to 3½ grains. Dose.—One, two or three times a day.

Capsules of Damiana Extract are each equivalent to 30 minims of the liquid extract.

DECOCTA.

Decoctions of drugs are usually prepared 5% (unless otherwise stated) by boiling the drug in coarse powder with distilled water for 10 minutes and straining. If necessary a few drops of Chloroform or Formaldehyde will preserve fresh decoctions for a reasonable period of time. For various decocta consult index. *The strengths of decoctions of powerful substances should be specified by the physician* (U.S.).

Decocota Concentrata are prepared commercially as a general rule ‘1 to 7.’ They should contain at least 20% Alcohol—as a preservative.

ⓈDIGITALIS FOLIA (Off.). U.S. Fr. Cx.

Dose.— $\frac{1}{2}$ to 2 grains (0.032 to 0.13 Gm.).

Fr. Cx.—*Maximum single dose 3 grains, maximum during 24 hours 15 grains approx.*

The dried leaves of *Digitalis purpurea* (Scrophulariaceæ) or foxglove, collected from plants commencing to flower. (P. Helv. gives a simple test for digitoxin in the leaves.)

Uses.—Valuable heart tonic and stimulant diuretic in pulmonary œdema and dropsy. *Caution!*—cumulative.

Simultaneous purging is said to be a useful adjuvant to treatment of cardiac disease with digitalis.

The leaf of the second year proposed. Powdered drug to be used entire.—F.I.—Fr. Cx. adopted.

C.R. 1908 agrees and provides new monograph.

Physiological tests have determined second year's leaves to be somewhat stronger than the first—i.e. in proportion of 10 to 8 $\frac{1}{2}$.

The difference probably due to the excess of petiole in the first year's growth which it may be noted in P. L. was ordered to be removed.—P.J. i./07, 198, *vide* also Am. Jl. Ph. July /08, 330.

Fresh powdered leaf, the best preparation, must not be kept longer than one year.—B.M.J.E., ii./08, 31.

The action of Digitalis on the heart can be observed in three distinct stages. The first is the therapeutic stage, the second and third being danger signals to be avoided; drug to be withdrawn.—Am. Jl. Ph. March /08, 112.

There is a fairly constant ratio existing between the chemical assay based on Digitoxin and physiological results on guinea pigs.—C.D. i./08. 597.

In endeavouring to standardise chemically the difficult point to solve is that no single constituent represents the drug entirely. Suggestion that Digitoxin should be the basis of examination and standardisation. Assay process devised.—Am. Jl. Ph. Mar. '08, p. 118., *c.f.* also Digitoxin. p. 304.

Discovery of the value of Digitalis internally; not greatly used until 1775, when Withering established it on a firm therapeutic basis, recognising its value when arterial tension low and unsuitability in high tension.—P.J. i./08, 667; L. ii./08, 109.

Tschirch pointed out that at present nothing is known as to the influence of the composition of the soil, of shade or light, of moisture or lack of moisture on the formation of Digitoxin in the plant.—P.J., ii./09, 420.

Physiologically Standardised Digitalis Preparations are advocated. Digitalis has a chemical action on cardiac muscle, and it is necessary to determine the minimum lethal dose of each batch of the drug or its preparation. It is pointed out that squill, digitalis and strophanthus have strengths in proportion as 3 : 2 $\frac{1}{2}$: $\frac{1}{4}$.—P.J. ii./05, 754.

Normal Tincture may be of such strength that the minimum lethal dose per 100 Gm. of frog is 16.5 minims, such dose proving fatal within 4 hours.—Southall's Lab. Rep., 1907.

Heart Tonic Units.—Houghton suggested at the International Congress of Applied Chemistry, London, May, 1909, that an International Committee be appointed to recommend the best method of determining the physiological assay of

members of the Digitalis group of Drugs,—Digitalis, Strophanthus, Squill and Convallaria, and that the Heart Tonic Unit be taken as a standard for same. The numbers of such units are to be derived directly from the minimum fatal dose of a given preparation. A convenient unit is obtained by dividing 1 by the minimum fatal dose per gramme weight of frog; in other words the number of units is the reciprocal of the minimum fatal dose. Thus, if the minimum fatal dose of a given drug is found to be equivalent to 0.01 Cc., then the given preparation, assuming that it belongs to the group of heart tonics, would contain 100 heart tonic units:— $1/0.01=100$ heart tonic units. This rule can be applied to any of the heart tonics as a means of expressing such values in whole numbers.

It is perfectly evident that in the case of important drugs like Digitalis and Strophanthus uniform methods of testing ought to be adopted. In Houghton's process, the death, or otherwise, is taken at the end of 12 hours. Other workers, e.g., Martin, use 3 hours, *vide infra*.

Some average recent results obtained by Houghton since 1901 were the following—

	Minimum fatal dose per Gm. wt. of frog.	Heart Tonic Units.	Suggested Standard M.F.D.
Fluidextract of Digitalis, U.S., 1890 (1=1)	0.00142	701	0.0015
Strophanthus Tincture, U.S., 1890 (5%)	0.000167	5985	0.000075
Fluidextract of Squill, U.S., 1890 (1=1)	0.00123	807	0.0012
Fluidextract of Convallaria (rhizome and roots) U.S., 1890 and 1900	0.000245	4067	0.00025

N.B.—Since the communication above outlined, it is thought better to adopt a H.T.U. equivalent to 10 times the normal M.F.D. per Gm. body weight of frog.—L. ii./09,1174.

It is, therefore, necessary for comparison to multiply the Minimum Fatal Doses above by 10 before taking the reciprocals. In this way the following proposed standards, after making due correction for the fact that the present U.S. Strophanthus Tincture is double the strength that it was in 1890, have apparently been arrived at, and have been suggested:—

REVISED STANDARDS.

			Revised H.T.U. per Cc. in round Nos.
Fluidextract of Digitalis, U.S. 1890 (1=1)	...	...	65
Strophanthus Tincture, U.S. 1900 (1 in 10)	...	...	1200
Fluidextract of Squill U.S. 1890 (1=1)	...	...	80
Fluidextract of Convallaria, U.S. 1900	...	...	400

The H.T.U. is a measure of toxic value, and these may be translated into therapeutic values based on therapeutic doses, but there is great discrepancy in doses of the latter.

Martin at the British Pharmaceutical Conference Meeting at Newcastle 1909, (*see* P.J. ii./09,149) drew attention to the seasonal variation of frogs. He found for example, that—

	April to Sept.		Oct. to March.
	Killed in average of		Killed in average of
Tincture of Digitalis ...	110 minutes	...	Many survivals.
„ Squill ...	102 „	...	173 minutes.
„ Strophanthus 74 „	...	...	182 „

He suggests that for the October to March period reliance can be placed on the proved keeping power of the crude drug; or, better a standard can be set up each August, against which preparations can be tested in the dormant months. By this means time limit would not be taken into account. In standardising a new batch in the winter it is a case of matching the new preparation against the standard. It would be deemed active if it killed a series of frogs as quickly as the standard attacked a similar lot of frogs at the same time of the year.

The following table of comparison is provided:—

STANDARDS THAT HAVE BEEN SET UP FOR DIGITALIS, SQUILL, AND STROPHANTHUS.

The figures have been calculated throughout to show the approximate doses for:—

B.P. Tinctures and 20 Gm. frogs.

Edmunds and Cushny:—

Digitalis.—A dose between 4 and 1½ minims. (0.24 to 0.03 Cc.) should kill a frog between 15 and 20 grammes in 1 hour.

Dixon:—

Digitalis.—2½ minims (0.15 Cc.) should kill in 1 hour.

Squill.—The same, but Strophanthus always more toxic.

Dixon and Haynes:—

Digitalis.—2½ minims (0.15 Cc.) kills in 66 minutes.

Squill.—2½ minims (0.15 Cc.) kills in 100 minutes.

Strophanthus.—3/10 minim (0.018 Cc.) kills in 48 minutes.

Haynes.—

Confirms Dixon and Haynes, but extends time limit to 3 hours.

Houghton (confirming his work of much earlier date):—

Digitalis.—4 minims (0.12 Cc.) should kill within 12 hours.

Squill.—2 minims (0.12 Cc.) should kill within 12 hours.

Strophanthus.—1/10 minim (0.006 Cc.) should kill within 12 hours.

Martin uses what may be called the "quick-kill" standard, and gives the following standards:—

Digitalis Tincture. (*Off.*) April to September against time.

Tincture of Squills. (*Off.*) October to March against standard, with 2½ minims (0.15 Cc.) per 20 Gm. in 3 hours, of 5 frogs all must be markedly and typically affected, and a majority must be killed.

Tincture of Strophanthus. (*Off.*) ½ minim (0.03 Cc.) per 20 Gm. in two hours. The general notes above otherwise apply.

The opinion is expressed that Pharmacists could carry out the frog tests, and that there ought to be no insuperable difficulty in overcoming the law regulating experimental work of this kind.

L. ii./08,408, Leaderette on Crawford's work ex Am. Jl. Ph., July, '08; L. i./09,1744; L. ii./09,1174; P.J. ii./09,473,504; Martin, P.J. ii./09,149.

See also note on Physiological Standardisation, p. 752.

Antidotes.—After emetics give gallic or tannic acid, camphor, nitroglycerin, coffee or tea, also ether or alcohol. Aconitine ½ grain hypodermically to be repeated in ½ hour if heart action improves. Patient should lie down until recovery.

Incompatible with preparations of cinchona and with lead acetate, also with iron salts (but the blackening is preventable by citric acid) and with iodine and potassium iodide.

Ⓢ **Extractum Digitalis.** Fr. Cx. Dried leaves extracted with 70% Alcohol, evaporated to soft extract.

Ⓢ **Infusum Digitalis** (*Off.*). About 1 in 146.

Dose.—2 to 4 drachms (7 to 15 Cc.).

As satisfactory as any other preparation.—P.J. i./01,699.

In granular kidney with cardiac failure the fresh infusion is of special value combined with some vasodilator.—L. ii./08,519.

U.S.—Digitalis 15, Boiling Water 500; infuse one hour, strain, add Alcohol 100, and Cinnamon Water 150, finally cold Water *q.s.* to 1,000.

Ⓔ **Infusum Digitalis cum Nitro.** Dose as above. Digitalis 0·5, Nitre 2½, Water to 100. Ph. Notes—Denmark.

Ⓕ **Acetum Digitalis, Ph. Ned.,** Digitalis Leaves 1. Dilute Acetic Acid (6%) 9, Alcohol (90%) 1, Macerate 5 days.

Ⓖ **Succus Digitalis, B.P.C.**

Expressed Juice, 3; Alcohol (90%), 1.

Dose.—5 to 10 minims (0·3 to 0·6 Cc.).

Ⓖ **Fluidextractum Digitalis, U.S.** 1 = 1 by percolation with diluted alcohol.

Average dose.—1 minim (0·05 Cc.).

This is stated to deteriorate at the rate of 11% per annum.—Am. J. Ph., Mar./08, 120.

Ⓖ **P. Dan.** has also an 'Extractum Fluidum' 1 = 1.

Ⓖ **Digitalone.** Physiologically standardised preparation suitable for hypodermic and intravenous use.

Dose.—Hypodermically 8 to 15 minims (½ to 1 Cc.). *Per os* 15 to 30 minims (1 to 2 Cc.) cautiously increased. Is practically ⅓ the strength of the U.S. preparation. Contains chloretone as preservative and 'anæsthetic.'

Ⓖ **Tinctura Digitalis (Off.).** 1 in 8 of 60% alcohol.

Dose.—5 to 15 minims (0·3 to 0·9 Cc.).

Might be made with 45% alcohol.—P. J. ii./09, 142.

U.S. 1 in 10 Alcohol 48·9% volume.

F.I. has 70% alcoholic percolate 1 in 10. Fr. Cx.—max. single dose 25 minims; max. during 24 hours 90 minims approx.—and P. Belg. have this. C.R. says: This would be ¼ strength of the present. The dose might have to be proportionally increased.

Maceration for 24 hours with ½ ounce of hide powder to the pint is said to detannate this tincture.

Flavoring.—Glyl Coriandri, Syl Lavandulæ; Syrupus Aurantii.

In aortic disease, when compensation fails, bold doses, *e.g.*, 15 minims, every four hours with safety.—B. M. J. i./07, 611.

Hallaway states must not be kept longer than 6 months (in amber bottles away from light.)

Ⓖ **P. Dan.** has Tinctura Digitalis 1 in 10, also Tinctura Digitalis Aetherea in 10, made with Spirit of Ether.

Ⓖ **Syrupus Digitalis, P. Belg.** 1 of the Belgian Tincture to 19 of Syrup.

Ⓖ **Pilula Digitalis Composita (Baillie's Pill).**—St. G. H.

Syn. Guy's Pill, Addison's Pill.

Mercurial Pill 2, Digitalis Leaves ½, Squill 1. In grains for one pill; in grammes for fifteen.

Dose.—1, as often as 3 times a day.

In cardiac dropsy has a deserved reputation.—B. M. J. ii./09, 537.

Ⓖ **Pilula Hydrargyri et Digitalis Composita.** St. Bart.'s H.

Mercurial Pill 1 grain, Digitalis 1 grain, Squill 1 grain, Extract of Henbane 2 grains.

Ⓖ **Vin de Digitale Compos é.** *Syn.* Vin de l'Hotel-Dieu, Vin de Trousseau.

Digitalis leaves 1, Squill 1½, Juniper Berries 15, Potassium Acetate 10, Alcohol 90% 20, White Wine 180—all by weight.

Digitalis Glucosides.

The Digitalis (and Strophanthus) Glucosides and their preparations are for the purposes of 1908 Act not strictly 'preparations' of Digitalis (and Strophanthus), but in our opinion they should be treated as (B)

Digitalis leaves and seeds contain several active crystalline and amorphous principles. They act for the most part as irritants to the skin, mucous membranes. Those with physiological activity slow the pulse (*c.f.* M.P., Jan. 23/07, p. 97.) and increase cardiac energy.

A. D. Waller (Proceedings Phys. Soc. Dec. 19/08, Jl. Phys. Soc. vol. xxxviii.) examined the action of Digitalins on striated muscle. The muscle test is suitable for drugs soluble in Normal Saline, but for certain insoluble "Digitalins" it gives no direct information. Soluble Digitalins give effects closely similar to those obtained with Saponine—in particular was this the case with Digitalinum pulv. pur. Germanic.

Experiments with a tincture and infusion of Digitalis (*Off.*), the former diluted 20 times so as to bring the Alcohol down to 3%, which is necessary for the test, gave for this an effect to all appearances analogous with the full tonic effect on the heart—contraction of the muscle in the course of 15 minutes. The infusion produced little or no effect.

Of five 'Digitalins' tried three were active, one being Digitalinum pure pulv. Germanic.

Digitalin, Merck (= Digitonin) was also one of the 'active' preparations on striated muscle identical in action with Saponin. There is a general parallelism between physiological activity measured by response of muscle and toxic or narcotic power found by 'killing power' per weight of living animal, the muscle method gives more precise results than the latter.

The method is applicable to physiological standardisation of Digitalis and allied preparations.

Digitaline Amorphe (Homolle).

Syn. CHLOROFORMIC DIGITALIN.

Dose.— $\frac{1}{80}$ to $\frac{1}{40}$ grain (0.001 to 0.002 Gm.).

Yellowish bitter powder. Practically insoluble in water, but soluble in alcohol and chloroform, and consists principally of a glucoside resembling Digitoxin in its action.

Granules de Digitaline (Homolle) contain 1 milligramme ($\frac{1}{80}$ grain). *Dose.*—1 or 2.

Digitaline Cristallisée, *Syn.* DIGITOXIN (Fr. Cx.) (*c.f.* p. 305).

Dose.— $\frac{1}{80}$ to $\frac{1}{40}$ grain (0.00025 to 0.00065 Gm.), in pill. Fr. Cx. has *max. single dose* $\frac{1}{80}$ grain; *max. during 24 hours* $\frac{1}{4}$ grain approx.

Light, white crystals, very bitter; insoluble in water, nearly insoluble in ether and benzine; very soluble in chloroform. In absolute alcohol at 15° it dissolves 1 in 80, and 1 in 43 of Alcohol 90%.

It consists almost entirely of digitoxin, is cumulative in action, and very potent; should be prescribed as Digitaline, crystallized (Fr. Cx.).

Granules de Digitaline Cristallisée Fr. Cx. contain $\frac{1}{10}$ milligramme in each.

Soluté de Digitaline Cristallisée au Millième. Fr. Cx.

Crystallised Digitaline 1, Alcohol 95% 460, Glycerin 400, Water to 1,000 by weight.

Dose.—*Max. single dose* 5 minims; max. during 24 hours 17 minims approximately.

In favour of crystallised Digitalin, not the Tincture—B.M.J.E. i./07,43.

***Nativelle's Crystalline Digitalin**, a special preparation, has been found more satisfactory than the German.—B.M.J. ii./05,682; C.D. ii./05,510. M.P. July 14/09, p. 28.

***Digitaline Granules, Nativelle** $\frac{1}{240}$ grain (0.00025 Gm.).

Large doses are given to diminish the period of systole and to effect diuresis. Small doses for sedative effect, *e.g.*, in palpitation and to relieve dyspnoea associated with mitral stenosis,—one Granule every three or four days. As a general rule suspend administration periodically to prevent cumulative effect.

***Nativelle's Digitaline Solution**. (For intramuscular injection into the pectoral or other region free from œdema.)

Dose.—1 Cc. containing $\frac{1}{240}$ grain (0.00025 Gm.). An oily stable solution. Ampoules are prepared.

In cases of asystole amenable to Digitaline an injection is made for four consecutive days. In milder cases of hyposystole two days following, 1 Cc. being injected on each occasion. In acute cases with implication of the myocardium and threatening cardiac failure, a single injection usually suffices to restore the strength of the contraction. May be repeated once or twice. When the case is grave an injection of Caffeine Sodio-Salicylate should be given two hours before the Digitaline. In pneumonia, according to circumstances, from one to four doses.

Indications for hypodermic use—

The hypodermic method alone is admissible (1) in grave cases where cardiac failure is imminent and immediate and certain action is required, because in such cases gastro-intestinal absorption is slow and uncertain. (2) in cases in which it is desirable to safeguard the stomach and to avoid setting up gastric intolerance or embarrassment of cardiac action by a dilated stomach, the hypodermic method must be used, *e.g.*, in typhoid with failing heart where diuresis is essential; in vomiting in arterio-sclerotics where the stomach becomes distended on the slightest irritation.

Digitalis and Strophanthus combined produce double action on the heart and a single action on the arteries, obtaining thus minimum of blood pressure with maximum cardiac effect.—M. Arch., Dec. 1905,385.

Angina treated satisfactorily with 5 drop daily doses of 1 in 1,000 solution, combined with Theobromine 0.5 Gm. before midday and evening meal for 10 days, then stop the Digitalin.—B.M.J.E. i./07,4.

Digitoxin (P. Helv.). $C_{28}H_{46}O_{10} = 538.28$ (542.368 I. Wts.). *Dose* $\frac{1}{250}$ to $\frac{1}{40}$ grain (0.00025 to 0.001 Gm.).

Crystallized, as prepared by Merck. This is a potent Glucoside, stated to have uniform therapeutic activity. Insoluble in water. Soluble about 1 in 80 of absolute alcohol, and soluble in chloroform.

"The border land between therapeutic and toxic dose with this glucoside is so narrow that no one could walk therein." Comparatively small doses cumulative, slow in action due to slow solubility.—Am.Jl.Ph. May/08,109.

The content in the leaf is about 0.25% in August and September after which the quantity dies off.—B.P.C.

Work in America shows 0.171 to 0.455%. Latest method of Assay.—C.D. i./o8,597. c.f. refs. under Standardisation, p. 299.

0.5 mgr. may be regarded as average therapeutic dose, corresponding to the effects of 0.06 Gm. of Digitalis leaves—but this quantity of leaf would contain only 0.12 mgr., so there is a discrepancy of about 400%. Digitoxin therefore represents only about $\frac{1}{4}$ the power of Digitalis. To assay Digitalis by Digitoxin alone would be about as rational as to assay Opium by Codeine content.—Am.Jl.Ph. Mar. /o8, p. 108.

Owing to its insolubility in water, and this being prone to develop fungi, an aqueous vehicle is inadmissible for the administration of Digitoxin; the best method is in solution in Glycero-alcohol. *Syn.* Petit's Liquor (*vide* p. 342). Solutions may be made containing $\frac{1}{8}$ grain (0.001 Gm.), Digitoxin in 17 minims (1 Cc.) of the mixture. This quantity will approximate 40 drops which may be considered a maximum dose. Suitable either *per os* or as an enema. May also be given in Syrup, Digitoxin 0.1, Alcohol (90%) 200, Distilled Water 750, Syrup to 2,500. *Dose.*—1 to $\frac{1}{4}$ drachms (3.5 to 15 Cc.).

Tablets and Granules (Pills) of Digitoxin are prepared containing $\frac{1}{250}$ grain ($\frac{1}{4}$ milligramme).

Digitalinum Pulverisatum Purum Germanicum. (Merck.)

Dose.— $\frac{1}{10}$ to $\frac{1}{4}$ grain (0.0065 to 0.032 Gm.) three or four times daily in pill, tablets, or subcutaneously. Consists of a mixture of Digitalin (Kilian), Amorphous Digitonin and Digitalein.—M.Am. Non-cumulative, but caution,—powerful drug. It is a yellowish-white powder soluble in water and alcohol nearly insoluble in chloroform. Intravenous injection of Digitalin has been practiced with good results.—B.C.D. i./o7,232. *Well adapted for hypodermic injection, but N.B. Dose was recently largely increased to the above.*

Hypodermic Tablets, $\frac{1}{100}$ grain (0.0065 Gm.).

An infant with bronchopneumonia received $\frac{1}{250}$ grain Digitalin in a hypodermic tablet every two hours for several days—this dose was not excessive—these tablets obviously too weak. $\frac{1}{100}$ grain tablet should be more useful.—B.M.J. ii./o9,919.

Sterules (Hypodermic) Digitalin $\frac{1}{100}$ grain also with Strychnine Hydrochloride $\frac{1}{100}$ grain as heart stimulants.

Tabellæ Digitalini et Nitroglycerini.

Digitalin $\frac{1}{100}$ grain (0.0065 Gm.) with Nitroglycerin $\frac{1}{100}$ grain (0.00065 Gm.)

Useful in aortic disease. Where vascular tension is high the addition of Nitroglycerin prevents increase of peripheral resistance, and thus robs the digitalis of the influence on the arterioles. "On account of which its administration is supposed to be contra-indicated."—L.i./o7,872; B.M.J. i./o7,611.

In high arterial tension where the heart is beginning to fail, and symptoms of irregularity of pulse, giddiness, or even œdema of ankles begin to appear.—L. ii./o8,1132.

*** Digalen (Cloetta's).**

A proprietary solution said to contain in each dose of 1 Cc. (17 minims) 0.3 mgr. of an amorphous glucoside of same empirical formula as digitoxin. For œdema of cardiac debility.—B.M.J. i./o5,1077.

The dose stated corresponds to 0.15 Gm. of *Digitalis Leaves* or 20.3 minims of Tincture (*Off.*).—B.M.J. ii./09,1100.

It has probably increased diffusibility on account of its increased solubility—to which is due, it is said, absence of digestive disturbance when given *per os.*—Pharmacol, 16.

***Digipuratum Tablets** 1½ grains (0.1 Gm.).

Dose.—As a rule four tablets on the first day, three on the second and third days, and two on the fourth, half hour after meals.

A preparation of *Digitalis* said to contain the active principles of the leaves (except *Digitoin*, to which gastric disturbances with *Digitalis* are thought to be due), and to be free from extraneous matter. It is thought to be absorbed in the intestine. The dose is stated to correspond to 0.1 Gm. of *Digitalis Powder*. Diuresis increases under it and pulse falls in frequency, but rises in amplitude.

ELATERIUM (*Off.*).

Dose.— $\frac{1}{10}$ to $\frac{1}{2}$ grain (0.0065 to 0.032 Gm.).

The dried sediment from the juice of fruit of *Ecballium Elaterium* (*Cucurbitaceæ*).

Is a powerful hydragogue cathartic, useful in renal or cardiac disease complicated with dropsy.

In Cyprus we understand the peasants take the fresh juice of the fruits by the nostrils for jaundice.—Ph. Notes.

Pilula Elaterii Composita, St. Bart.'s H.

Elaterium $\frac{1}{4}$ grain, Compound Extract of *Colocynth* 2 grains, Calomel 1½ grains, Capsicum $\frac{1}{2}$ grain.

Tinctura Elaterii Composita.

Dose.—10 to 30 minims (0.6 to 1.8 Cc.).

Elaterium in powder 1, Chloroform 50, macerate 2 days, then add Alcohol (90%) 200, and Compound Tincture of Cardamoms 250, macerate 5 days more and filter. Is more active than a corresponding dose of the powder.

Elaterinum, Elaterin (*Off.*, U.S.). *Syn.* MOMORDICIN.

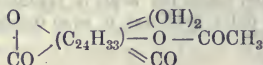
$C_{20}H_{23}O_5 = 345.6$ (348.224 I. Wts.).

Dose.— $\frac{1}{40}$ to $\frac{1}{10}$ grain (0.0016 to 0.0065 Gm.).

The crystalline neutral active principle (to extent of at least 20%) of Elaterium, insoluble in water, soluble in chloroform (about 1 in 12) and sparingly in alcohol.

Mann (Ph.D. Thesis, Giessen, 1907) shows Ether-Precipitation of Conc. Chloroform Extractive best method of preparing Elaterin— $C_{20}H_{30}O_6$ according to him.

Berg thinks the composition to be $C_{23}H_{33}O$, and assigns to it the formula



—Int. Cong., 1909.

According to Power and Moore, Elaterin is not homogeneous; it contains 60–90% of a colorless crystalline non-purgative body; it melts at about 230°C., and is levorotatory. It is accompanied, however, in *crude Elaterin* by varying amounts of

a crystalline body of similar empirical composition, but which is active; it is dextro-rotatory, but has not as yet been purified. This is the active principle. Physiological standardisation desirable—to be controlled by specific optical rotation.

The various empirical formulæ which have been assigned from time to time to Elaterin suffice to show that its composition is not established.

Repeated crystallisation, i.e., 'purification,' tends to remove the active substance.—P.J. ii./09, 497, 501.

The authors suggest terming the laevorotatory constituent α -elaterin and the dextro-rotatory physiologically active constituent β -elaterin. Elaterin exists in the fruits in the free state—not in the form of glucoside. There is no evidence of Glucoside being present.—P.J. ii./09, 701.

Pulvis Elaterini Compositus (Off.).

Dose.—1 to 4 grains (0.065 to 0.32 Gm.).

Elaterin 1, Milk Sugar 39. This is a Trituration, *q.v.*

ELIXIRS.

These are generally composed of a weak-flavoured syrup, with a fair proportion of alcohol. For list consult Index.

Elixir Adjuvans, U.S. Fluidextract of Glycyrrhiza 120, Aromatic Elixir 880.

Elixir Aromaticum, Aromatic Elixir, U.S.

Dose.— $\frac{1}{2}$ to 2 drachms (1.8 to 7 Cc.).

Compound Spirit of Orange, U.S. 12, Alcohol to 250. Add gradually, with constant agitation, Syrup 375, and then Distilled Water 375. Mix with the liquid Purified Talc 30, and filter until clear; then add a mixture of Alcohol 1 and Distilled Water 3 *q.s.* to 1,000. (*Spiritus Aurantii Compositus*, U.S.—Oil of Orange Peel 40, Oil of Lemon 10, Oil of Coriander 4, Oil of Anise 1, Alcohol to 200).

The following saves time:—Mix the Compound Spirit of Orange with Talcum (Magnesium Carbonate better), add to this in a mortar gradually the water and alcohol previously mixed, transfer to a wetted filter and when all 'through' make up volume to 818 Cc., then add the sugar and shake or percolate the sugar with the filtrate.—Am. Jl. Ph., July '06, 332.

Elixir Simplex, B.P.C., 1894:—

Oil of Bitter Orange 30 minims, Rectified Spirit 6 ounces. Dissolve and add, Distilled Cinnamon Water 7 ounces, Syrup 7 ounces. Filter through paper moistened with proof spirit, and well sprinkled with kaolin, returning the first portions of filtrate until it passes through bright.

Dose.—20 minims to 1 drachm. This quantity may be added to the ounce of a liquid medicine.

That of B.P.C. 1907 is about $\frac{1}{2}$ the alcohol strength of above.

N.B.—Alcohol Soluble drugs quite compatible with the original formula may be insoluble in the new one.

Syrupus Aromaticus (Off.).

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.).

Tincture of Orange 1, Cinnamon Water 1. Mix. Shake with a little powdered talc, filter and add Syrup 2.

An alternative formula; Mix equal volumes of 90% Alcohol and Cinnamon Water, and macerate the fresh orange peel in the mixture. This filters clear at the first running, and when mixed with equal volume of Syrup makes a product of much finer flavor.—P. Bo. P.J. i./09, 295.

Elixir Rhei, B.P.C.—Syn. LIQUOR RHEI DULCIS.

Dose.—1 to 3 drachms.

Rhubarb in No. 12 powder 5, Fennel (bruised) 2, Glycerin 3, Sugar 4, Mixture of Alcohol 90% 1, and Water 3, *q.s.* to 20.

Moisten the rhubarb and fennel with diluted spirit 15, macerate 48 hours and press. Break up the mass and add more menstruum *q.s.* to produce, after macerating 24 hours and pressing, 15, with the former liquor. After 24 hours again express and after standing 2 days filter united liquors into the glycerin and sugar and dissolve without heat. Make up to volume.

Elixir Rubrum.

Dose.—20 minims to 1 drachm (1·2 to 3·5 Cc.).

Solution of Carmine (*q.v.*) 1, Simple Elixir (B.P.C. '94) 64. Gives an agreeable flavour and colour to liquid medicines, but is not compatible with acids.

Elixir Ficorum (Martindale).—Syn. SYRUPUS FICORUM.

Elixir or Syrup of Figs.

Dose.—1 to 4 drachms at bedtime or early morning.

Macerate Senna 16 ounces in cold water *q.s.* to cover, twice and decant. In the first liquor heated to boiling, macerate figs cut small 32 ounces. Strain off the liquor as much as possible, and macerate the marc in the second senna liquor previously heated to boiling point. Strain off this second maceration liquor, and evaporate the two combined to 35 ounces. Dissolve in this (hot) sugar 70 ounces. Add, mixed, cinnamon oil 10 minims, oil of cloves 10 minims, chloroform 25 minims in alcohol 90% 150 minims. Make the product up to 80 ounces with water.

ENEMATA.

Substances administered per rectum are absorbed approximately at the same rate as when administered *per os*,—exceptions are Strychnine and Quinine *q.v.* (slower). Albumins are slowly taken up, albumoses and peptones with rapidity; sugars easily, and fatty substances hardly at all, of Starch 50 Gm. *pro die* can be digested. Diluted Alcohol is readily absorbed and increases the absorption of other medicines.

Stimulant Enema. 1 to 2 ounces of Brandy with warm water 1 to 3 ounces.

Nutrient Enemata (*cf.* p. 527 and Peptonoids of Beef, p. 528) are usually small in bulk—about 4 or 5 ounces.

Those to act locally on the rectum or large intestine are generally half to two pints in volume.

Glycerin Enemata for laxative effect rarely exceed $\frac{1}{2}$ ounce. It is customary with Medicated Enemata *e.g.*, Enema Opii to prescribe 'Opium Tincture' *q.s.* (*e.g.*, 5 to 20 minims) as desired by the physician, Mucilage of Starch to 1 (or 2) ounces, and direct this to be used at 100° F., mixed with arrowroot or gruel 5 ounces added by the attendant.

Aperient Enemata (1 to 6 pints) are made with Soft Soap, with warm water *q.s.* or gruel.

Marshall gives the following:—

Evacuant Enemata.

Enema of Sodium Chloride 2 to 5%; Enema of Molasses 10 to 30%; Enemata of Chamomile Infusion and other vegetable infusions; Enemata of Fixed Oils ($\frac{1}{2}$ to 1 pint of Olive Oil), for inflammation of rectum associated with hardened faecal masses. *Vide* also **Aperient** above mentioned.

Enemata for action on rectal mucous membrane contain—

Alum 0·5%.	Ⓢ Mercuric Chloride 0·01 to 0·05%.
Asafetida 5%.	Mucilage 25%.
Boric Acid (Saturated Solution).	Oil of Turpentine 0·5 to 1%.
Bismuth Carbonate or Subnitrate 1%.	Ⓢ Opium (or its alkaloids), a maximum
Cresol (preparations) 0·5 to 1%.	dose (Ⓢ if containing less than 1%
Ferric Chloride (Strong Liquor) 2%.	morphine).
Infusion of Garlic and similar antispasmodic substances.	Salicylic Acid 0·3%.
Lead Acetate 1%.	Silver Nitrate 0·1%.
	Tannin 1%.

Cf. also in text *Enema Magnesii Sulphatis* (et Acida), *Enema Naphthalini*, *Enema Nutriens*, *Enema Olei Ricini* and *Enema Olei Terebinthinæ*.

For ulceration of rectum Silver Nitrate 10 grains to the pint, also Salol Enemata 1 to 2 drachms in Turpentine (U.S.), also Ferrous Sulphate and Copper Sulphate.—Pr. Aug. 09, 152.

Enema for thirst after operation (U.C.H.): 2 pints of hot water.

U.C.H., C.X., E., C.H.W., St. G.H., and W., and many others give formulæ for various Enemata which should be consulted.

ERGOTA.

Ⓢ *Ergot of rye and preparations of Ergots.*

Ⓢ *Ergot of Rye* (Off.).—Syn. SECALE CORNUTUM.

The sclerotium of the fungus *Claviceps purpurea* (*Pyrenomyces*) on *Secale cereale* (*Graminaceæ*).

Dose.—20 to 60 grains (1·3 to 4 Gm.) in recent powder infused in boiling water.

FR. CX. Maximum single dose 15 grains. Maximum during 24 hours 60 grains approximately.

To be not more than 1 year old (U.S.) and to be kept whole, not in the powdered condition.—F.I.

Ergot was found to become 7 or 8 times weaker after being kept one year, whilst aqueous extracts of Ergot begin to lose activity in a few hours.—L. ii./08, 408.

Kramer thinks Ergot might possibly be cultivated on nutrient Media made from cereals such as wheat and rye.

Antidotes,—see chapter on.

It was found that not only were fluid extracts physiologically active in proportion with the amount of precipitate they yielded on dilution with water, but also in proportion as this precipitate yielded high percentage of Benzol extractive. Benzol, however, does not exhaust the drug completely. The Benzol extractive is a yellow resin, soluble also in Alcohol, insoluble in Acids, but readily soluble in solutions of the Hydroxides. Other characters go to deduce that the body is the Sphacelotoxin of Jacobi.—Am. Jl. Ph.—May '09, 215.

Flavoring.—The Liquid Extract, etc., are not nauseous to taste, but Syl Vanilla, or Syrupus Limonis or Syrupus Aurantii may be used.

Uses.—Almost entirely for its action on the uterus, stimulating muscular contraction, and so to check bleeding after parturition, and, from the presence of fibroid tumour, also to promote involution.

Ergotiu causes spasm of arterioles and rise of blood pressure, by acting

directly on the vessels independently of the central nervous system. It is useful in polyuria.

Is also given to check night sweats, spermatorrhœa and menorrhagia. It has been suggested for the relief of sleeplessness, by causing cerebral anæmia by constricting the blood vessels.

All diseases in which a drug inducing muscular contraction is indicated should, according to one authority, be treated by Ergot, *e.g.*, disturbances of the circulatory system, skin affections, acne rosacea, also nerve complaints (excessive smoking).—M./o8,205.

Surgical shock prevented by Ergot with Sparteine.—L. ii./o4,1395.

In surgical shock 15 minims of Injection useful.—L. ii./o8,23,85.

For disordered circulation and for headache (hypodermically), alcoholism, hysteria and in acute inflammatory infections—meningitis, pneumonia, pericarditis.—New York Med. Assoc., March, 1903.

Yield of alkaloid 0.06 to 0.12%.—P.J. ii./o4,475.

Estimation method.—P.J. ii./o5,580.

No assay by chemical method recognised. White Cross Society wanted 0.1% Alkaloid.—C.D. ii./o9,579.

Samples yielding high extractive to water inferior therapeutically to ones yielding low.—Southall's Lab. Rep., 1907.

Spanish Ergot is better than Russian.—Martin. (We have always thought so ourselves.) In physiological assay uterine muscle contraction is the only true test.—P.J. ii./o9,149,211.

Ⓢ **Extractum Ergotæ Liquidum.** 1=1 of Ergot. (*Off.*), "100%."

—F.I. C.R. says apparently no change will be necessary.

Dose of Off. preparation.—10 to 30 minims (0.6 to 1.8 Cc.) or more.

B.P. directions are to exhaust 20 ounces with $7\frac{1}{2}$ pints of water by repeated infusion and evaporate to 14 ounces. Equally good effect can be produced by percolation without evaporation.—C.D. i./o5,464.

Fr. Cx., 1=1 by weight. Maximum *dose* during 24 hours 6 Gm. Macerate Ergot 1,000 with water 2,000 containing Tartaric Acid 1, for 12 hours. Percolate and finish exhausting with a further 3,000 of water. Evaporate the liquid on a water bath to 500, allow to cool, and add Calcium Carbonate 2 and Alcohol 95% 500. Shake thoroughly and allow to stand 24 hours. Filter. Evaporate the Alcohol on a water-bath at low temperature. Add Cherry Laurel Water 150, and then Distilled Water to 1,000. Finally dissolve in the product Salicylic Acid 1.5—all by weight, and filter.

Ⓢ **Extractum Fungi Secalis Fluidum P. Austr.** Extract fat from Ergot 100 by petroleum ether; dry the marc and moisten with a mixture of Glycerin 5, Alcohol 20, Water 20. Percolate to 100.

In chorea 1 to $1\frac{1}{2}$ drachms of liquid extract together with liquor arsenicalis 2 to 3 minims.—B.M.J. i./o5,354.

The preparation of P. Belg. (1=1) contains 1.7% hydrochloric acid and the Ergot is first freed from fat with Petroleum.

Normal (Physiologically Standardised) may be of such strength that 0.66 Cc. will cause a rise in blood pressure of 60 m.m. in an animal weighing 1,500 Gm.—Southall Bros., Lab. Rep., 1907.

Martin finds the Liquid Extract of the British Pharmacopœia a good active preparation if made from sound ergot. The official preparations need to be studied afresh pharmaceutically, clinically and pharmacologically.—P.J. ii./o9,149.

Physiological Tests on identical samples of Liquid Extract of Ergot by three different physiological experts, gave three totally different reports. Difference of opinion exists, as to whether Russian or Spanish Ergot is best.—P.J. ii./o9,794.

① **"Ergot Aseptic."** Concentrated and sterilised liquid extract in 1 Cc. bulbs, representing Ergot 2 Gm.

① **Infusum Ergotæ** (*Off.*) 1 in 20.

Dose.—1 to 2 ounces (30 to 60 Cc.).

① **Tinctura Ergotæ** (B.P. 1885). 1 in 4 Proof Spirit.

Dose.—5 to 30 minims (0·3 to 1·8 Cc.) or more.

Might be made with 45% Alcohol.—P.J. ii./09,142. Ph. Ned. has 1 in 5 in Alcohol 70% Ergot freed from fat with Petroleum Ether.

① **Vinum Ergotæ**, U.S.

Average dose.—2 drachms. Fluidextract of Ergot 20, Alcohol 5 White Wine 75.

① **Injectio Ergotæ Hypodermica** (*Off.*).

Dose.—3 to 10 minims (0·18 to 0·6 Cc.).

Extract of Ergot 10, Phenol 0·3, Distilled Water, *q.s.* to 30. Should be freshly prepared.

Use.—In epistaxis, injection into the arm of 3 grains of Extract in 10 minims of warm water is successful. A dose of Ergotin, injected deeply into the gluteal muscles just before delivery, seldom fails to give perfect uterine contraction. Neither ergot nor iron will induce abortion in pregnant women unless previously disposed (Lombe Atthill).—B.M.J. i./89,350.

① Sterules, Hypodermic contain 10 minims of this injection.

① **Extractum Ergotæ** (*Off.*). *Syn.*—ERGOTIN, EXTRACTUM HÆMOSTATICUM (F.E.).

Dose.—2 to 8 grains (0·13 to 0·52 Gm.).

Ergot, in No. 40 powder, 1,000, is exhausted with 60% alcohol, and the percolate evaporated to 250. To this is added Distilled Water 250, the mixture filtered, Diluted Hydrochloric Acid 47, added, and after twenty-four hours again filtered, Sodium Carbonate 20, added, and the mixture evaporated to a soft extract.

This extract was designed not exclusively for medication *per os*, but also for hypodermic use.

Ergot contains sphacellinic acid and colouring matter. In the official process the acid is precipitated by water and the colouring matter by hydrochloric acid, which is then neutralised by sodium carbonate. For making a hard extract for pills evaporate to dryness and add milk sugar or powdered althea.—P.J. ii./04,107.

U.S. is similar in strength but contains 10% of glycerin.

Fr. Cx. an aqueous extractive precipitated by alcohol and evaporated.

F.I. requires this method. C.R. queries suitability of the new extract for making hypodermic injection.

P. HUNG employs chloroform water for macerating and has in addition a Dextrinated Extract $\frac{1}{2}$ strength.

It is given to check all forms of passive hæmorrhage.

① Tablets and Pills, 1, 2, and 3 grains. *Dose.*—1 to 3.

① Capsules of Ergotin contain 3 and 5 grains (0·2 and 0·3 Gm.). (*c.f.* also Capsules Apiol and Ergotin.)

Ⓐ **Ergotinina**, *Ergotinine Cristallisée* $C_{35}H_{40}N_4O_6 = 607.89$ (612.36 I. Wts.), FR. CX., F.E. Contains more Nitrogen, according to Barger and Carr, than the base of Tanret (Brit. Ass. 1906) $C_{28}H_{32}O_4N_4 = 484.76$ (488.296 I. Wts.). B. and C.'s formula is $C_{35}H_{39}O_5N_5 = 604.95$ (609.362 I. Wts.).—B.M.J. ii./06, 1791.

Dose.— $\frac{1}{200}$ to $\frac{1}{4}$ grain (0.00032 to 0.001 Gm.).

FR. CX. has the latter as *maximum single dose*, and maximum in 24 hours, $\frac{1}{2}$ grain, approx.

An alkaloid in minute yellowish crystals, insoluble in water, soluble in Alcohol (1 in 200 of 95 %, FR. CX.), less in ether, very in chloroform, present to the extent of 0.1 to 0.25 % in Ergot.

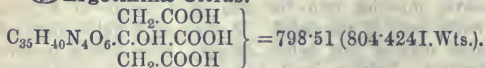
Acetic, Lactic and Formic Acids dissolve the base, especially if in concentrated strength.

This body according to Barger and Carr is practically inactive.

Ⓐ **Solution hypodermique d'Ergotinine de Tanret.*

Dose.—3 to 10 minims (1 Cc. contains 0.001 Gm.).

Ⓐ **Ergotininae Citras.**



Dose.— $\frac{1}{160}$ to $\frac{1}{30}$ grain (0.00043 to 0.0022 Gm.).

A soluble salt of the above, in greyish powder.

Ⓐ **Hypodermic Tablets and Sterules*, Hypodermic are also prepared containing $\frac{1}{200}$ and $\frac{1}{100}$ grain of Ergotinine citrate.

Ⓐ **Ergotoxine** (Sphacellinic Acid and Sphaecelotoxin—Kobert, Jacoby may contain this)— $C_{35}H_{41}O_6N_5 = 622.83$ (627.378 I. Wts.) *Dose.*— $\frac{1}{100}$ to $\frac{1}{20}$ grain. Is described as amorphous and hardly soluble in water, and strongly active physiologically on the uterus,—raises blood pressure. Solutions in dilute Caustic Alkali are injected.

Ergotinine is stated to be the Anhydride of Ergotoxine *v. supra*,—one can be converted into the other. Ergotoxine Salts (all crystalline) are described, *e.g.*, the Acid and Normal Oxalate, Phosphate and Hydrochloride.—P.J.I./07, 520. *c.f.* also M.A. 1908, 15; Y.B.P., 1907, 60. J.C.S. 1907, 91, 349.

Ergotoxine Hydrochloride is the salt employed in producing,—it is soluble only 1 in 6,000.—J.O.S. 1907, 91, 337.

Ⓐ **Hypodermic Tablets* contain Ergotoxine 1/100 grain, also Ⓐ with Morphine Sulphate 1/6 grain, and Ⓐ with Strychnine Sulphate 1/20 grain.

Ⓐ **Injectio Ergotoxinæ Hypodermica* 0.12% ($\frac{1}{100}$ grain in 8 minims).

Dose.—2 to 15 minims (0.12 to 0.9 Cc.).

We gather that extracts made according to the British Pharmacopœia are a good deal more active than could be accounted for by the small amount of Ergotoxine present?—one or more additional principles in it.—*vide infra*.

Ⓐ **Ernutin.*—Tubes of Solution physiologically standardised for hypodermic use, contain Ergotoxine and Tyramine. In two forms (a) for oral—*Dose*, 30 to 60 m. to be given after labour is completed, and (b) for hypodermic use.

Ⓐ **Cornutine.** (*Dose.*— $\frac{1}{2}$ to $\frac{1}{4}$ grain), which Kobert claimed as a decomposition product of Ergotinine is apparently impure Ergotoxine. *q.v.* above.

A summary showing relationship of ergot substances—in any of them old names—the rest are embodied in text.—L. ii./08, 514.

Ⓐ **p-Hydroxyphenylethylamine.** *Syn.* *TYRAMINE.

$OH \cdot C_6H_4 \cdot CH_2CH_2NH_2 = 136.1$ (137.098 I. Wts.).

* It could, however, be upheld that these are "preparations" of Ergot and hence be Ⓐ

Dose.—1/12 grain (0.005 Gm.), repeated if necessary.

An organic base which is stated to be the chief active principle of aqueous extracts of Ergot.

Hypodermic Tablets, $\frac{1}{12}$ grain, are prepared.

It contributes along with Ergotoxine to the action of Ergot, and is a constituent with the latter in Ernutin.

The activity of placental extracts has been shown to be due to Tyramine. It appears to be present in Ergot to the extent of 0.01 to 0.1%. It is probably a normal product of the living fungus, like Cadaverine, which was also isolated from Ergot. *p*-Hydroxyphenylethylamine was obtained from putrid meat. It may be made by heating tyrosine, and is readily synthesised by reducing *p*-hydroxybenzylcyanide with sodium and alcohol: $\text{OH.C}_6\text{H}_4.\text{CH}_2.\text{CN} + 4\text{H} = \text{OH.C}_6\text{H}_4.\text{CH}_2\text{CH}_2\text{NH}_2$. Crystallised from xylol and distilled (B.P. 161°–163° at 2 mm.) the base forms hexagonal plates, m.p. 161°, readily soluble in water and in Alcohol. On methylation it yields the methiodide of the alkaloid hordenine. $\text{OH.C}_6\text{H}_4.\text{CH}_2\text{CH}_2\text{N}(\text{CH}_3)_3\text{I}$.—*Biochem. Jl.* 1907, 2, 286; *Trans. Chem. Soc.* 1909, vol. 95, p. 1123; *C.D.* i./09, 833, ii./09, 229, *P.J.* i./09, 739, 761; ii./09, 141; *L.* ii./09, 1442.

Urine normally contains this body or one allied to it and Urohypertensine (the latter probably identical with iso-amylene) both causing rise in blood pressure.—*L.* ii./09, 367.

Uses. Its action is similar to that of the supra-renal active principle, but weaker, slower, more persistent and less toxic. Given hypodermically or by the mouth it produces a marked rise of blood-pressure, with increased vigour of the heart's action. Administered in shock or collapse, and for producing contraction of the uterus *post-partum*.

Ⓓ *Liquor Ergotæ Aceticus.* *Syn.*—*Fluidextractum Ergotæ.*
U.S. Contains 2% of acetic acid, with diluted alcohol. 1 = 1 of Ergot.

Dose.—10 to 60 minims (0.6 to 3.5 Cc.).

U.S. *Average dose.*—30 minims.

Ⓓ *Liquor Ergotæ Ammoniatus.*—1 = 1 of Ergot.

Dose.—10 to 60 minims (0.6 to 3.5 Cc.).

An efficient and reliable preparation, made with diluted ammoniated alcohol. The combination of ammonia and Ergot is indicated in some forms of post-partum hæmorrhage, &c. In dose of $\frac{1}{2}$ to 1 drachm is useful in second stage of labour when the pains are feeble but the passages are normal.

Ⓓ *Tinctura Ergotæ Ammoniata (Off.).*

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.).

Ergot 5, Solution of Ammonia 2, Alcohol (60%) *q.s.* to 20 by percolation.

Ⓓ *Elixir Ergotæ cum Ferro.* Martindale.

Dose.—2 drachms repeated if necessary.

Dissolve the Iron pyrophosphate (U.S.) 5 grains in 1 drachm warm water and add to Liquid Extract of Ergot 10 minims, Simple Elixir (B.P.C. 504) to 50 minims.

N.B.—The Iron Pyrophosphate *must* be the U.S. scale preparation.

For anæmia and excessive (or diminished) menstruation in young women.

Ⓓ *Mistura Ergotæ cum Ferro*, St. M.'s H.

Liquid Extract of Ergot $\frac{1}{2}$ drachm, Tincture of Ferric Chloride 15 minims, Spirit of Chloroform 10 minims, Glycerin $\frac{1}{2}$ drachm, Water to 1 ounce.

Ⓢ Mistura Ergotæ Sedativa S.H.

Ammoniated Tincture of Ergot 30 minims, Potassium Bromide 8 grains, Potassium Chlorate 8 grains, Glycerin 15 minims, Chloroform Water to 1 ounce.

Ⓢ* Acidum Scleroticum.—Syn. SCLEROTINIC ACID. $C_{12}H_{19}NO_9$ (?) = 318.78 (321.162 I. Wts.).

Dose.— $\frac{1}{2}$ to $\frac{3}{4}$ of a grain (0.032 to 0.05 Gm.) hypodermically in 10 minims of water.

An amorphous brown hygroscopic acid principle obtained from Ergot. Hæmostatic and anti-epileptic.

Ⓢ* Hypodermic Tablets contain $\frac{1}{16}$ grain (0.004 Gm.) Sclerotic Acid.**ERYTHROL NITRAS.**

$CH_2.ONO_2 - CH.ONO_2 - CH.ONO_2 - CH_2.ONO_2 = 299.96$ (302.088 I. Wts.).

Syn. ERYTHROL TETRANITRATE; NITRO-ERYTHRITE. ERYTHRO-TETRANITRAL.

Dose.— $\frac{1}{2}$ to 1 grain (0.032 to 0.065 Gm.), increased to 3 grains or more in tablet form *vide infra*.

In colourless and slightly tar-like smelling crystals, nearly insoluble in water, **soluble** about 1 in 60 of absolute alcohol; melting point, 61° C. It is formed by dissolving erythrol (a sugar) in fuming nitric acid, and precipitating by sulphuric acid; is explosive, except when in solution in chocolate.

Uses.—As a vaso-dilator like nitroglycerin and amyl nitrite, and has a less powerful though perhaps more prolonged action in reducing blood-pressure. Employed in angina pectoris, chronic Bright's disease, nephritis, aneurism, Raynaud's disease, dyspnoea, headache, and nervous affections.

For angina, to avert paroxysms even half a drachm a day was taken.—B.M.J. i./98,18,127; i./99,256,1088.

Has been found to be an excellent sedative in lead colic, as it relaxes the painful spasms of the intestinal coats.—Nonveaux Remèdes, 1901,477.

In granular kidney most satisfactory.—B.M.J. ii./08,519.

Tabellæ Erythrol Nitratis. *Dose.*—1 or 2.

Contain $\frac{1}{2}$ grain, combined with chocolate; the fat of the chocolate being a solvent of the nitrate. Tabellæ $\frac{1}{2}$, $\frac{1}{4}$ and 1 grain are also prepared.

These tablets are the best method of administration.—B.M.J. i./97,907; i./99,256; ii./99,411.

Præcordial pains promptly relieved by a tablet three times a day.—B.M.J. i./98,431.

Asthma, very effective in, especially if followed by some hot drink, *e.g.*, Bovril, relief lasts at least 24 hours.—W.W.W.

As a vasodilator in the aged better than nitro glycerin, because action slower.—B.M.J. ii./09,1314.

*These might be held to be "preparations of Ergots" and hence Ⓢ.

A doctor kept himself free from attacks of angina by daily use of, for 3 or 4 years, beginning with $\frac{1}{2}$ grain thrice daily and gradually increasing.—Brunton. L. ii./os, 1132.

Intermittent closing of cerebral arteries, various questions to consider as to treatment, Spirit of Nitrous Ether controls the irritable toxicity of the vessel walls; where symptoms are urgent Erythrol $\frac{1}{4}$ to $\frac{1}{2}$ grain repeated every 3, 4, or 6 hours, as required, is advised.—B.M.J. ii./og, 1110.

Mannitol Nitrate, Mannitol Hexanitate.— CH_2ONO_2 . (CH_2ONO_2)₄. $\text{CH}_2\text{ONO}_2 = 448.94$ (452.124 I. Wts.). *Syn.* HEXANITRIN; NITROMANNITE.

Dose.—1 grain (0.065 Gm.), increased.

The nitrate of the hexatomic alcohol mannite, *v.p.* 714.

$\text{C}_6\text{H}_8(\text{OH})_6 = 180.74$ (182.112 I. Wts.). *Ph. Ned.*

In light acicular crystals, M.P. 113°C .; is less soluble in water, but more explosive than erythrol nitrate, and if long kept is liable to decomposition. Requires extra care. Is used similarly to erythrol nitrate, and is not so costly. In angina and asthma its action is not so powerful, but probably more prolonged.—B.M.J. ii./95, 1213; i./98, 528.

Tabellæ Mannitol Nitratis.

Contain 1 grain (0.065 Gm.) in each with chocolate.—B.M.J. i./98, 893.

ERYTHROPHLÆUM.

Casca Bark.—*Syn.* SASSY BARK; ORDEAL BARK. The bark of *Erythrophlæum Guineense* (*Leguminosæ*).

Tinctura Erythrophlœi.

1 in 10 Alcohol (90%). *Dose.*—5 to 10 minims (0.3 to 0.6 Cc.).

① **Erythrophlœinæ Hydrochloridum.** *Dose.*— $\frac{1}{10}$ to $\frac{1}{4}$ grain (0.0016 to 0.0027 Gm.) in pill.

In yellowish white granular crystals, readily soluble in water. Has the combined action of digitalin and picrotoxin, and is a local anæsthetic for eye-work in 0.05 to 0.25% solution.

Dental Use.—An almost ideal drug for the treatment of sensibility of dentine. It is a true obtundent only where locally applied, and has no central direct effect on the pulp. The sensibility in a cavity filled with the alkaloid was in 24 hours absolutely abolished.

② 'Throphleol,' a solution (50%) of Erythrophleine Hydrochloride in Eugenol is most conveniently used.

After thorough dehydration of the cavity a small piece of cotton or bibulous paper saturated with the solution is sealed with a temporary gutta percha filling, placing as much as possible in actual contact with the dentine, and left *in situ* for 24 or 48 hours, not longer, or slight inflammatory symptoms in pulp or peri-cementum supervene. With this exception it has no injurious effects even for young children. Death of the pulp has not been observed after use. Pain and peri-cementitis 2 or 3 days after filling have, however, been reported.—Dental Annual and Directory, 1904, p. 223.

Excavation of the approximal cavity in a first molar was painless, but that of the occlusal cavity in the same case was painful.—Dental Surgeon, April 15, 1905.

EUCALYPTI FOLIA.

Dose.—5 grains (0·32 Gm.) or more in powder.

The dried leaves of *Eucalyptus Globulus* (*Myrtaceæ*), or Blue Gum-tree of Australia, have been employed medicinally in the treatment of ague and bronchitis, and malarial fevers; an infusion 10 grains to the ounce of hot water is said to have cured diabetes; also for smoking in cigarettes in cardiac and aneurismal asthma. They are official in U.S. 5 to 10% in dusting powder is useful to ward off mosquitos.

Oleum Eucalypti (*Off.*), U.S.

Dose.— $\frac{1}{2}$ to 3 minims (0·03 to 0·18 Cc.) on sugar, emulsified, or mixed with olive oil. U.S. *average dose* 8 minims.

Is principally distilled from the leaves of *Eucalyptus globulus*, as well as *E. amygdalina*, *E. dumosa*, *E. oleosa*, *E. Cheorifolia*, *E. uncinata*, *E. gracilis*, *E. incrassata* and *E. citriodora* (the latter has odour resembling lemon-grass). The amount yielded from the fresh leaves is about 1 to 4%. The official oil contains at least 50% eucalyptol. The oil ozonizes the atmosphere whilst oxidizing. The pinenes contained have the principal action in this direction. It is of a pale yellow colour, and has aromatic odor and taste; boils between 338° and 392° F.; its official Sp. Gr. is 0·910 to 0·930. It should not cause much coughing when inhaled (due to Phellandrene—for inhalation the oil should have a Sp. Gr. not below 0·9). PH. ITAL. requires at least 70% Cineol.

As source of Eucalyptus Oil (above) Umney thinks *E. dumosa* plays important part at the present time.—C.D., ii./09,580.

OLEUM EUCALYPTI.—(*P. Off.*) Oil distilled from the fresh leaves of *Eucalyptus Globulus*, *E. dumosa*, and other species, and rectified. Sp. Gr. as above. O.R., +10° to -10° soluble, 1 in 5 of 70% alcohol. Should contain at least 55% by vol. of cineol when tested according to the process described under "*Oleum Cajuputi*," (*P. Off.*). If 1 Cc. be mixed with 2 Cc. of glacial acetic acid and 5 Cc. of petroleum ether, and 2 Cc. of a saturated aqueous solution of sodium nitrite added, and the mixture gently shaken, no crystalline precipitate should form in the upper layer (exclusion of oils containing much phellandrene).

Effects of 5 to 6 drachms of the oil taken in error. Violent vomiting: recovery.—B.M.J. i./09,1297.

Soluble in oils, fats, paraffins, and about 3 in 1 of 90% alcohol, and in all proportions in absolute alcohol.

Uses.—Antiseptic, a popular prophylactic, inhaled or sprayed for influenza and bronchial catarrh. Useful mixed with an equal quantity of olive oil as a rubefacient for rheumatism,

West Australian Eucalypts and their Oils. Aromadendral is a new aldehyde.—P.J. ii./05,356, 382.

Transvaal Oil is of excellent quality.—P.J. i./09,4.

Poisoning by drachm doses. Emetics: Recovery.—L. ii./05,963,1894; B.M.J. i./06,1085; B. & C.D. /06, 12.

Broncho-pneumonia of Infants, Treatment by. Surround the crib with a tent soaked in Eucalyptus Oil 1, Water 5. Evaporation of the moisture and inhalation of the Oil has soothing effect, and greatly diminishes cough.—B.M.J. ii./08,371.

Scarlet Fever treated by inunction of the Oil over the entire body.—B.M.J. ii./08,1333. Several cases proving efficacy of the method.—B.M.J. i./09,440. The procedure is of exceedingly doubtful efficacy,

It has often been tried in fever hospitals. Furthermore, likely to be exceedingly irritating to the eyes if rubbed for example over the scalp.—B.M.J. i./09,307.

In cholera Eucalyptus Oil 10 minims twice daily has a definite prophylactic effect.—Brooke, 166.

Eucalyptol, U.S. Fr.C.X, F.E.—*Syn.* CINEOL; CAJUPUTOL.

$C_{10}H_{18}O = 152.98$ (Off. and U.S. Wts.) (154.144 I. Wts.) *Dose.*—1 to 4 minims (0.06 to 0.24 Cc.).

Is that portion of eucalyptus oil which passes over between 347° and 351° F., and crystallizes at 30° F. It is preferred to the crude oil for use in the oro-nasal inhalers, as it does not dry up as a varnish. It may be obtained from the oil by the action of phosphoric acid (Faulding's Process), with which it forms a crystalline compound, **Eucalyptol Phosphate** (official test). On addition of water, this splits up, setting free Eucalyptol.

Further notes on Eucalyptus Oils and Cineol, Allen, Vol. II., part 3, '07, pp. 348 and 418.

Phellandrene, $C_{10}H_{16} = 135.1$ (135.123 I. Wts.) is a large constituent of the oil of *E. amygdalina*, producing an irritating effect when inhaled.

C. T. Bennett experimenting with the resorcin method of determining eucalyptol in the oil finds the results misleading. Resorcin solution gives results 25 to 50% too high. The process in the U.S.P. gives results invariably too low.—C.D., Jan. 11/08, p. 55.

Fluidextractum Eucalypti, U.S. 1=1 Hydro-alcoholic percolate.

Average dose.—30 minims.

Tinctura Eucalypti (Foliorum), B.P.C.

Dose.—15 minims to 2 drachms.

Leaves in No. 20 powder in alcohol 60% 1 in 5.

Hæmorrhage from superficial wounds.—Any form is stated to be stopped by internal use of calcium chloride combined with local application of this tincture.—B.M.J. ii./09, 81.

Unguentum Eucalypti (*Off.*).

Hard Paraffin 4, Soft Paraffin, white, 5. Melt, and add while hot, Oil of Eucalyptus 1. Stir till cold. A mild antiseptic dressing.

Unguentum Eucalypti et Acidi Borici.

Eucalyptus Oil 40, Boric Acid 120, Soft Petroleum to 500. Lessens secretions of rhinitis.—M. Arch., 1905.

Vapor Eucalypti, T.H.

Eucalyptus Oil 20 minims, Light Magnesium Carbonate 10 grains, Water to 1 ounce. A teaspoonful in a pint of hot water. (Vic. Park has double quantity of oil.)

Vapor Eucalypti Compositus, R.F.H.

Eucalyptus Oil 2, Compound Tincture of Benzoin 3, Thymol 1, Spirit of Chloroform to 8. 10 drops at a time to be inhaled through an inhaler, the 'Ozonic.'

Nebula Eucalypti Composita.

Form A.—Eucalyptus Oil 5 minims, Cinnamon Oil 2 minims, Menthol 12 grains, Liquid Paraffin containing 2% Aristol to 1 ounce. A small quantity sprayed into the nostrils at bed time, and occasionally afterwards if suffering, is said to be a cure for a common cold.

Form B.—Eucalyptus Oil 5 minims, Wintergreen Oil 5 minims, Menthol 5 grains, Liquid Paraffin to 1 ounce.

References to Eucalyptus Oil.

Typhoid fever has been treated by 10 minim doses of Eucalyptus Oil. The oil must contain a sufficiency of ozone due to oxidation of the terpenes—or with advantage a little hydrogen peroxide may be added. There is a marked reduction in temperature.—C.D. i./05,402.

Ankylostomiasis treated with good results by Eucalyptus Oil. Two formulæ (l.) weak,—Eucalyptus Oil 2 Gm., Chloroform 3 Gm., Castor Oil 40 Gm. (ll.) strong,—Eucalyptus Oil 2·5 Gm. Chloroform 3·5 Gm. Castor Oil 40 Gm. Dose $\frac{1}{4}$ to $\frac{1}{2}$ of either according to age and condition of patient. Also successful for tapeworm and threadworm. L. i./06,285; i./08,699.

Colds treated by steam inhalation with the oil, also internally 10-15 minims on sugar every 3 or 4 hours.—L. ii/08,1661. See also Oleum Cinnamomi.

* **Eugol.** A proprietary said to contain Beta-Naphthol, Boric Acid, Menthol, Thymol, Eucalyptol, Gaultheria and Hamamelis.—B.M.J. i./98,702.

EUONYMI CORTEX (Off). U.S.

The Root Bark, obtained from *Euonymus atropurpureus* (Celastraceæ), the wahoo or spindle-tree.

Uses.—Possesses tonic, hydragogue, cathartic, diuretic, and anti-periodic properties.

Extractum Euonymi Siccum. Dry Extract of Euonymus. (Off). *Syn.* EUONYMIN.

Dose.—1 to 2 grains (0·085 to 0·13 Gm.).

$\frac{1}{4}$ to 1 grain cholagogue, 1 to 4 grains cathartic.—C.D. ii./07,371.

The bark in No. 20 powder is percolated with 45% alcohol, the percolate concentrated, calcium phosphate added, and the mixture evaporated and reduced to powder. It must be kept cool and dry, or it cakes together again. (Naylor.—P.J. July 28,06, recommends 70% alcohol). As thus prepared it would obviously be of brown colour. In commerce chlorophyll is sometimes added. U.S. 1=4 of bark by concentration of Liquid Extract and making up to weight with powdered Glycyrrhiza.

Fr. Cx. has EUONYMINE BRUNE. *mar. single dose* $1\frac{1}{2}$ grains, max. in 24 hours 3 grains approximately.

Pilula Euonymin.

Euonymin 2 grains (0·13 Gm.), Extract of Henbane, *q.s.*, for one pill; take at bedtime. A cholagogue stimulant, producing no depression or headache; requires to be followed by a saline aperient in the morning.

One grain, combined with 4 grains of Iridin, is a successful purging dose. Tablets, Euonymin, $\frac{1}{8}$, $\frac{1}{2}$ grain.

Extractum Euonymi Liquidum.

1 = 1 made with Alcohol (90%) 4, water 1.

Dose.—10 to 60 minims (0·6 to 3·5 Cc.).

Fluidextractum Euonymi. U.S. Is similar.

Liquor Euonymini et Cascaræ. B.P.C.

Dose.— $\frac{1}{2}$ to 1 drachm.

Macerate Dry Extract of *Euonymus* 3·5 with Alcohol 60% 25, in a closed vessel 4 days—filter and wash the filter with sufficient Alcohol 60% to produce 25. Add sufficient Tasteless Liquid Extract of Cascara (B.P.C.) to produce 100. In chronic constipation.

Liquor Euonymini* et Iridini*. B.P.C.

Dose.— $\frac{1}{2}$ to 1 drachm.

Macerate Dry *Euonymus* Extract 3·5 with Alcohol 60% 50, in a closed vessel 4 days. Dissolve Iridin 1·75 and Potassium Carbonate 1·5 in water 25 by warming. Mix, filter, and make up with Alcohol 60% to 100. Purgative and presumed cholagogue.

Liquor Euonymini et Pepsini (Glasg. Form.).

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Extract of *Euonymus* (*Off.*) 155 grains, Pepsin Soluble (Scale) 310 grains, Dilute Hydrochloric Acid 340 minims, Alcohol (45%) 6 ounces, Chloroform Water to 20 ounces.

This preparation can be satisfactorily made according to the formula.

Tinctura Euonymi, B.P.C.

Dose.—10 to 40 minims.

Euonymus Bark in No. 20 powder 1, Alcohol (90%) 5. Moisten, macerate 24 hours, and percolate to 5.

EUPHORBIA PEPLUS.

(*Euphorbiaceæ.*)

PETTY SPURGE, DEVIL'S MILK.

Is of value in all cases of dyspnoea whether of pulmonary or pneumogastric origin. Modifies secretion in asthma and suppresses attacks.

Whatever the active ingredients may be the plant in the fresh condition has an acrid juice, which, when carefully dried, imparts its virtues both to water and alcohol.—Tincture, Decoction or Extract are, therefore, equally suitable for use.

Extractum Euphorbiæ Pepli.

Dose.— $7\frac{1}{2}$ to 30 grains (0·5 to 2 Gm.). Apparently too high in comparison with dose in Decoction.—W.H.M.

Tinctura Euphorbiæ Pepli. (1 in 5 by 45% Alcohol.)

Dose.—30 to 60 minims (1·8 to 3·5 Cc.) during the day.

Decoctum Euphorbiæ Pepli.

45 grains of the entire herb to the pint.

Dose.—1 teacupful (diluted if preferred) 3 or 4 times daily, preferably between meals.

Has acrid taste, must be flavored, *e.g.*, with Gyl Lavandule or Syl Rosæ.

—L. ii. 08,253; F.N. 1909.

EUPHORBIA PILULIFERA.

(*Euphorbiaceæ.*)

Australian Snake Weed or Cat's Hair.

Uses.—For asthma, bronchial affections, paroxysmal dyspnoea, laryngeal spasm, whooping-cough, angina pectoris, in coryza, and hay fever. It appears to act directly and solely on the respiratory and cardiac centres.—

L. ii./91,505; ii./08,252. Constituents of.—P.J. ii./05,414.

* Would perhaps be better without final 'i'—indeclinable.

Extractum Euphorbiæ (Piluliferæ) (Aqueous).

Dose.— $\frac{1}{2}$ to $1\frac{1}{2}$ grains (0.032 to 0.1 Gm.).

Tinctura Euphorbiæ (Piluliferæ), B.P.C.

1 in 5 of alcohol 60%.

Dose.—10 to 30 minims.

The resinous constituent finely powdered is injected suspended to stop hæmorrhage, *e.g.*, in fibroma of the uterus.—M.A. 1908, 15.

Contains small quantity of alkaloid, resins and waxy substances, but no volatile oil.—P.J. ii/09, 141.

FEL BOVINUM PURIFICATUM.

Purified Ox Bile (Off). U.S.

Dose.—5 to 15 grains (0.32 to 1.0 Gm.).

A dark greenish brown bitter-sweet mass.

Soluble in water and alcohol 90%, insoluble in ether.

Manufactured by evaporating 20 of fresh ox bile to 5, mixing with 10 of alcohol 90%, separating the precipitate and evaporating the clear fluid to thick extract consistence. It is composed of bile salts, cholesterin, lecithin and bile pigments. It is best given in keratin-coated pills or capsules.

The fresh bile is also official in U.S.

Uses.—An emulsifier of fat and a stimulant to the action of the liver. Has been given in jaundice and typhoid. A small quantity diluted with water may be used as an enema in obstinate constipation. Pig's gall has also been used. The bile of venomous snakes is said to act as antidote to their poison.

There is only one cholagogue worthy of the name—that is “Bile-Salts.”—Dixon.—B.M.J. ii/09, 540.

Fel Bovinum Exsiccatum.—A dry powder given in doses of 5 to 10 grains in cachets.

Capsules of Fel Bovinum contain 5 grains each.

Tablets, Keratin-coated, contain 5 grains.

Dysentery treated with satisfactory results by rectal injection of $1\frac{1}{2}$ —2 ounces of fresh bile of sheep—introduced through a tube 12 inches long.—I.M.G., Jan., 1907.

Symptoms indicating insufficient hepatic activity well treated by dried bile.—M.A. 1908, 10.

Pilula Fel Bovini et Fœnu-græci Seminum.—The latter is in Arabic called ‘Helba’ (v.p. 706), employed in diabetes in Egypt.—B.M.J. ii./07, 1059. No strength is indicated. We suggest Exsiccated Bile, 3 grains and Fenugreek 2 grains in each.

FERRUM (Off.).

Fe=55.6 (55.85 I. Wts.).

The element iron is tetravalent, but the Fe atom occurs in compounds, apparently either as di- or tri-valent—the explanation by some chemists is that there are present “double atoms” held together either by 2 or by

1 linkage. Iron salts may thus be either Ferrous, in which they are traceable to the oxide FeO and contain



or they are Ferric, which refer to the ferric condition



as in Fe_2O_3 (ferric peroxide or sesquioxide).

Ferrum Redactum (*Off.*). *Syn.* QUEVENNE'S IRON.

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

Fine powdered iron containing at least 75% metallic iron, prepared by reducing ferric hydroxide heated to redness, by a stream of dry hydrogen. U.S. requires 90% metallic iron.

Incompatible with tannin and metallic salts.

Considering the fact that the human body contains only about 39 grain, of iron, to give large quantities, *e.g.*, 6 to 10 grains of reduced iron *per diem* is futile.—H.

Umney discusses the testing of reduced iron for arsenic and suggests a new test with limit 1 in 2,000.—P.J. 11/04,500. Discussed at White Cross Congress, C.D.11/00,581.

The Royal Commission on Arsenical Poisoning recommended the limit of 60 parts per million.

Pills of Reduced Iron require $\frac{1}{4}$ to $\frac{1}{2}$ grain Compound Tragacanth powder to bind them.

Trochisci Ferri Redacti contain 1 grain in simple basis.

Ferri Carbonas Saccharatus. (*Off.*).

Dose.—10 to 30 grains (0.65 to 2 Gm.).

Ferrous oxycarbonate, $x\text{FeCO}_3 \cdot y\text{Fe(OH)}_2$, partially oxidized and mixed with sugar, the mixture containing about one-third of its weight of anhydrous carbonate $\text{FeCO}_3 = 115.15$ (115.85 I. Wts.).

U.S. requires not less than 15%, and prepares by precipitation of ferrous sulphate with sodium bicarbonate *vice* ammonium carbonate (*Off.*)

Dissolve Ferrous Sulphate 26 ounces and Liquid Glucose 4 ounces in water 4 pints, add to a solution of sodium carbonate 28 ounces in water 2 pints, stirring constantly. Then add 6 pints of Distilled Water, mix, cover and allow the precipitate to settle. Wash it again twice with 8 pints of water. Mix the precipitate with 4 ounces of Liquid Glucose, evaporate on a steam bath, and dry quickly in oven. Yields nearly double as much actual FeCO_3 as that of B.P., and keeps well.—Franklin, P.J.11/07,114.

Saccharas Ferricus, Ph. Ned., contains at least 3% Iron.

Incompatible with tannin-containing drugs, also with acids and acid salts.

Ferri Carbonas Saccharatus Concentratus.

Four times as strong as the U.S. preparation, *i.e.*, containing about 60% of Ferrous Carbonate. Can be made by U.S. method, but adding 5% Glucose at end of the process instead of the 80% of Cane Sugar. Is useful for capsule and pill making.—P.J.11/05,134.

Uses.—Preparations of Ferrous Carbonate are the best means of treatment for anemia and the chlorosis of young women. The dose may be increased up to 10 grains daily of Anhydrous Ferrous Carbonate.

Capsules and Tablets of Saccharated Iron Carbonate, contain 5 grains (0·32 Gm.).

Pilula Ferri Carbonatis (B.P. 1885). Saccharated Iron Carbonate 4, Confection of Roses 1. Better made with simple syrup.

Dose.—5 to 20 grains (0·32 to 1·3 Gm.).

Pilula Ferri (*Off.*). *Syn.* BLAUD'S PILL.

Dose.—5 to 15 grains (0·32 to 1 Gm.).

Exsiccated Ferrous Sulphate 15, Exsiccated Sodium Carbonate 9·5, Gum Acacia 5, Tragacanth 1·5, Syrup 15, Glycerin 1, Distilled Water 2, or *q.s.* Mix the Syrup, Glycerin and Water, add the Iron, and then quickly the Sodium Carbonate, mix thoroughly. Set aside 15 minutes, or until the reaction is complete; add the gums and incorporate thoroughly. If divided into 5-grain pills, each contains about 1 grain of Ferrous Carbonate.

With official sanction a little Reduced Iron could be added to prevent oxidation.—P.J.ii./03,916.

Glucose instead of glycerin and syrup makes a pill with better keeping qualities.—C.D.i./05,464.

The employment of sodium bicarbonate in place of the carbonate, together with plenty of water, a little honey and gum acacia, produces a pill which will keep unoxidised for a long time.—C.D.i./05,793; P.J.i./05,765.

The original formula was published in 1832:—Dried Ferrous Sulphate and dried Potassium Carbonate equal parts with Mucilage of Tragacanth and Powdered Licorice.—P.J.ii./06,369.

Iron acts more as a stimulant to the blood forming organs than as a constituent of new blood. In whatever way it enters the blood corpuscle iron is an essential factor in treatment.—B.M.J.ii./09,1423.

In pernicious anæmia rapid increase in number of red corpuscles under Bland Pill capsules.—B.M.J.i./09,209.

Massa Ferri Carbonatis, U.S.

Average dose.—4 grains (0·26 Gm.).

Dissolve Ferrous Sulphate crystals 100 in 200 of boiling distilled water and add Syrup 20. Dissolve separately Sodium Carbonate (dried) 46 in 200 of boiling water, filter each and allow to cool. Add the alkaline solution to the Ferrous Sulphate solution with care. Set aside well covered to subside. Pour off the supernatant liquor and wash the precipitate with diluted Syrup (1 in 20), collect on muslin and mix with Honey 38 and Sugar 25, and evaporate on water bath to 100. Contains about 40% Ferrous Carbonate.

Bland Pill Estimation.

The white or other coatings having been carefully removed the weight of two pills should be carefully noted. They are dissolved in a beaker in a small quantity of water, say 15 Cc. with sulphuric acid 5 Cc. Decinormal solution of potassium bichromate (4·87 Gm. in 1,000 Cc.) is then run in until a drop of the solution no longer gives a blue colour with drops of potassium ferricyanide solution arranged on a white tile. Multiply the number of Cc. of Bichromate solution used by 0·0115 to obtain the amount of ferrous carbonate in grammes in the two pills.

Capsules of Bland Pill each equal to 5 grains of the official pill are also prepared;

Pilulæ Ferri Carbonici. P. Austr., **Pilula Ferri Carbonici** Blandii. P.G. iv., and **Pilules de Carbonate de Fer Composées**, FR. CX. are made with Potassium Carbonate instead of Sodium Carbonate.

The last mentioned weigh 0·3 Gm. contain 0·03 Gm. of Iron, no standard being set up for ferrous carbonate.

Pilules de Carbonate Ferreux, Formule de Vallet, Fr. Cx. are made with Crystallised Sodium Carbonate and Ferrous Sulphate Solution—the Ferrous Carbonate being first precipitated, collected and mixed with the ingredients.

Tablets, 4 and 8 grains. *Dose.*—1 to 4 four-grain, or 2 eight-grain Tablets, also made (P) 4 gr. with Arsenious Acid $\frac{1}{8}$ grain. *Dose.*—1 to 4.

Capsules are also made in the following combinations:—

Bland Pill 5 grains with Aloes $\frac{1}{2}$, or 1 grain.

(E) „ „ 5 grains with Arsenic $\frac{1}{100}$, $\frac{1}{80}$, $\frac{1}{30}$ grain.

„ „ 5 grains with Cascara Extract, 3 grains.

„ „ 5 grains with Cod Liver Oil, $\frac{1}{4}$ dr.—B.M.J. ii./05, 1393.

(P) „ „ 5 grains with Nux Vomica Extract, $\frac{1}{4}$ grain.

„ „ 5 grains with Quinine Sulphate, 1 grain.

Ferri Citras, U.S.

Average dose.—4 grains (0.26 Gm.).

Contains ferric citrate corresponding to not less than 16% metallic iron. Garnet red scales with slight ferruginous taste. Soluble in water.

Ferri et Ammonii Citras. (Off.) U.S.

Dose.—5 to 10 grains (0.32 to 0.65 Gm.). Yields 31% or 32% ferric oxide. (Off.) Contains 16% metallic iron (U.S.). Dark red scales soluble in about half their weight of water.

Flavoring.—Is practically tasteless.

In ordinary cases of debility and anæmia. Especially preferred in lingering cases of gastric catarrh after alkalis have ceased to benefit and the stomach is not ready for an acid tonic. Also with Sodium Salicylate in subacute rheumatism of children.—B.M.J.ii./08, 1145.

Ferri Hydroxidum, U.S.

The Hydroxide precipitated from 100 Cc. of Solution of Ferric Sulphate by Ammonia Solution 138 Cc., washed and mixed with water *q.s.* to 300 Gm.

Mistura Ferri Composita (Off.). Syn. GRIFFITHS MIXTURE.

Dose.— $\frac{1}{2}$ to 1 ounce (15 to 30 Cc.).

Ferrous Sulphate 5, Potassium Carbonate 6, Myrrh 12, Sugar 12, Spirit of Nutmeg 9, Rose Water *q.s.* to 875. The mixture is best kept of double strength, and the iron salt ($2\frac{1}{2}$ grains to each ounce) added when dispensed.

Ferri Perchloridum.

$\text{Fe}_2\text{Cl}_6 \cdot 12\text{H}_2\text{O} = 536.90$ (540.652 I. Wts.).

Ferric Chloride, U.S. Should contain not less than 22% metallic iron in the form of chloride.

Dose.—2 to 8 grains (0.13 to 0.52 Gm.).

Deliquescent yellow masses made by evaporating the stronger official solution and crystallizing. Soluble in water.

Incompatible with infusions &c., containing tannin, with the alkalis, alkaline carbonates, iodides, salicylates and mucilage of acacia. Ferric Chloride with Potassium Iodide in presence of Potassium Citrate produce a Potassium Ferricitrate and hence compatible.—P.J. ii./05, 862.

Uses.—A well-known tonic in anæmia, has astringent action and is a useful styptic (it may be used as such).

The perchloride is the most diuretic preparation of iron.—H.

Iron decreases the elimination of uric acid, which may account for the production of headache in rheumatic patients under its influence.—H. Its administration may bring on an attack of gout.—W.W.W.

For gastric ulcer, whether deep or superficial, with or without hæmorrhage, the stomach should be emptied by a soft sound. By means of a funnel 100 Cc. of a solution of Ferric Chloride 1 in 1,000 are introduced. This is removed, and the operation repeated till the liquid comes out clear, *i.e.*, usually after about five washings with the solution. 500 or 600 Cc. will usually control even the most severe hæmorrhage, and this is repeated for 4 or 5 days.—Pr. Nov. '08, 679.

In rickets and splenic anæmia is the best iron preparation. In erysipelas certain cases may benefit.—B.M.J. ii./'08, 1145; *c.f.* also P.J. ii./'08, 837.

T. H. orders for Nebula Ferri Perchloridi, 5 grains; for Pigmentum Ferri Perchloridi 60 grains to 120 grains of this salt to each ounce of solution.

Glycerinum Ferri Perchloridi, G.H., has Ferric Chloride 1, Glycerin 4. For use as a paint. Mid. H. & U.C.H. have Liquor Ferri Perchloridi 1, Glycerin 1. Glycerin and chloroform water cover its metallic astringent taste.

Löffler's Pigment for Diphtheria.

Menthol 10, Toluol *q.s.* to 36, Ferric Chloride Solution 4, Absolute Alcohol to 100. To apply on wadding every 3 hours. Painful in use. Dilute hydrogen peroxide is preferable.

'Collapsubes' with rectal tube contain Ferric Perchloride 1 in 40 with vaseline basis for pills.

Gossypium Stypticum. *Syn.* GOSSYPIUM FERRI PERCHLORIDI.

Absorbent Styptic Wool. Contains 15% Ferric Chloride.

Saturate Absorbent Wool 85 with Water 100 containing Ferric Chloride 15 and dry. Linteum Stypticum may be similarly prepared.

In Ph. Ned. Gossypium Stypticum contains at least 2% Quinine Hydrochloride, and no iron.

Liquor Ferri Perchloridi Fortis (Off.). Contains about 20% Fe. Has Sp. Gr. 1.42. Its yield of Fe_2O_3 is 1.6 Gm. from 5 Cc. Ph. Ned. 75% Fe_2Cl_6 , 'Liquor Stypticus.'

A Liquor Ferri Perchloridi Fortis of B.P. Sp. Gr. 1.42 may be made by dissolving Ferric Chloride, with 12Aq. 5 parts, in Distilled Water 2 parts.

Liquor Ferri Chloridi. U.S.

Average dose.— $1\frac{1}{4}$ minims. (0.1 Cc.)

Contains 29% to 10 Gm. Fe in 100 Gm. (instead of 37.8% anhydrous ferric chloride=13 Gm. Fe in 100 Gm. in 1890, U.S.).

Liquor Ferri Perchloridi (Off.).

Dose.—5 to 15 minims (0.32 to 1 Cc.).

Contains about 5% Fe. Strong Solution of Ferric Chloride 1, Water to 4.

In septicæmia—in the first 24 hours 4 drachms of the official liquor divided in 12 doses; for the second 24 hours 6 drachms; for the third 1 ounce. All cases were successful.—L. ii./'04, 1248.

Tinctura Ferri Perchloridi (Off.)

Dose.—5 to 15 minims (0·32 to 1 Cc.)

Strong solution of Ferric Chloride 1, Alcohol 90% 1, Water to 4 (16·3 Gm. Anhydrous Ferric Chloride in 100 Cc. approximately).

Owing to the fact that ferric chloride does not remove any of the acid of the gastric juice (as when reduced Iron or Bland's Pills are given), this is preferred by many.

Flavoring. Syl Aurantii Floris (double dose); Syrupus.

Thread worms are killed by rectal injection of a drachm of the Tincture in 10 ounces of water.

In erysipelas 15 to 20 minims every 2 hours arrests progress of the disease.—L. ii./o4,1313.

Angio-neurotic oedema treated with drachm doses repeated if necessary every 20 minutes.—L. ii./o8,1359.

For strumous children with tuberculous bone disease, or chronic enlarged glands, 5 to 10 minims with 10 to 20 minims of solution of mercuric chloride *i.d.s.* for months.—B.M.J. ii./o8,1145; *c.f.* P.J. ii./o8,837.

The Tincture occasionally loses its colour, but the Liquor does not. The former contains an oxidiser—Ferric Chloride. Exposure to light induces action, the ferric iron becoming ferrous, the chlorine oxidising or combining with the Alcohol.—P.J. i./o7,397.

Tinctura Ferri Chloridi, U.S. *Average dose.*—8 minims.

Solution of Ferric Chloride (U.S.) 7, Alcohol to 20. Contains 13·28% Anhydrous Ferric Chloride (=4·6% Fe.).

Tinctura Ferri Chlorati Ætherea. P.G. iv. Liquor Ferris Sesquichlorati (= Perchloride) (Sp. Gr. 1·28) 1, Ether 2, Alcohol 7 Contains 1% Fe. Sp. Gr. 0·850 to 0·860.

Mistura Ferri Aperiens. U.C.H.

Magnesium sulphate 30 grains, ferrous sulphate 2 grains, diluted sulphuric acid 2 minims, peppermint water to 1 ounce. An excellent mixture for the cure of inebriety.

Ⓜ **Mistura Ferri Arsenicalis.** U.C.H.

Citrate of iron and ammonium 8 grains, arsenical solution 5 minims, infusion is calumba to 1 ounce. *Dose.*— $\frac{1}{2}$ to 1 ounce.

Mistura Ferri Perchloridi. U.C.H.

Solution of ferric chloride 15 minims, glycerin 15 minims, chloroform water to 1 ounce.

Mistura Ferri Salina. U.C.H.

Potassium citrate 22 grains, solution of ferric chloride 24 minims, chloroform water to 1 ounce. The styptic taste of iron is masked in this mixture, as a double decomposition occurs between the iron and the potash salt.

Mistura Ferri Laxans. St. M.'s H.

Ferrous sulphate 3 grains, magnesium sulphate 1 drachm, dilute sulphuric acid 5 minims, peppermint water to 1 ounce.

Liquor Ferri Chloroxidi.

Dose.—10 to 30 minims (0·6 to 1·8 Cc.).

Contains, it is said, a basic ferric chloride of the formula $\text{Fe}_2\text{Cl}_6 \cdot 7\text{Fe}_2\text{O}_3$. Strong solution of Ferric Chloride 4, Distilled Water 40. Mix, and add in excess, Solution of Ammonia *q.s.*; collect, wash well the precipitate, stir, and dissolve it with a gentle heat in Strong Solution of Ferric Chloride 1, Distilled Water *q.s.*, to make when filtered 20.

Liquor Ferri Oxychlorati, P.G., is about one-third weaker than the above. From it may be made Liquor Ferri Dialysatus (B.P. 1885).—Sp. Gr. 1·047. *Dose.*—10 to 30 minims (0·6 to 1·8 Cc.).

The last two preparations are dark reddish-brown in colour, and contain about 5% of ferric oxide. The strength of the latter will be slightly variable as some of the iron passes through the septum.

Better tolerated than the strong acid preparations of iron. To be prescribed as "drops," undiluted, or mixed with glycerin.

Glycerinum Ferri Dialysati.

Dialysed Iron Solution 1, Glycerin 2. Keeps well and is palatable. *Dose*.—1 drachm (3·5 Cc.).

Dialysed iron is useful as an antidote to arsenic—much superior to the moist peroxide; 1 ounce doses should be given repeatedly, preceded by a dose of common salt or sodium bicarbonate, *see also* p. 144.

Ferric oxide in a more or less hydrated condition is used under a great variety of names. The three following preparations are pure as regards arsenical contamination:—

Ferri Oxidum Præcipitatum Fuscum.—A brown powder containing about 80% Fe_2O_3 , prepared by precipitation from ferric sulphate. Soluble readily in hydrochloric acid. Under this heading come Ferri Peroxidum, Ferri Peroxidum Hydratum (B.P./85, &c.).

Ferri Oxidum Præcipitatum Rubrum.—A dull red powder containing about 85% Fe_2O_3 , prepared by precipitation from ferrous sulphate (it undergoes complete oxidation during the process of washing and drying). Readily soluble in hydrochloric acid. Under this heading come Ferri Carb., Ferri Sub-Carb., Ferri Carb. Solubile, and Ferri Sesquioxid. Solubile.

Ferri Oxidum Calcinatum.—A bright red powder containing about 99% Fe_2O_3 , prepared by the calcination of ferrous sulphate. Not readily soluble in HCl , = Ferri Sesquioxid., Ferri Oxid. Rubr., and Ferri Rubigo.

Technically, Armenian bole ("bole armen."), ochre, sienna, Venetian red, colcothar, caput mortuum vitrioli, crocus ferri, crocus martis, polishing crocus, and jewellers' rouge are impure ferric oxides.—Hill. P.J. ii/06,694.

Ferrum Oxydatum Saccharatum, P. Austr., P.G. iv. **Saccharated Ferric Oxide.**

Dose.—10 to 40 grains (0·65 to 2·6 Gm.).

Sodium carbonate 15, dissolved in water 30, to this gradually add ferric chloride solution 30, cold distilled water, 600; mix with the above sodium carbonate 15 dissolved in water 600. Set aside, decant, wash the precipitate, collect and press gently, mix in a porcelain dish with sugar 25, soda ley (Sp. Gr. 1·17) 3. Heat in a water-bath, add sugar 70 and stirring continuously, evaporate to dryness to form a reddish-brown powder. Should contain at least 2·8% of metallic iron.

Liquor Ferri Oxydati Saccharati.

Dose.— $\frac{1}{4}$ ounce.

Under this name a solution is sold on the Continent containing about 5% of the above, flavoured with Cinnamon or Vanilla.

Liquor Ferri Pernitratis (Off.).

Dose.—5 to 15 minims (0·32 to 1 Cc.).

A reddish brown solution containing ferric nitrate $\text{Fe}_2(\text{NO}_3)_6 = 480·68$ (483·944 I.Wts) Sp. Gr. 1·107, contains 3·3% Fe. Uses similar to those of the solution of the perchloride.

For children in convalescence from prolonged chronic diarrhœa, 1 to 2 minim doses.—B.M.J. ii./08,1146.

Vinum Ferri, (Off.). *Dose*.—1 to 4 drachms (3·5 to 15 Cc.). Iron Wire 1, almost entirely immersed in Sherry 20.

Vinum Ferri Citratis (Off.). *Dose*.—1 to 4 drachms. Iron and Ammonium Citrate 18·3, Orange Wine to 1,000.

Vinum Ferri, U.S. *Average dose*.—2 drachms. Iron and Ammonium Citrate 4, Tincture of Sweet Orange Peel 6, Syrup 10, White Wine to 100,

Vinum Ferri Amarum, U.S. *Average dose.*—2 drachms. Soluble Iron and Quinine Citrate 5, Tincture of Sweet Orange Peel 6, Syrup 30, White Wine to 100.

***Ferratin.** *Dose.*—8 to 15 grains (0.52 to 1 Gm.).

Prepared from meat and iron; is a tasteless brown powder; has been used in anæmia and chlorosis.

***Bivo. BEEF AND IRON WINE.** *Dose.*—1 teaspoonful. A detannated wine each teaspoonful stated to contain non-coagulable nitrogenous constituents of beef with the equivalent of $\frac{1}{2}$ grain of iron in an assimilable state. As a general tonic, Wineglassful (2 ounces) contains Alcohol 3 drachms, Iron 2.0 grains, Meat Extract 30.0 grains, Glucose 100 grains.—B.M.J. i./09,796.

Triferrin. *Syn.*—FERRI NUCLEINAS, FERRINOL.

Dose.—15 grains *per diem* after meals in divided doses.

An insoluble powder said to contain 21% of Iron and nearly 3% of Phosphorus. In anæmia and in phthisis.

Triferrol.

Dose.— $\frac{1}{2}$ ounce (15 Cc.).

Thrice daily, at or directly after meals. An Iron Cordial. Liquid equivalent to Triferrin.

Liquor Ferri Albuminati (after Dieterich; *Liquids to be weighed*).

Same strength as P.G. iv., is in P. Jap. 1907 slightly modified.

Dose.—1 to 4 drachms (3.5 to 15 Cc.).

Dissolve dried egg albumin 30 in water 4,000 at 50°C. and add to solution of chloroxide of iron 120 mixed with water 4,000 at 50° C.; neutralise the mixture with diluted soda solution; collect precipitate, and wash till free from chloride with water at 50°C.; then transfer it to a tared bottle, and dissolve in soda solution 18.3; add alcohol (90%) 160 diluted with cinnamon water 90; finally add water to 1,000. Contains about 4 of iron in 1,000. Is easily digested and borne by a delicate stomach.

Good dry egg albumin, or failing that fresh egg albumin, should be used and solution of Ferric Chloride in place of the Oxychloride Solution. This produces a clear preparation.—Am. Jl. Ph. Apl. 08,169.

① **Arsenoferratose.**—*Adult Dose.*— $\frac{1}{2}$ ounce (15 Cc.) thrice daily. Children less. For anæmia.

A proprietary article containing Iron (0.3%), Albumen and Arsenic (0.003%) i.e., $\frac{1}{160}$ grain Arsenic and $\frac{2}{3}$ grain Iron per $\frac{1}{2}$ ounce dose.

② **Arsen-triferrol.** *Dose.*— $\frac{1}{2}$ ounce (15 Cc.). A solution of 'Arsenogen' and Triferrol. The former contains Iron, Phosphorus Arsenic and Nitrogen.—M. 08,143.

Liquor Ferri Peptonati (after Dieterich; *Liquids to be weighed*).

Dose.—1 to 4 drachms. (3.5 to 15 Cc.)

Dissolve dried egg albumin 10 in distilled water 1,000; add to this pepsin 0.5 and hydrochloric acid 14. Digest the mixture for 12 hours at 40 °C. (104° F); cool and neutralize with solution of soda; then add solution of chloroxide of iron 120 diluted with distilled water 1,000. Again neutralize exactly with diluted soda solution, collect and wash, precipitate free from chloride.

Transfer to a tared bottle and dissolve in hydrochloric acid 1.17, warming slightly, add simple syrup 10, compound tincture of cinnamon 10, alcohol (90%) 130, and distilled water to 1,000. This solution is clear by transmitted light but opaque by reflected light.

Freshly prepared Solutions of Peptone as in this formula are free from odor whilst dry peptone invariably has a gluey odor being made commercially from fish, serum and egg albumen of varying quality. W. H. Harrison modifies the N.F. formula, working with solution of Ferric Chloride in place of the Solution of the Oxychloride, producing a perfectly clear article. He adds Angelica Wine and Vanilla Tincture to improve flavor.

Liquor Ferri Peptonati cum Mangano. N.F. Improved. May be prepared by increasing the amount of Sodium Citrate to 25 Cm, and dissolving in the

solution of this salt in water 4.4 Gm. of Normal Manganese Citrate before adding it to the Peptonised Iron. The finished article contains 0.1% Manganese and is of better flavor than if Manganese Chloride is used.—*Am. Jl. Ph.*, April '08, 162.

Ferrum Peptonatum in scale form can be produced by digesting egg albumen with pepsin and dilute hydrochloric acid at 39°C. The peptone solution is neutralised and added to solution of chloroxide of iron. The precipitated peptonate is dissolved in water with a little hydrochloric acid—the solution is evaporated and 'scaled' in the customary manner.

★ **Ovoferrin. IRON-VITELLIN.** *Dose.*—2 drachms.

This brown liquid claims to contain a "new form of organic iron." A hæmatinic tonic.—*Pr.* lxxiii., 151.

Hæmaboloids.

Dose.— $\frac{1}{2}$ ounce (15 Cc.) after meals. Children in proportion.

A proprietary preparation stated to contain iron derived from vegetable nucleoproteids ($\frac{1}{2}$ ounce being equivalent to 20 minims of the Tincture of Perchloride of Iron) with beef peptone, bone marrow extract and nuclein. Does not constipate or disturb digestion in anæmia and convalescence.

Also made Ⓢ with Arsenic $\frac{1}{10}$ grain (Arsenious Acid) and Strychnine $\frac{1}{10}$ grain in the $\frac{1}{2}$ ounce dose. Combined hæmatinic nutritive and tonic.

Liquor Ferri Peptonati cum Quinina.

Dose.—1 to 4 drachms (3.5 to 15 Cc.). Contains $\frac{1}{2}$ % of Quinine Hydrochloride.

Liquor Ferro-Manganesii Peptonati.

Dose.—1 to 4 drachms (3.5 to 15 Cc.). Contains, in addition to Iron, 0.1% of Manganese.

Liquor Ferro-Manganesii Peptonati cum Hæmoglobin (5 grains) in the drachm—suspended will not dissolve to this extent.

Also Liquor Iodo-Ferro-Manganesii Peptonati [0.1% Iodine in combination ($\frac{1}{16}$ grain per drachm)].

Are prepared and are suitable as 'tonics' in certain cases.

Extractum Ferri Pomatum is prepared by digesting iron filings in juice of sour apples. P. HUNG. gives mode of making.

Tinctura Ferri Pomata, P.G.

Dose.—15 to 30 minims (0.9 to 1.8 Cc.).

Ferrated Extract of Apples 1 part, Cinnamon Water (P.G., containing 10% of alcohol) 9 parts.

Liquor Ferri Acetatis (Off.).

Dose.—5 to 15 minims (0.3 to 0.9 Cc.).

This solution does not decompose iodides.

Pneumonia treated with full doses every six hours until crisis past.—*B.M.J.* i./05,1024, *C.D.* i./05,756.

Liquor Ferri et Ammonii Acetatis, U.S. BASHAM'S MIXTURE.

Average dose.—4 drachms (16 Cc.).

Tincture of Ferric Chloride 4, Dilute Acetic Acid 6, Solution of Ammonium Acetate 50, Aromatic Elixir 12, Glycerin 12, Water to 100 (was 2 Cc. in 100 Cc. in 1890, U.S.P.). To be freshly made. Particularly useful in anæmia and chronic parenchymatous nephritis. It acts as a good diuretic and diaphoretic.—*H.*

In albuminuria, especially towards end of an acute attack of Bright's disease, when the albumin is slow to disappear.—*B.M.J.* ii./08,1146.

Ferri Iodidum. $\text{Fe I}_2=307.4$ (309.69 I. Wts.).

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

Crystalline brown hygroscopic masses readily soluble in water. Mostly prescribed as one of the following:—

Syrupus Ferri Iodidi (*Off.*).

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Contains Ferrous Iodide 1 in 10 (1 gr. in 11 m.), and is slightly stronger than B.P. 1885. Iron Wire 25, Iodine 83, Sugar 825, Water to 1,000.

Instead of boiling the syrup to cause formation of some glucose (which has preservative action) it has been suggested to add 6 drachms of syrup of glucose to each pint of syrup in the cold.

Better to use Reduced Iron, and Allcock revises formula as follows:—

Place the iron with the iodine in a bottle containing 6 ounces of the water, after reaction (about a minute) filter the solution through starch-and-chlorine-free filter paper and wash the precipitate with two quantities of $1\frac{1}{2}$ ounces of water (previously well boiled and cooled). Much heat is given off. The filtrate is received into a 30-ounce bottle marked at 20 ounces, into which the powdered cane-sugar has been placed. Then well cork, put in a warm place, and shake occasionally until dissolved, and finally make up to correct volume, or the correct weight.—P.J. i./09,366.

F.I. requires 5% anhydrous ferrous iodide. This may be adopted.—C.R. U.S. has this (was 10% in 1890).

Incompatible with Sal Volatile and with Easton's Syrup—strychnine iodide, and perhaps quinine iodide thrown out.—P.J. i./05, 263, 268.

Capsules are prepared equivalent to 10 and to 30 minims of the Syrup. Rheumatoid arthritis well treated by.—H.W.

Exophthalmic goitre and rheumatoid arthritis treated with Iodide of Iron and Arsenic, also previously with sodium salicylate, belladonna (improved under), guaiacum and ferrous iodide.—L. ii./08,1877.

Syrup of Iodide of Iron with Easton's Syrup mixed together precipitate in time, whether as such or diluted, but if both be made with glycerin they are compatible as such, but precipitate on dilution. But if a trace of hypophosphorous acid be added to the ordinary Syrup of Iodide of Iron they do not cause precipitation.—P.J. ii./09,389.

Citric acid $\frac{1}{2}\%$ is even better than hypophosphorous acid to preserve this Syrup.—P. ii./09,405.

Liquor Ferri Iodidi. *Dose.*—3 to 6 minims (0·18 to 0·35 Cc.).

The above *sine* sugar. 10 minims are equivalent to 1 drachm of the Syrup.

Ferri Iodidum Saccharatum, U.S. 1890.

Dose.—2 to 15 grains (0·13 to 1 Gm.).

Combine Iron Wire 6, Iodine 17, in Water 20, when complete filter on to milk sugar 40, and Reduced Iron 1, previously mixed. Evaporate to dryness and add milk sugar, *q.s.* to 100. This and similar preparation of P. Jap. contain about 20% FeI_2 .

Uses.—An exceedingly useful tonic, especially in arthritis, anæmia and phthisis. May be ordered in form of cachet.

Acute goitre treated by Syrup of Iodide of Iron and Potassium Iodide with Iodine paint. Tracheotomy ultimately performed.—L. ii./08,1215.

Pilula Ferri Iodidi (B.P. 1885).

Dose.—3 to 8 grains (0·2 to 0·52 Gm.).

Shake carefully in a stoppered bottle Iodine 80, Water 40, with Iron Wire 40; add decanted Solution to Sugar 70; mix and combine with Liquorice Powder

140. In dividing this into pills, roll them in a mixture of reduced iron and lycopodium, and varnish.

⑩ **Pilula Garrodii**, N. H. W.

Pill of Ferrous Iodide 2 grains, Exsiccated Sodium Arsenate $\frac{1}{36}$ grain, Extract of Belladonna $\frac{1}{2}$ grain.

Ferri Oxalas, $\text{Fe}(\text{COO})_2 \cdot 2\text{H}_2\text{O} = 178.7$ (179.883 I. Wts.). *Syn.*—

FERROUS OXALATE, PROTOXALATE DE FER. F.E. and P. Hung.

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

Yellow crystalline powder, insoluble in water but soluble in dilute acids. Has been given in anæmia and as a nerve tonic.

Ferri Phosphas, Iron Phosphate (*Off.*).

$\text{Fe}_3(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O} = 498.48$ (501.678 I. Wts.).

Dose.—5 to 10 grains (0.32 to 0.65 Gm.).

A slate-blue amorphous powder containing at least 47% of ferrous phosphate, with ferric phosphate and oxide.

The precipitate by the B. P. method is Di-Ferrous Phosphate.—C.D. i./05,792.

Ferri Phosphas Solubilis, U.S., is a green soluble sodio-citro-ferric phosphate. Contains Ferric Phosphate corresponding to 12% metallic iron.

According to Squibb the following gives a green salt. Dilute Iron tersulphate solution 135 Gm. with water 300 C.c. Pour this rapidly, with constant stirring, into Caustic Soda, U.S. 50 Gm. dissolved in water 300 Cc. in a vessel of 2,000 Cc. capacity.

Decant and wash thrice. Drain off most of the water and add the magma gradually to Citric Acid 55½ Gm. and Sodium Phosphate 76 Gm. in just sufficient cold water to dissolve. Allow to stand 24 hours at about 60° C. to dissolve and filter. Concentrate at not exceeding 60° C and seal without heat.—P.J.li./09,405.

Syrupus Ferri Phosphatis (*Off.*).

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.). One drachm contains 1 grain of anhydrous ferrous phosphate. It is best kept in bottles quite full.

Syrupus Ferri Phosphatis Compositus, B.P.C. *Syn.*

CHEMICAL FOOD; PARRISH'S SYRUP (*modified*). *Dose.*— $\frac{1}{2}$ to 2 drachms. Iron Wire, free from oxide 37½ grains, Concentrated Phosphoric Acid, Sp. Gr. 1.5, 1 ounce, Distilled Water 5 drachms. Place in a glass flask, so that the liquid completely covers the wire, plug with wool, and heat gently till dissolved.

Mix Precipitated Calcium Carbonate 120 grains, Concentrated Phosphoric Acid 4 drachms, Distilled Water 2 ounces, and add Potassium Bicarbonate 9 grains, Sodium Phosphate 9 grains. Then add the solution of phosphate of iron, filter and set aside.

Boll Cochineal 30 grains with distilled water 7½ ounces 15 minutes, cool and filter, pouring over the filter sufficient water to produce 7 ounces. To this add refined sugar 14 ounces.

Heat till dissolved and strain. When cold, add the solution of phosphates, Orange Flower Water 288 minims, and sufficient water to measure 1 pint.

B.P.C. Supp., altered the proportion of Orange Flower Water to 480 minims. Contains in each drachm $\frac{1}{2}$ grain Ferrous Phosphate and $\frac{1}{4}$ grain Phosphate of Calcium, with small quantities of the phosphates of potassium and sodium. It should be kept in bottles quite full. A small proportion of glucose added, assists keeping qualities. It is not too nauseous to administer to children, for whom it is frequently prescribed.

One drachm doses, thrice daily, with increasing doses of cod liver oil, for "recurrent" abortion.—M.A. 1904,99.

Capsules of Chemical Food are each equivalent to 1 drachm of the above syrup.

Ⓟ **Syrupus Ferri Phosphatis cum Quinina et Strychnina.** (*Off.*).

Syn. EASTON'S SYRUP (*modified*), SYRUPUS TRIUM PHOSPHATUM.—G.H.

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).—One drachm represents 1 grain of anhydrous ferrous phosphate, $\frac{1}{2}$ grain Quinine Sulphate and $\frac{1}{3}$ grain Strychnine. As this syrup becomes discoloured it is more satisfactory to make only small quantities at a time.

Easton's Syrup has Sp. Gr. approx. 1·290.

The acid liquor is officially filtered into the syrup, and afterwards made up to a pint. If the solution is made up to *about 6 ounces* filtration is much *more rapid* and exposure to air less.—C.D. 1./05, 464.

Equal parts of glucose syrup and syrup produce a preparation—with much better keeping qualities.—C.D. 1./05, 709. A sample made by us by this modification was under observation for four months, at end of which time it was clear, and had not turned brown. But similarly, a batch of Easton's Syrup during the same time had not materially darkened.

The original formula was published in Aitken's Practice of Medicine, vol. ii. p. 62, 5th. ed. U.S. employs Ⓟ Glyceritum Ferri, Quininae et Strychninae Phosphatum 25, *q.v.*, Syrup to 100. *Average Dose.*—1 drachm (4 Cc.).

It is intended to be extemporaneously mixed as it is impossible to prevent darkening owing to action of the acid on the sugar.—Caspari.

Flavoring.—One drachm requires Syl Aurantii Amari 2 or 3 drachms and water to 1 ounce (or less). Syl Menthae Piperitæ is not so good; Extractum Glycyrrhizæ Liquidum covers, but not so good as Syl Aurantii.

It improves the coagulability of the blood. The excess of acid in this Syrup is said to be injurious to the teeth.

With Syrup of Iodide of Iron (*q.v.*) also made with Glycerin is compatible in the concentrated form, but not if diluted.—P.J.ii./09, 389.

Ⓟ **Liquor pro Syrupo Eastoni.** 3 with 7 of Simple Syrup = Easton's Syrup (*i.e.* 144 minims with Simple Syrup *q.s.* to 1 ounce).

Add to a Solution of Ferrous Phosphate 5 ounces (produced by dissolving Iron Wire 150 grains in Phosphoric Acid, Sp. Gr. 1·5, 2½ ounces and water *q.s.* to 5 ounces), Liquor Eastoni sine Ferro made by dissolving Strychnine 10 grains, and Quinine Sulphate 260 grains in Phosphoric Acid warmed, 2 drachms; mix, and add water *q.s.* to 12 ounces. Is better recently prepared. The Solution of Ferrous Phosphate keeps for a moderate time in stoppered bottles, which should be as full as possible to prevent exposure to the air.

Liquor Eastoni sine Ferro.—Some recent protracted experiments have shown that this Liquor can be kept almost colourless by using Sulphurous Acid B.P. in proportion of 1 minim in 3 ounces. This is better than hypophosphorous Acid, which has been used by some. The bottle must be kept stoppered, *i.e.*, air must not have access to the Liquor.

Hypophosphorous Acid and Sulphurous Acid must not be used together.

Ⓟ **Syrupus Triplex.** Understood to mean a mixture of equal parts of Easton's, Fellows's and Parrish's Syrups.

Edinb. Royal Infirmary has 1, 1 and 2 respectively—this form is so used in some parts.

Physicians should specify in prescribing which formula for 'Syrupus triplex' is intended.

Ⓔ **Elixir Ferri Phosphatis cum Quinina et Strychnina.**—Martindale.

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

The same strength as the Official Easton's Syrup. Prepared with Simple Elixir ('94) in place of Syrup as a vehicle.

Ⓔ **Elixir Ferri, Quininæ et Strychninæ Phosphatum, U.S.**

Average dose.—1 fluidrachm (4 Cc.).

Dissolve Quinine 8·75 Gm. and Strychnine 0·275 Gm. in Alcohol 60 Cc., then add Phosphoric Acid 2 Cc. and Aromatic Elixir 350 Cc. Dissolve Ammonium Carbonate 9 Gm. in Acetic Acid 28·65 Gm. Neutralize with ammonia solution, dilute to 50 Cc. with water; mix the solutions, and add Aromatic Elixir to 880 Cc. Dissolve Ferric Phosphate 17·5 Gm. in water 30 Cc., neutralize with ammonia if acid, and add Aromatic Elixir to 120 Cc. Finally mix the two solutions and filter if necessary.

Hughes, Am. Jl. Ph., Sept. 06, 420, says it is better for keeping qualities not to neutralise but to allow to remain slightly acid.

Physicians should carefully distinguish whether the first or the second (U.S.) preparation is to be used, as the first contains double the quantity of strychnine in the second.

Easton's syrup has its equivalent dose in the following pill, which is portable, tasteless, and readily soluble:—

Ⓔ **Pilula Ferri Quininæ et Strychninæ Phosphatum.**

EASTON'S PILLS.—Martindale.

Ferrous Phosphate	...	...	...	...	16 grains	(1·065 Gm.)
Quinine Sulphate	...	...	...	...	16 grains	(1·065 Gm.)
Strychnine	...	...	...	...	$\frac{1}{2}$ grain	(0·032 Gm.)
Milk Sugar	...	...	...	...	20 grains	(1·25 Gm.)
Concentrated Phosphoric Acid <i>q.s.</i>						

Mix quickly, having first triturated the strychnine with the Milk Sugar, and divide into 16 pills. Also made one-half this strength. Either may be combined Ⓔ with Arsenious Acid, $\frac{1}{80}$ grain (about 0·001 gramme).

Ⓔ **Glyceritum Ferri, Quininæ et Strychninæ Phosphatum, U.S. Syn.—Glycerole-Easton.**

This preparation is suggested as a substitute for the syrup for administration where sugar is not desirable. It keeps better than the syrup and is palatable.

Average dose.—15 minims (1 Cc.) containing approximately Soluble Ferric Phosphate $1\frac{1}{2}$ grain (0·08 Gm.), Quinine as Phosphate $1\frac{1}{2}$ grain = 0·1 Gm., Strychnine base $\frac{1}{80}$ th grain = 0·001 Gm. For exact quantities *vide* U.S.P. p. 225.

Ⓔ **Tablets of Easton's Syrup** are each equivalent to $\frac{1}{2}$ and 1 drachm of the syrup. (Sugar coated.)

Ⓔ **Capsules** equivalent to $\frac{1}{2}$ and 1 drachm of Easton's syrup are also prepared and each combined Ⓔ with Arsenic $\frac{1}{80}$ grain.

Ⓔ **Pilula Trium Phosphatum, G.H.** Is similar to the above with liquorice powder *vice* sugar.

Liquor Ferri Persulphatis (Off.).

Ferrous Sulphate 16, Sulphuric Acid $1\frac{1}{2}$, Nitric Acid $1\frac{1}{2}$, Water *q.s.* to produce 22. Sp. Gr. 1·441. 5 Cc. yield 1·04 Gm. Fe_2O_3 = 10·105% Fe by weight.

Liquor Ferri Tersulphatis, U.S., 36% normal ferric sulphate
 $\text{Fe}_2(\text{SO}_4)_3$ = not less than 10% Fe.

Ferri Sulphas (Off.), $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ = 276.1 (278.032 I. Wts.), Ferrous Sulphate.

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

In clear, pale, bluish green crystals, soluble 1 in 1.49 of water at 62° F.—P.J. ii./03,881.

A saturated solution with some crystals of the salt in excess keeps better than a weak solution, in the latter oxidation soon takes place.

Flavoring.—Glycerin or Syrup.

Relieves anæmia more thoroughly than carbonate or phosphate.—L. i./93,403; M.C. April, 1893,55.

1% solution of Ferrous Sulphate prevented development of ankylostoma ova and all died in 24 hours.—L. i./10,355.

Ferri Sulphas Exsiccatus (Off.). *Dose.*— $\frac{1}{2}$ to 3 grains (0.032 to 0.2 Gm.) 5 grains = 8 of the above.

Best administered in pill, as:—

Pilula Ferri Sulphatis, 3 or 5 grains, with syrup *q.s.* Dissolving slowly, these pills do not derange the stomach. If made with lanolin or kaolin ointment as excipient will not crack.

Liquor Ferri Subsulphatis, U.S. Monsel's Solution.

Dose.—3 to 6 minims (0.18 to 0.35 Cc.).

A solution of basic ferric sulphate. When evaporated and sealed forms Monsel's Salt or Oxypersulphate of Iron.

A spray of 20 grains to the ounce checks hæmoptysis, and internally is not irritating although astringent.

Ferri et Magnesii Sulphas.

$\text{FeSO}_4 \cdot \text{MgSO}_4 \cdot 6\text{H}_2\text{O}$ = 377.74 (380.406 I. Wts.).

Dose.—2 to 10 grains (0.13 to 0.65 Gm.).

A double salt containing about half its weight of each sulphate; green crystals, soluble 3 in 4 of water.

In 10-grain doses has no astringent or aperient action, hence suitable for prolonged use in chlorosis and anæmia.

Ferri et Manganesii Citras.

Dose.—3 to 15 grains (0.2 to 1 Gm.).

In reddish scales, freely soluble in water. Useful in chlorosis, combining the action of the two elements.

Ferro-Alumen. Iron Alum.—Syn. FERRIC AMMONIUM SULPHATE, U.S. $\text{FeNH}_4(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$ = 478.78 (478.69 U.S.; 482.224 I. Wts.)

Dose.—3 to 10 grains (0.2 to 0.65 Gm.). 99.5% pure, and to contain not less than 11.5% metallic iron U.S. Amethyst coloured efflorescent crystals, of styptic taste. **Soluble** 1 in 3 of water (best with a little sulphuric acid added), insoluble in alcohol. Internally to arrest hæmorrhage, also as an astringent gargle (8 grains to an ounce), throat spray or pigment.

Ferrum Tartaratum. (Off.) FERRI ET POTASSII TARTRAS, U.S.

Dose.—5 to 10 grains (0.32 to 0.65 Gm.). U.S. *Average dose.*—4 grains.

Reddish brown scales soluble in water about 1 in 1. Prepared by evaporating a solution of Ferric Hydroxide in Acid Potassium Tartrate. 10 Gm. incinerated yield not less than 3 Gm. of residue.

For mucous disease, this or the Ammonio-Citrate with alkali in Calumba Infusion.—B.M.J. ii./08,1145.

Ferri et Ammonii Tartras, U.S. *Average dose.*—4 grains. Contains not less than 13% metallic iron.

FILIX MAS (*Off.*).

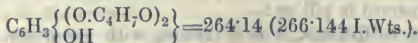
The rhizome of *Aspidium Filix-mas*. The Male Fern.

Acidum Filicicum. Filicic Acid.

Dose.—6 to 15 grains (0.4 to 1 Gm.).

A white, tasteless powder, soluble in alcohol, oils, and alkalis, insoluble in water. Is the active principle of male fern as an anthelmintic.

Manufactured also as a crystalline compound of formula



Oleoresina Aspidii, U.S., prepared by acetone percolation, is directed to be thoroughly mixed before use; a granular crystalline substance usually deposits. The yield is as much as 18%.—Caspari. *Dose.*—30 grains.

Extractum Filicis Liquidum (*Off.*).

Dose.—45 to 90 minims (2.7 to 5.3 Cc.).

Prepared by ether extraction.

Flavoring.—The taste of this preparation is horrible. Nothing will cover it. Best prescribed as capsule.

For all varieties of tapeworm and the *ankylostomum duodenale* may be administered fasting, in capsules, or emulsified with about half its weight of compound tragacanth powder. This and the anthelmintics below should be preceded and followed by a dose of some brisk purgative. The extract is best recently prepared.—B.M.J.E. i./06,64. Cured threadworm.—B.M.J. i./07,604.

Various tuberculous conditions are stated to benefit under treatment with ether-alcohol extract of fresh plant. Children to receive $\frac{3}{4}$ grain, adults $1\frac{1}{2}$ grains, in pills, twice daily for 10 to 15 consecutive days each month.—Nouv. Remèdes/08,24,121 per P.J. ii./08,260.

Capsules contain 15 minims (0.9 Cc.) of Liquid Extract.

Dose.—1 to 4.

Haustus Filicis Maris, L.H. Liquid Extract of Male Fern, 1 drachm; Syrup of Ginger, 1 drachm; Tincture of Quillaia, $\frac{1}{2}$ drachm; Water to $1\frac{1}{2}$ ounces.

Mistura Filicis, U.C.H. *Dose.*—1 ounce.

Liquid Extract of Male Fern 1 drachm, Powdered Acacia 1 drachm, Chloroform Water to 1 ounce.

Filmaron is a proprietary preparation made from Male Fern.—Ji. Trop. Med. 1904,64; B.M.J.E. i./06,64.

Dislodged 2 ft. of worm, including the head.—B.M.J. i./09,380.

Other tæniacides are **Kamala** (now discarded from B.P.), the glandular red powder attached to the capsule of *Rottlera tinctoria*;

Mallotus Philippinensis (*Euphorbiaceæ*); this may be given in dose of 30 to 120 grains suspended in water; **Cowhage**, *Dolichos pubes*, the hairs adhering to the pod of *Dolichos* or *Mucuna pruriens* (*Leguminosæ*), dose 1 or 2 grains in treacle or honey; **Papain**, and **Thymol Carbonate**, *q.v.*, but the most efficient tæniacide is **Pelletierine Tannate**, *q.v.*

Ankylostomiasis treated by anthelmintics.—L. ii./04,1636.

Most tæniacide drugs contain a phloroglucin group. Tschirch.—P.J. ii./09,421.

Use of Liquid Extract of Male Fern as an anthelmintic.—L. i./10,386.

GELATINUM (*Off.*).

Gelatina alba, P.G. iv. U.S.

Nearly colourless translucent sheets or shreds produced by action of boiling water on animal tissues, skin, tendons, ligaments, and bones.

Dose.—Ad libitum *per os*, and injected.

Tubes of Sterile Concentrated Saline Gelatin Solution are prepared for injection into the gluteal region as a hæmostatic; each makes a 2% solution on dilution with boiled water to five ounces—sufficient for one injection at 103°F.

Recently, however, the solution as strong as 10% has been used,—*i.e.*, the contents of the tube to be diluted to 1 ounce (30 Ce.).

Gelatina Soluta Sterilisata, P. Helv. Is 10% in Normal Saline. The utmost precautionary directions are given, including animal experiments, to exclude organisms of malignant œdema and tetanus.

Uses.—To check bleeding from the lungs, from the intestines in typhoid and dysentery, from the bladder and from the stomach in ulcer and cancer of that organ. These injections may be followed by pain, fever, local swellings and nettle rash. Other hæmostatics may be combined with it.

Aortic aneurism is relieved by subcutaneous injection of solution 1 or 2%. May be used with impunity. B.M.J.E.—ii./06,66, but pain is caused.—B.M.J. i./07,606.

A case of purpura hæmorrhagica cured in three weeks by means of enemata of 6 to 10% solution.—M. 02,71. Also for hæmoptysis. $\frac{1}{2}$ pint of solution gave satisfactory results.—B.M.J. i./05,68.

For infantile diarrhoea, with food.—B.M.J.E. ii./03,59.

Intestinal bleeding arrested by administration by the mouth.—M.A. 1908,17.

Secondary hæmorrhage well treated. Blood which ordinarily coagulates in 7 minutes clots in 3 minutes after an injection. Dose is about 5 Gm. in a 1% solution. Very useful in cases of ruptured tubal pregnancy.—L. ii./08,1782.

For gastric ulcer gelatin is very easily digestible. It 'fixes' a great deal of acid. Though not a true substitute for proteid it is a very powerful proteid sparer. A diet of gelatin, fat and sugar has been advised.—Pr. Nov. '08,679.

Formalised Gelatin.—This is now largely used with complete success as a substitute for Collodions. Gelatin Solution 10% in water is stored in wide mouth test tubes holding three ounces each. The tubes are plugged with cotton wool and sterilised at 100°C. for 15 minutes on three successive days. When required for use melt in a water bath and add

1 drachm of Formalin Solution diluted 10 times—*i.e.*, 4% strength of Actual Formaldehyde approx.—the final product will then contain a little over 1% of Actual Formaldehyde or fully $2\frac{1}{2}\%$ of Commercial Formalin.

The wound is dressed with a thick roll or pad of sterilised gauze, with a piece of stiff gauze above extending beyond the wound. The Formalised Gelatin is applied with a swab on the top of the stiff gauze beyond the limit of the wound,—this holds the dressing in place without bandage.—Communicated by the Dispenser, General Infirmary, Leeds.

Glutoid Capsules. *Syn.* Sahli's Capsules, are made of gelatin coating hardened by exposure to Formaldehyde Solution and allowed to dry. This renders them digestible by the pancreatic juice only—not in the stomach.

Many substances may be enclosed, *e.g.*, copaiba, eucalyptol, male fern extract, gauliacol, iodipin, creosote, menthol, methyl salicylate, pancreatin, etc.

Sahli uses three grades of insolubility—the weakest withstands the gastric action from $1\frac{1}{2}$ to 7 hours, the strong for 12 hours.

Those containing iodoform (0.05 and 0.15 Gm.), and of salol, are utilised for diagnostic purposes—testing the power of the pancreatic juices, *c.f.* p. 399. Certain substances are *not suitable* for enclosure in glutoid, *e.g.*, potassium iodide, sodium salicylate, antipyrin.

There is considerable difficulty in making capsules of this description to obtain the precise degree of hardening which will allow the capsules to pass through the stomach and yet dissolve in the intestine.

For a full consideration of this subject *vide* Formagules p. 542.

★ **Vernisol.**—A water-soluble skin varnish, is a special preparation in form of a jelly which dries and leaves a transparent, flexible coating, non-irritating, and may be medicated with the usual dermatological agents.

GELSEMI RADIX (*Off.*) U.S.

Syn. GELSEMINUM.

Dose.—5 to 15 grains (0.32 to 1 Gm.).

The dried rhizome and roots of “yellow jasmine”—*Gelsemium nitidum* (*Loganiaceæ*) (*G. sempervirens*, Aiton) (*Loganiaceæ*) imported from the United States, must be distinguished from the yellow jasmine cultivated here, which is a species of *Jasminum*.

Uses.—Has febrifuge properties, as it lowers the pulse and depresses the nervous system, being anti-spasmodic and analgesic. It has been much used in acute and rheumatic neuralgia, toothache, uterine and ovarian pain and chorea. It is a powerful paralyser, as well as tetanizer, and respiratory poison. Large doses contract the pupil and cause giddiness and diplopia.

The plant contains two alkaloids, one designated Gelseminine, by Merck, which is highly toxic, the other (Gelsemine) is of little importance. Much confusion has arisen between these two bodies.

Antidotes.—Emetics, Atropine or Strychnine hypodermically, repeated, and Nitroglycerin; or Amyl Nitrite; artificial respiration, stimulants.

A standard of 0.5% total alkaloids for the root, and 0.05% for the tincture has been suggested.

An assay process (in U.S.P.) should be provided as the drug varies.—Am.Jl. Ph. Feb. 08, 77:

Ⓟ **Gelseminina.** $C_{22}H_{26}N_2O_3 = 363.54$ (366.228 I. Wts.). (Alkaloid —Merck.)

Dose.— $\frac{1}{100}$ to $\frac{1}{32}$ grain (0.00065 to 0.002 Gm.).

Yellowish-white minute crystals, with a bitterish taste, odourless, sparingly soluble in water, easily soluble in alcohol, ether, and dilute acids. This forms crystalline salts, and has mydriatic properties.

Ⓟ **Gelsemininæ Hydrochloridum** (Merck).

$C_{22}H_{26}N_2O_3 \cdot HCl$ (P) = 399.73 (402.696 I. Wts.).

Dose.— $\frac{1}{80}$ to $\frac{1}{30}$ grain (0.0011 to 0.0032 Gm.).

In white, granular crystals, freely soluble in water.

Ⓟ **Ophthalmic gelatin discs** contain $\frac{1}{800}$ grain Gelseminine.

Gelsemin. *Dose.*— $\frac{1}{2}$ to 2 grains (0.032 to 0.13 Gm.) in a pill, with spirit and glycerin.

The powdered alcoholic extractive (resinoid) of a pale brown colour. *Must be distinguished from the alkaloids.*

Toxic symptoms following $\frac{1}{10}$ grain Gelseminine hydrochloride, given instead of Gelsemin.—B.M.J. i./89, 355.

Ⓟ **Powdered Extract of Gelsemium** of commerce contains 2.5% total alkaloids.

Ⓟ **Fluidextractum Gelsemii**, U.S. By percolation with Alcohol, strength 1 = 1. *Average dose.*—1 minim (0.05 Cc.).

Dysmenorrhœa is well treated by 3 minims of this fluid extract with 3 to 5 minims of Tincture of Belladonna thrice daily. Will often relieve pain in the most obstinate cases.

For nervousness before examination a small dose thrice daily is a useful tonic.—B.M.J. i./09, 1380.

Ⓟ **Tinctura Gelsemii** (Off.).

Gelsemium in No. 40 powder 2, Alcohol (60%), *q.s.* to 20. Percolate, U.S., 1 in 10 Alcohol (94.9% vol.), and Water in proportion of 650 and 350

Dose.—5 to 15 minims (0.3 to 0.9 Cc.), often combined with bromide of ammonium or potassium for neuralgia. The tincture is fluorescent

Flavoring.—Syl Anethi, Syl Rosæ; Syrupus Aurantii.

For neuralgia of face and jaws associated with carious teeth—15 minims of the tincture every 6 hours rarely fails to give relief.

Disordered vision may follow even moderate doses.—B.M.J. i./01, 640.

In the knowledge of the writers a case of neuralgia has been treated by $\frac{1}{2}$ drachm doses thrice daily for two months.

GLUCOSE.

Syn. DEXTROSE, GRAPE SUGAR. $C_6H_{12}O_6 = 178.74$ (180.096 I. Wts.).

Glucose in white lumps or as a sticky mass, is prepared by acting on Starch with Dilute Hydrochloric Acid. We found the lump contained 14% and the liquid form 17% moisture.

Glucose Tubes are prepared for artificial feeding as a preliminary to severe operations, for the resultant shock, and for wasting diseases. The use of this carbohydrate injection is, beyond doubt, of great value, and ought to be more widely known and practised. The glass tubes can be carried about for every serious operation. The contents of a tube are diluted to a pint with boiled water to make a 5 % solution (which strength is isotonic with the blood) and as much as a litre of this solution may be injected, and has never been found to cause any evidence of sugar in the urine. An ordinary aspirator needle about 1 mm. in transverse section of its lumen, attached to 3 feet of rubber tubing with a suitable glass reservoir above are all the apparatus required; this is carefully sterilised by boiling and is filled with the sterilised injection. The needle is introduced under the skin of the arm, near the axilla—the skin having been previously carefully cleansed—the douche is then raised 2 feet or so and the transfusion proceeds easily. The effect of the treatment is good as regards pulse, general strength and relief of thirst.—A. E. Barker, B.M.J. i./02,770.

By this means water, the first need of the system, can be given in large amount and with perfect safety and sugar to the extent of 2 ounces per diem—an important food without any demand upon the alimentary tract. Increased action of the kidneys by free instillation of fluids most useful furthermore in carrying off diluted toxic matters from the system.—A. E. Barker, L.ii./09,290; B.M.J.ii./09,266.

Glucose is said to be employed in the sophistication of honey, hence *Oxymel Scillæ (Off.)* varies in colour and density.—P.J. ii./03,778,871.

In gastric ulcer the hyper-acidity of the stomach-contents hinders digestion of carbohydrates. Dextrose is assimilable and causes less secretion than starch. Contraindicated however in cases with atony as it favours fermentation. It is better than Cane Sugar. Lactose is even better, being least liable to undergo fermentation.—Pr. Nov. 1908, 680.

'Sugar' Solutions for injection non-toxic: are as effectual as 'Saline' and can be used without risk—but not in diabetes.—L.i./09,1490.

Gastric ulcer has been treated by giving nothing, not even water by the mouth, and supplying 3 or 4 pints daily of Saline Sugar Solution—the method gives the ulcer every chance of healing. Secondary parotitis may however occur, special care is therefore necessary to order antiseptic mouth washes.—B.M.J.i./09,1296.

Delayed Chloroform Poisoning treated by rectal injection of Sodium Bicarbonate. Also Glucose Solution $\frac{1}{2}$ ounce in $\frac{1}{2}$ pint of Milk by nasal tube and a 10% solution by the rectum four-hourly, in addition to a good supply of Carbohydrate food. Improvement nothing short of marvellous, and recovery perfect.—L. ii./09,710.

For Estimation in Urine *see* Analytical Memoranda.

Syrupus Glucosi, v.p. 538.

Dextrin (P. Helv.).—Yellowish powder or gum-like masses. Is obtained commercially by heating starch to 200° C. According to P.G.I. it is made by heating Potato Starch 150, with Oxalic Acid 4 in water 750 until a little of the mixture no longer gives blue with Iodine. Dextrin takes up some Iodine without colouring. . . add *q.s.*, *s.a.* Neutralise with calcium carbonate and evaporate the filtered liquor. Consists principally (there are various other

dextrins formed before this) of Achroo-dextrin which is the ultimate product of starch hydrolysis before the grape sugar stage is reached.

Glucose Fr. Cx.—Should be completely soluble in its own weight of water, soluble in 30 alcohol but insoluble in 80%.

***Grapelax.**

Dose.—1 drachm to $\frac{1}{2}$ ounce, according to age, once or twice daily.

A preparation of currant grape juice with 7% senna extractive. A tonic laxative and diuretic.

GLYCERINUM (*Off.*). U.S.

$C_3H_5(OH)_3 = 91.37$ (*Off.* and U.S. Wts.) (92.064 I. Wts.).

Dose.—1 to 2 drachms (3.5 to 7 Cc.).

Manufactured by decomposing fats with alkali or superheated steam.—P.J.i./o6,316. **Soluble** in alcohol and water in all proportions but immiscible with Ether or Chloroform.

For Official preparations, *see* Index.

Estimation of Glycerin in Galenical Preparations (Naylor).—About 5 Cc. or a quantity containing from $\frac{1}{2}$ to 1 Gm. of glycerin is diluted to 50 Cc. and aqueous solution of lead acetate is added to complete precipitation. (Warming assists this). Filter by a filter-pump and a little kieselguhr, and wash precipitate with hot water thrice (10 Cc. each). Precipitate the lead by carefully adding Dilute Sulphuric Acid. Solution of phosphotungstic acid is added to the cold mixture until a precipitate ceases to form. The mixture is again filtered, and the precipitate washed as before. The filtrate is concentrated to about 10 Cc., rendered alkaline with NaHO, and concentrated at a low temperature to 3 or 4 Cc.; 15 to 20 Gm. copper sulphate (dried at 110° C.) are then gradually added to the cooled solution. The mixture is powdered and transferred to an extraction thimble, the open end being plugged with cotton wool (exhausted with acetone). The thimble is introduced into a Soxhlet extractor—with ground glass joints—and extracted with acetone (dried over anhydrous sodium sulphate or copper sulphate) for about seven hours. The acetone is distilled off, and the residue dried at 85° to 90° C. The glycerin so obtained may be colored, and usually yields a little ash, but not enough to interfere with general accuracy. The method is applicable to solutions containing small percentages of glycerin, if concentrated.—P.J.ii/09,131 139, B.C.D. ii./09,128.

Results included :—

				Gm. per 100 Cc.	
				Present.	Found.
Tinctura Cardamomi Composita	...	...	...	8.60	8.34
Tinctura Aurantii...	...	...	...	6.74	6.08
Tinctura Catechu	...	...	...	24.17	23.65
Tinctura Sennae Composita	...	...	...	13.96	14.08

The loss in some cases is probably due to volatilisation during the addition of the copper sulphate.

Uses.—Internally tends to relax the bowels. Is added to cough mixtures and to relieve forms of indigestion with gaseous distention. As an enema $\frac{1}{2}$ ounce alone or with $\frac{1}{2}$ water added relieves constipation and it reduces piles. Externally 1 with 2 or 3 of water prevents cracks of chilblains and forms an ingredient in a large number of skin applications. It is a useful solvent for many active principles of drugs, standing midway between alcohol and water, *c.f.* Glycetracta, p. 344. It is also a valuable preservative, *c.f.* "Aqueous" Tinctures.

For burns stated to have been of much value as an application. Cotton wool to be soaked with it and covered with Oiled Silk.

As a throat pigment, and for uterine application, glycerin of tannic acid may be used double the official strength—1 in $2\frac{1}{2}$ of Glycerin—Pigmentum Acidi Tannici, the *Off.* being 1 in 5.

Glyceritum Acidi Tannici, U.S., is 1 in 5, P. Belg. Tannin 3, Glycerite of Starch 17.

Glycerin of Borax is not a mere solution; it has an acid reaction and when mixed with an alkaline carbonate evolves carbonic acid; useful, in infantile diarrhœa, in doses of 20 minims, repeated according to age.

Glycerin of Starch. (*Off.*). Glycerin 6½, Water 1½, Starch 1, is improved by adding 0.25% of Tragacanth.—P.J.i./97,201. **Glyceritum Amyli**, U.S. Glycerin 8, Water 1, Starch 1.

Glycerinum Aluminis is a useful astringent in chronic pharyngitis; is less disagreeable than tannin.

Intra-uterine injection of an ounce of 3% solution of formalin in glycerin in cases of septic infection after childbirth.—L. ii./03,1229.

Gargarisma Aluminis. L.H. 10 grains, E.L. 15 grains to ounce, U.C.H. 2% in Acid Infusion of Roses C.H.W. 5 grains with Tincture of Myrrh 40 minims to ounce, C.X., Glycerin of Alum 12.5%. **Composita.** L.H. Alum 5 grains with Dilute Sulphuric Acid and Tincture of Myrrh each 10 minims, water to 1 ounce.

Glycerin Jelly, for toilet use.

Gelatin 140 grains, Rose Water 6 ounces; soak a few minutes, and heat in a water-bath to dissolve; add, when cool but still fluid, White of Egg ¾ ounce. Heat to coagulate completely, and add Glycerin 6 ounces, Salicylic Acid 12 grains. Mix well, filter through a hot-water funnel, and bottle while warm.

Lubricant Glycerin Jelly is supplied in 'Collapsubes.' Is somewhat softer than the above; is also suitable for toilet use; intended for the lubrication of Stomach Tubes.

Microscopic Glycerin Jelly is somewhat harder and is specially prepared for mounting purposes.

Glycerinum Aluminis et Acidi Tannici.

Potassium Alum (free from iron), in powder, 1, Glycerin 6. Heat to dissolve, and add Tannic Acid 1.

This forms a solution which is a very astringent throat pigment; has the advantages of a gargle without destroying the appetite. An ounce to a pint of tepid water forms a useful astringent vaginal injection.

Glycerinum Bismuthi Nitratis.

Bismuth Nitrate, in crystals 1, Glycerin to 4. Diluted 4 or 5 times with Glycerin is a stimulant application in eczema.

Glycerinum Bismuthi Effervescens (Martindale) may be prescribed thus:—

R Glycerini Bismuthi Nitratis 4 ounces (or *q.s.*).

Eighty minims to be mixed with a solution made by dissolving two 5 grain Sodium Bicarbonate Tablets in 1 ounce (or more if preferred) of water (slightly warm in preference), stirred up and taken during effervescence.

This gives a 10 grain dose of Bismuth Carbonate.

The preparation has the advantage of the Bismuth Carbonate being in a practically 'nascent' form. It is palatable and the Carbon Dioxide assists as a digestive.

The necessities may be arranged in a small outfit for use.

Note.—Chemically 10 grains of Bismuth Carbonate are produced by 12 grains of Bismuth Subnitrate and 4 grains of Sodium Bicarbonate, also 10 grains are formed by 20 grains of Bismuth Nitrate (Crystal) and 10 grains of Sodium Bicarbonate—approximately.

Glycerinum cum Aqua Rosæ.

Glycerin 2, Rose Water, prepared with Otto of Rose, 3. Mix. An agreeable emollient for the skin.

Ⓟ **Glycerinum Hydrargyri Perchloridi** contains $\frac{2}{3}$ grain in 1 minim. *q.v.*

Glycerinum Plumbi Subacetatis (Off.).

This is about $\frac{2}{3}$ the strength as Goulard's Extract—**Liquor Plumbi Subacetatis Fortis**, with glycerin for the solvent in place of water; it keeps much better than and does not deposit like the latter. The **Liquor (Off.)** has Lead Acetate 5, Lead Oxide $3\frac{1}{2}$, Water to 20. U.S. has Lead Acetate 18, Lead Oxide 11, Water to 100. The *Off.* preparation has been stated to be capable of being made by shaking ingredients together occasionally for a week or so in the cold, but Wilbert pointed out that insufficient lead acetate is taken up in this way. **Liquor Plumbi Subacetatis Dilutus (Off.)**, is 1 in 80 and U.S. 1 in 25 respectively. B.P. has also Alcohol 90% 1 in 80.

Useful in chronic eczema. It should first be applied diluted 1 part with about 7 of glycerin, or *better 1 with 7 of water*, and the strength gradually increased; it desiccates the eruption without producing a hard crust. May also be diluted with milk.

In inflamed joints after injury to bruised surfaces, especially if suppuration threatens, lead lotion (warmed) is useful.—L. ii./05,853.

Lead lotion should be used with great caution for eye lotions if the cornea is damaged.

In gonorrhœa compresses of, useful prior to injections.—Pr. Apl. 09,544.

Liquor (or Lotio) Plumbi Lactatis has 1 part of Solution of Lead Subacetate to 15 of Milk, but it is more frequently used about 1 to 9. (Mid. H. adds Salicylic Acid 1 grain to each ounce.) A little Eau de Cologne may be added. For nettle rash and any skin irritation.

The glycerole has also been found useful, in some uterine affections, applied on absorbent wool, diluted as above.

The Mid. H. formula but with 2 grains of Salicylic Acid to 9 drachms, in acute erythematous eczema useful. Allow to dry on and apply freely every 4 hours.—B.M.J. i./09,1340.

Jelly-fish stings. Apply the following ointment. Lanolin 1, Paraffin Ointment 3, Almond Oil 4, Lime Water 8, Strong Solution of Lead Subacetate 4, Clove Oil $\frac{1}{2}$. Said to be superior to Carron Oil for this purpose.—Brooke, 119.

Lotio Plumbi Talci et Amyli. (BOECK OF CHRISTIANIA). Dilute Lead Subacetate Solution Talcum, Starch, and Boric Acid Solution (1%) of each 10 by weight, Glycerin 4, Camphor Water 25. Relieves itching.—L. ii./08,922.

Unguentum Glycerini Plumbi Subacetatis, Lead Subacetate Ointment (*Off.*).

Glycerin of Lead Subacetate, by weight, 1, Paraffin Ointment, White, 5.
Useful in chronic eczema, ulcerated legs, and in tinea tarsi.

Glycero-alcohol. *Syn.* PETIT'S LIQUOR.

Dose 5 to 60 minims (0.3 to 3.5 Cc.).

Glycerin 333, Distilled Water 146, Alcohol 95% 580. Is used as a solvent of alkaloids and active principles, as it keeps indefinitely and does not evaporate. It has Sp. Gr. about 1.

Glyco-gelatin, T.H.

Refined Gelatin 1 ounce, Glycerin (by weight) $2\frac{1}{2}$ ounces, Solution of Carmine *q.s.*, Orange Flower Water $2\frac{1}{2}$ ounces. Soak the gelatin in the water two hours, then heat in a water-bath till dissolved, add the glycerin, and stir well together. When nearly cold add the carmine solution; mix till uniformly coloured.

Gelatinum Glycerinatum, U.S. Soak Gelatin 1 for one hour in sufficient previously boiled and cooled water to cover it. Drain and add Glycerin 1, heat until dissolved, strain hot, and evaporate until the product weighs 2.

Glyco-gelatin affords a ready method of prescribing lozenges to meet the requirements of individual cases; one ounce of the mass will make twenty-four pastils; it is medicated by melting in a water-bath, and the medicament added; or this, if insoluble, is first rubbed with a little glycerin, and then mixed with the hot basis, and cooled by pouring into an oiled tray, and, when solidified, cut into the required number of pastils. Pastils are specially suited to cases of inflammation of the tongue or palate, and their gelatinous nature gives much relief in dryness of the throat. The following list may be kept prepared:—

Pastillus

Acidi Borici	...	gr. 2
Acidi Carbolici	...	gr. $\frac{1}{2}$
{ Acidi Citrici	...	gr. $\frac{1}{4}$ }
{ Ol. Limonis	...	m. $\frac{1}{4}$ }
Ammonii Bromidi...		gr. 1
(P) { Apomorphinæ	...	gr. $\frac{3}{32}$ }
{ Codeinæ	...	gr. $\frac{1}{16}$ }
Bismuthi Carb., T.H.		gr. 3
(P) { Bismuthi Carb., T.H.		gr. 3 }
{ Morphinæ Acet.	...	gr. $\frac{1}{40}$ }
Cascara Sagrada	...	gr. $2\frac{1}{2}$
(P) Cocæ Extracti	...	gr. $2\frac{1}{2}$
(P) Cocainæ HCl.	gr. $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{16}$, $\frac{1}{32}$, $\frac{1}{20}$ (T.H. has $\frac{1}{10}$.)	
(P) { Cocainæ	...	gr. $\frac{1}{16}$ }
{ Morphinæ	...	gr. $\frac{1}{30}$ }
(P) Codeinæ	...	gr. $\frac{1}{8}$
Convallariæ Tinct.		m. 2
Eucainæ β.	...	gr. $\frac{1}{10}$
Eucalypti Olei	...	m. $\frac{1}{2}$

Pastillus

(P) { Eucalypti Olei	...	m. $\frac{1}{2}$ }
{ Cocainæ HCl.	...	gr. $\frac{1}{20}$ }
(P) Heroin	...	gr. $\frac{1}{24}$
Menthol, T.H.	...	
(St. Th. H. gr. $\frac{1}{4}$)		gr. $\frac{1}{8}$
(P) { Menthol	...	gr. $\frac{1}{20}$ }
{ Cocainæ HCl.	...	gr. $\frac{1}{20}$ }
(P) { Menthol	...	gr. $\frac{1}{20}$ }
{ Codeinæ	...	gr. $\frac{1}{16}$ }
{ Menthol	...	gr. $\frac{1}{20}$ }
{ Eucalypti Olei	...	m. $\frac{1}{2}$ }
(P) Morphinæ Acet.	...	gr. $\frac{1}{30}$
{ Pini Pumil. Olei	...	m. $\frac{1}{2}$ }
(P) { Terpeni Hydratis	...	gr. $\frac{1}{8}$ }
{ Heroin HCl.	...	gr. $\frac{1}{24}$
{ Sulphur Præcip.	...	gr. 5 }
{ Potassii Tart. Acid.	...	gr. 1 }
Terebeni	...	m. 2
Thymol	...	gr. $\frac{1}{32}$
(P) Tussis = Cocainæ	...	gr. $\frac{1}{15}$
et Morphinæ		gr. $\frac{1}{30}$

The **Pastils** or **Jujubes** commonly sold of oval or round shape (the latter are frequently 'sugared') will be found in the index under *Trochisci* marked 'G.' (i.e. of Gum).

Suppositoria Glycerini. (*Off.*). Soak Gelatin, $\frac{1}{2}$ ounce, in Distilled Water, q.s. for a minute, and pour away the excess; then add Glycerin by weight, $2\frac{1}{2}$ ounces, dissolve in a water-bath and evaporate to 1,560 grains. Pour into moulds of 15, 30, 60, or 120 grain-measures, or other capacities as required. Contain 70% by weight of Glycerin. This basis may be used for gelatin pessaries.

It is better to add the warmed glycerin 5 to gelatin 1, dissolve in water 2.—C.D. i./05, 464.

U.S. orders Glycerin 30, Monohydrated Sodium Carbonate 0.5, Stearic Acid 2, Water 5, in Gm. for 10.

Vaginal Suppositories, U.S., are globular or oviform in shape and weigh about 10 Gm. if made with Glycerinated Gelatin, and 4 Gm. if with Theobroma Oil, v. also *Ovules*.

Hollow Suppositories, composed of Oil of Theobroma. May be filled with 20, 45, or 90 grains of Glycerin; they are prompt in action.

Hollow Suppositories and Pessaries may also be filled with Bismuth and Cocaine Ointment, Gall and Opium Ointment, Liquid Extract of Hamamelis, Hamamelis Ointment, Suprarenal Extract, Adrenalin Solution.

Pessar-Suppositories.—These constitute a recent improvement in the suppository treatment of piles, combining the physical supporting and enlarging property of the hard pessary (*minus* its defects) with the lubricating power of the suppository. They consist of bullet-shaped central cones 4 cm. long and 1.5 cm. thick, made of animal-fat tissue and an external layer of cacao-butter and hard paraffin. On placing the pessar-suppository *in situ* the central fat tissue becomes elastic in a short time, and thus provides the necessary alleviation of the pain and discomfort without the use of narcotic or anæsthetic drug.

Cataplasma Kaolini, U.S.—Kaolin 577, Boric Acid 45, Thymol 0.5, Methyl Salicylate 2, Peppermint Oil 0.5, Glycerin 375 (all by weight). Heat the Kaolin one hour on a water bath, add boric acid, glycerin, and other components.

History of Medicinal Earths and this Cataplasm.—Am. Jl. Ph., Mar., 09, L. i/09, 932.

Cataplasma Salicylicum Compositum, *Antiphlogistine Antithermoline, Sorbefacin, and Thermofuge are useful to remove oedema, to relieve pain and swelling of local inflammations.

GLYCETRACTA (GLYCETRACTS)

Strength. —1=1 of Drug.

Dose.—The equivalent in volume to the dose of the drug, excepting those standardised. v., p. 345. For complete list of doses see Index.

Glycerin is well known to be a good all-round solvent and preservative for medicinal substances. As Marshall remarks, "Substances which are soluble in water and insoluble in alcohol are to some extent soluble in glycerin." It should be noted that, as a general rule, glycerin extracts must contain at least 25 per cent. of glycerin to preserve them.

Formulae have been published for glycerin tinctures (*q.v.*), and are in use for glycerinated preparations using alcohol, either to extract the drug at the commencement or to be included in the finished product; but "glycetracts" aim at the exclusion of alcohol, they contain as a general rule 50% glycerin.

A communication to the New Jersey Pharmaceutical Association was made by Beringer in June, 1907 ("American Journal of Pharmacy," 1907, p. 410) on a method of preparing "fluidglycerates,"* representing the fluidextracta of the U.S.P., notably the fluidglycerate of krameria was described. We have elaborated and extended the idea to other drugs. Franklin's method of making liquid extract of cascara sagrada (*q.v.*) should also be noted.

The various drugs require individual treatment in order to yield the best results. With alkaloidal drugs a small proportion of an acid is obviously necessary, but many drugs containing simple bitters and the like can certainly be extracted quite as well with glycerin as with alcohol or aqueous menstrua.

"Glycetracts" in general have the advantage of miscibility and compatibility with aqueous vehicles, with exceptions (those made with acid would be incompatible with alkalis). Many of them are suitable both for internal and local use; they keep well, are cheap, and being free from alcohol, are convenient and suitable for export.

The following glycetracts are perfectly miscible with water, forming a clear solution:

- ① Glycetract of belladonna
- Glycetract of calumba
- Glycetract of cascara
- Glycetract of chiretta
- ② Glycetract of conium
- ② Glycetract of digitalis
- ② Glycetract of gelsemium
- Glycetract of gentian
- Glycetract of hamamelis

- ② Glycetract of hyoscyamus
- ② Glycetract of jaborandi (almost)
- Glycetract of quassia
- Glycetract of sarsaparilla
- Glycetract of squill
- Glycetract of senega
- Glycetract of senna
- Glycetract of taraxacum
- Glycetract of valerian

The following do not form perfectly clear solutions with water, but can be rendered miscible, as stated later:

- ② Glycetract of aconite
- Glycetract of catechu
- Glycetract of cinchona
- ② Glycetract of coca
- ② Glycetract of colchicum

- ② Glycetract of ergot
- ② Glycetract of hydrastis
- Glycetract of krameria
- Glycetract of rhubarb
- Glycetract of Virginian
prune

MODE OF PREPARATION.

1. For drugs containing water-soluble constituents, bitters tannin principles, and some flavouring agents:

(a) *Percolation-process*.—For those drugs which will percolate satisfactorily without "blocking" this method is to be preferred. Macerate 100 of the drug in No. 20 powder in glycerin 50 and water 200 for twenty-four hours, then commence percolation. Reserve the first 50 of percolate and continue percolation with chloroform-water (1 in 1,000) until exhausted. Evaporate the liquor to 50 and add to the reserved portion.

*See also Am. Jl. Ph. 1908, 525, 1909, 312.

Experiments show that this percolation method is suitable for calumba, cascara (1% of strong solution of ammonia to be added), digitalis, gentian, hamamelis leaves, krameria, rhubarb, sarsaparilla, senega, taraxacum, valerian, and Virginian prune bark. In the case of cascara the yield of extractive is the same as by the method of Franklin. Glycetract of Virginian prune is made without heat.

(b) *Maceration-process*—i.e., for drugs which will not percolate satisfactorily. Macerate crushed drug 100 in a hot mixture of glycerin 50 and water 200 for six hours, press off, and repeat maceration with hot water twice. Combine liquors and evaporate to 100.

Experiments show that this is suitable for chiretta, liquorice (cold maceration), quassia, senna (cold maceration), squills (cold maceration)

2. Alkaloidal Drugs:

For drugs containing alkaloids we recommend to percolate, wherever possible, crushed drug 100, with a mixture of glycerin 50, acetic acid 9, and water 191, and proceed otherwise as under 1 (a), making the final product 100 containing about 3 per cent. of acetic acid.

This method our experiments show to be applicable for aconite, belladonna, cinchona, colchicum, conium, ergot, gelsemium, hydrastis, hyoscyamus, ipecacuanha and jaborandi. A larger proportion of acid does not seem to yield better alkaloidal results.

The acetic glycerin mixture does its work fairly well, and extracts the bulk of the alkaloids in most cases. The marcs left over, after being pressed dry, were percolated with alcohol and found to be, practically speaking, exhausted, with one or two exceptions. Hydrochloric acid might yield better figures, but there are some objections to its use.

We conclude that by one or other of the above methods the bulk of the active ingredients can be extracted; there is some unavoidable loss with the alkaloidal drugs.

"Glycetracts" of those drugs which do not form *clear liquids* with water can, if preferred perfectly miscible, be replaced by an aqueous extractive, evaporating and mixing a sufficiency of glycerin with the warm liquor. Alkaloidal drugs should, however, be handled by the method given under No. 2, and the fact of these forming opalescent mixtures with water cannot well be obviated.

The following Glycetracta are standardised:—

Glycetract.	Alkaloidal Strength.	Dose.
Ⓐ Aconite	0·4 per cent.	(Average) 1 min.
Ⓑ Belladonna	0·375 "	1 to 2 min.
Cinchona	3 "	8 to 25 min.
Ⓒ Coca	0·25 "	1 to 2 dr.
Ⓓ Colchicum (seeds) ...	0·5 "	(Average) 3 min.
Ⓔ Conium (seeds)	0·45 "	(Average) 3 min.
Ⓕ Hyoscyamus	0·075 "	(Average) 3 min.
Ⓖ Ipecacuanha	1·1 "	Expectorant 1 to 4 min.
		Emetic 30 to 40 min.
Ⓗ *Nux vomica	0·75 " Strychnine	2 to 6 min.

* This Glycetract is best made with Hydrochloric Acid—the strength employed, is 5% by which we mean 5 Gc. of Hydrochloric Acid Off. to 100 Gm. of drug.

Beringer Am. Jl. Ph. Nov. '08, p.525 continuing his work on this subject now reserves 50 parts of the first percolate in extracting the drug (as suggested by us). The remaining percolate he evaporates to 60, adds this to the reserve and then continues the evaporation till the product measures 100. He thinks that confusion may arise by our using the name "**Glycetracta**" instead of 'Fluidglycerates.' We conducted a considerable amount of research on the Glycerin Extraction of Drugs, *vide* previous edition, and thought best to name our preparations "**Glycetracta**," to distinguish from the 'Fluidglycerates.' We do not think that confusion will arise.

For alkaloidal extraction we employed Acetic Acid. Beringer now uses Tartaric Acid 2%, to be contained in the finished Fluidglycerate. For Colchicum, Conium, and Ipecacuanha, however, he also uses Acetic Acid.

Beringer gives the following as having been prepared :—

<i>Fluidglycerate.</i>	<i>Alkaloid.</i>	<i>Fluidglycerate.</i>	<i>Alkaloid.</i>
Aconite	0.435% w/v.	Ipecacuanha (using 10 Cc. of Acetic Acid for 100 Gm. of root)	1.4756% w/v.
Belladonna leaves ...	0.27542% "	Nux Vomica (using 5 Cc. of Acetic Acid)	0.996% "
" root	0.37884% "	Pilocarpus (extracted without Acid) ...	0.35% "
Cinchona	3.58% "	Stramonium	0.2296% "
Coca	0.3% "		
Colchicum corn ...	0.29% "		
" seed	0.36% "		
Conium	0.46% "		
Guarana	3.8% "		

It will be seen that these results, so far as the **Glycetracta** for which we suggested standards are concerned, mostly approximate our own figures.

The same worker tried Hydrochloric Acid 5% *inter alia* for Fluidglycerate of **Nux Vomica**, as producing a result less likely to deposit. We suggested this Acid ourselves (see original paper) but did not advise it at the time, for several reasons. We find, however, it will extract the drug satisfactorily, employing it in proportion of 5 Cc. Hydrochloric Acid, *Off.*, to 100 Gm. of drug. The yield of Strychnine approximates that contained in the entire drug. We retain the standard 0.75% Strychnine for this **Glycetracta**.

For **Sanguinaria** Acetic Acid is unsatisfactory, 10% of Hydrochloric Acid is, however, useful.

Fluidglycerate of Buchu is made with Buchu 100 Gm., Potash Solution 50 Cc., Glycerin 50 Cc., Water 100 Cc.

Fluidglycerate of Grindelia is also made alkaline on the lines of that of Buchu. Should prove effective as a topical application in rhus poisoning.—Am.Jl.Ph.Oct./09, p. 475.

The Fluidglycerates of **Digitalis** and **Ergot** were not so active physiologically as the corresponding hydro-alcoholic Liquid Extracts. Tested on frogs the former was about 5 times as weak as the corresponding hydro-alcoholic preparation. These products may possess therapeutic value which can be better found by clinical tests.—Am.Jl.Ph. Feb./09, 84.

Glycopasta is the name given to a Glycetract (*neutralised if necessary*), made into a paste for local use by mixing with Tragacanth 2 to 3%, e.g., the following:—

Ⓐ **Glycopasta Belladonnæ** 0.375% Alkaloids. (Glycerinum Belladonnæ q.v. is about 0.5% Alkaloids.)

Ⓑ **Glycopasta Aconiti** is the Glycetract alone (no thickening necessary).

Ⓒ **Glycopasta Hyoscyami** 0.075% Alkaloids.

If considered too strong they should be directed to be diluted with Glycerin.

Glycetracta—'Lancet' note on.—L.ii./09,62.

GLYCYRRHIZA (Off.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.) or more.

The peeled root and subterranean stem of *Glycyrrhiza glabra* (Leguminosæ).

U.S. has *G. Glabra* (Spanish) and *G. Glauca* (Russian) (Leguminosæ).

37 samples yielded 24 to 38% of aqueous extractive.

Extractum Glycyrrhizæ (Off.).

Dose.—5 to 60 grains (0.32 to 4 Gm.).

Extractum Glycyrrhizæ Purum. U.S.

Exhaust Glycyrrhiza in No. 20 powder with diluted ammonia. Incorporate 5% glycerin with the evaporated percolate. Is completely soluble in water.

Liquorice Juice of commerce contains 10 to 15% and more of Glycyrrhizin. White Cross Congress required only 6%. Umney.—C.D. ii./09,550.

Extractum Glycyrrhizæ Liquidum (Off.).

By cold exhaustion 1=1, contains $\frac{1}{2}$ of its volume of 90% alcohol.

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.).

Incompatible with acids.

Fluidextractum Glycyrrhizæ, U.S.

Average dose.—30 minims (2 Cc.).

Macerate Glycyrrhiza 100 with boiling water 40 for one hour, and percolate with boiling water until exhausted. Concentrate to 40 and add 45 of Alcohol, set aside three days. Filter and distil until 50 remain, add Glycerin 25, Ammonia solution 5 and Alcohol 20. Make up volume with water to 100.

Elixir Pectorale.—P.G. *Syn.* Liquor Pectoralis. P. Dan. '93.

King of Denmark's Chest Mixture. *Dose.*—1 drachm (3.5 Cc.).

Extract of Liquorice 1, Fennel Water 3, Anisated Liquid Ammonia 1.

Liquor Ammonii Anisatus consists of Oil of Anise 1, Alcohol 25, Solution of Ammonia 5.

Many of the Foreign Pharmacopœias give similar formulæ. e.g. that of P. Dan. 1908.

Glycyrrhizinum Ammoniatum, U.S.

Dose.— $\frac{1}{2}$ to 5 grains (0.032 to 0.32 Gm.).

The Ammonia Salt of Glycyrrhizin (Glycyrrhizic Acid) $C_{44}H_{83}NO_{18} = 886.82$ (893.514 l. Wts.), the principle of liquorice. Is incompatible with acids. It is contained in the root as the ammoniacal compound (Kraemar); it forms garnet coloured, shining scales when precipitated, purified, re-combined with ammonia, and dried on glass plates; these possess persistent sweet taste. Glycyrrhizin reprecipitated by acid is bitter-sweet and has acid reaction. A grain will flavour 5 ounces of water.

Soluble—readily in water and in diluted alcohol.

Liquorice preparations cover the taste of ammonium chloride, alkaline iodides, cascara, magnesium sulphate, quinine sulphate, ipecacuanha, and aloes, hence is in *Mistura Sennæ Composita*, *Decoctum Aloes Compositum*, and *Confectio Sennæ*. As a demulcent it was used in *Infusum Lini*, B.P. 1885. N.B.—*Incompatible with Acids*.

In addition to the official extracts, dried 'Liquorice Juice,' or 'Spanish Liquorice,' is sold, that bearing the stamp of Solazzi being most prized. Pontefract Cakes of Liquorice, 'Pipe Liquorice,' are useful in allaying tickling coughs.

Examination of commercial Stick Liquorice.—P.J. i./o6,494; C.D. i./10,21.

Tschirch discovered that Glycyrrhizin of Liquorice Root is an ester of Glycronic Acid (cf. p. 877), which is of importance in animal life—an unexpected fact, as the most varied sugars are at the disposal of a plant if it wishes to form Glucosides.—P.J. ii./09,421. c.f. also Y.B.P., 1907,73.

Tabellæ Glycyrrhizæ, MARTINDALE, Liquorice - Chocolate Tablets.

Liquorice in chocolate basis. Useful for coughs and colds.

Trochisci Glycyrrhizæ, Brompton Hospital, and City Road Chest Hospital, commonly known as 'Brompton' Cough Lozenges, or 'Brompton Blacks.'

Liquorice Extract 3 grains, Anise Oil $\frac{1}{2}$ minim in each (Acacia basis).

Pastilles de Réglisse.—Liquorice pastils, much used in France.

Pulvis Glycyrrhizæ Compositus (Off.).

Syn. PULVIS LIQUIRITIÆ COMPOSITUS, P.G., PULVIS PECTORALIS (*Kurellæ*).

Senna and Liquorice of each 2 ($1\frac{1}{2}$ P.G. iv.), Fennel 1, Sublimed Sulphur 1, White Sugar 6 (5 P.G. iv.). Mix.

Dose.—1 to 2 drachms (3.5 to 7 Gm.), mixed with water or milk, taken early in the morning, is a mild and agreeable laxative. For constipation and hepatic disease, it is pleasant to take, and effectual without catharsis. U.S. uses oil of fennel, which makes the preparation less granular.

It is also prepared *sine Saccharo* (Hewlett),—with *half* above dose, more palatable, and more suited for use where sugar is barred.

***GLYL AND *SYL FLAVORING AGENTS (Martindale).**

The Official flavoring *Waters, Infusions, Spirits, Syrups, and Tinctures* are largely used, but in these there is room for improvements in many particulars. We may briefly recall the principal official and non-official flavoring agents:—

Aqua.—*Anethi, Anisi, Aurantii Floris, Camphoræ, Carui, Chloroformi, Cinnamomi, Fœniculi, Laurocerasi, Menthæ Piperitæ, Menthæ Viridis, Pimentæ, Rosæ, Sambuci*.

Elixir.—*Aromaticus, Saccharini, Simplex*.

Extractum.—*Glycyrrhizæ Liquidum*.

Glycerinum.

Inrusum.—*Aurantii, Aurantii Compositum, Caryophylli, Gentianæ Compositum, Rosæ Acidum*.

Mistura Amygdalæ.

Spiritus.—*Animonæ Aromaticus, Anisi, Camphoræ, Chloroformi, Cinnamomi, Menthæ Piperitæ, Myristicæ*.

Succus.—*Limonis*.

Syrupus:—*Aromaticus, Aurantii, Aurantii Floris, Limonis, Pruni Virginianæ, Rosæ, (Simplex), Tolutanus, Zingiberis.*

Tinctura:—*Aurantii, Capsici, Cardamomi Composita, Cinnamomi, Gentianæ Composita, Lavandulæ Composita, Limonis, Zingiberis.*

Our suggestion is to employ as flavoring agents to prescribed 'mixtures' Solutions of those Essential Oils which are pleasant to the taste in either Glycerin or Syrup. These preparations are called respectively ***Glyl** and ***Syl*** throughout our pages. We add the name of the Essential Oil required in Latin.

'Glyl' and 'Syl' Flavoring Agents will keep good for a considerable length of time within ordinary limits of temperature. Their use will tend to uniformity,—a matter of obvious importance to the pharmacist. They show distinct advantage in time saving, both in prescribing and in dispensing.

The preparation of the Distilled Waters of the Pharmacopœia entails, we venture to think, unnecessary labour, more especially as several, *e.g.*, Cinnamon, Orange Flower, Rose, have poor keeping qualities. Then again, many of the Official Waters require the addition of either Glycerin or Syrup to render them of use in covering the taste of nauseous medicines. The same applies in regard to Tinctures and Spirits.

We think from the tasting experiments that we have conducted, Glyl and Syl Flavoring Agents might well replace many of the official preparations.

Fresh infusions of drugs are useful for flavoring, but the fact seems to be ignored that, though the infusions are '*fresh*,' the drugs with one single exception throughout the Pharmacopœia are *dried*, and *ergo* may have lost much of their aroma. And then again, when we realise that these '*fresh*' infusions are prepared from '*concentrated*' infusions—presumably used to overcome the prescribed time of infusion difficulty—the whole position is obviously unsatisfactory.

Again in the course of daily dispensing experience one can find no valid reason why both Water and Spirit of Aniseed, Cinnamon, and Peppermint should be official as flavoring agents. 'Glyl' and 'Syl' Solutions in each instance would avoid the duplication, and in the case of Orange a triplication (Infusion, Syrup, and Tincture. N.B.—All from *dried* orange peel.)

Furthermore the use of such a satisfactory flavoring agent as Glyl or Syl Menthæ Piperitæ will obviate the unnecessary labour entailed in making Aqua Menthæ Piperitæ, and the waste of time in prescribing and dispensing the additional Glycerin or Syrup necessary to render it palatable.

Of the official flavoring tinctures in our opinion that of Orange is the only one of sufficient power to '*cover*' the taste of a nauseous drug, but alone it is of little avail—a sweetening agent in addition is essential. Syrup of Orange by reason of its utility has, to say the least of it, become hackneyed.

The spirits of Aniseed, Peppermint, Cinnamon, and Nutmeg of the Phar-

* These two words are Registered Trade Marks—the property of the authors. We intend, however, to permit Pharmacists to make the preparations in question for the flavoring of prescribed medicines. They are easily prepared, and we trust will be widely used. The strength and method of preparation to be strictly adhered to as described herein or as amended by us in any future communication on the subject.

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macopœia are, we think, too strong—the oil will throw out again on dilution unless a further quantity of Spirit be added.

Preparation.

Glyl and Syl flavorings are all of uniform strength—1 of the Essential Oil in 500 respectively of Glycerin or Syrup—or approximately 1 minim to the ounce, and are quickly prepared by placing $\frac{1}{2}$ the required amount of Glycerin (slightly warmed, *e.g.*, by standing the bottle in a little hot water) or Syrup in a bottle capable of holding the full amount, adding the required amount of Essential Oil mixed with three times its volume of 90% Alcohol in small portions with continuous shaking, then adding the remainder of the Glycerin or Syrup with further vigorous shaking.

Thus made (it is intended the pharmacist should prepare a small stock ready for use) and allowed to stand a short time for the small excess of Essential Oil to rise, which will occur in some instances, and which is easily removed by passing through a pledget of moist Cotton Wool or by the use of a separating funnel, it will be found that all the following are perfectly clear, and remain so for a long period, with exception of Syl Anisi (Glyl Anisi is clear), Syl and Glyl Sassafras, and Syl Pimentæ. Indeed the solubility of these Oils in Glycerin is remarkable.

The following have been made and tried as flavoring agents. Others will possibly suggest themselves to Pharmacists,

Glyl vel Syl Amygdalæ Essentialis <i>sine</i> HCN.		Glyl vel Syl Limonis.	
"	Anethi.	"	Menthæ Piperitæ.
"	Anisi.	"	Viridis.
"	Aurantii Amari.	"	Myristicæ.
"	Aurantii Floris.	"	Pimentæ.
"	Carui.	"	Pini Pumilionis.
"	Caryophylli.	"	Rosæ.
"	Cinnamomi.	"	Sassafras.
"	Fœniculi.	"	Thymi.
"	Lavandulæ.	"	Vanillæ (1 of Essence q.v. in 8).

Note.—We find by experiment that several of the Glyl Flavorings *can* be made stronger if desired. Glyl Cinnamomi, Glyl Lavandulæ, and Glyl Pini may be prepared 1%. Glyl Pini and Glyl Rosæ can be made 3 minims to the ounce to form a solution, *but these are not intended for use except when so prescribed*—as a general rule the strength 1 in 500 will suffice. The oils in the case of Syl Anisi, Aurantii Amari, Cinnamomi, and Thymi are not held in solution sufficiently to enable these to be kept for any length of time—the Glyls of these, however, retain full flavour.

The favorites in the entire series according to our taste were :—

Glyl vel Syl Amygdalæ Amari.		Glyl Aurantii Amari	
"	Coriandri.	"	Cinnamomi.
"	Lavandulæ.	"	Pini (Excellent for Tere- binthinous drugs).
"	Menthæ Piperitæ.	"	Thymi.
"	Rosæ.		
"	Vanillæ.		

Combined Glyl Pini and Syl Lavandulæ are useful for exceedingly objectionable drugs.

Dose.—Of either Glyl or Syl to flavor an ounce dose of a mixture 1 to 2

drachms, as a general rule, suffices. In the case of Glyl or Syl Menthae Piperitæ $\frac{1}{2}$ drachm will be ample.

Pharmaceutically the Glyl are better than Syl preparations, but to the taste the latter as a rule are preferable. For nauseous drugs with a disagreeable penetrating *after taste* Glyls are frequently to be preferred. In certain affections where sugar in any form is to be avoided preference will naturally be given to the Glyls.

In the various instances in which Glyl or Syl flavorings are recommended we have had regard to compatibility and custom heretofore, and have frequently selected an official or existing semi-official flavoring agent in addition so as to be of general assistance.

Occasionally a fresh infusion of a drug, *e.g.*, a vegetable bitter is required. In such cases the addition of a Glyl or Syl, if used in bold dose, will act both as preservative and flavoring agent,—both Essential Oils and Glycerin are antiseptics.

GOSSYPIMUM (Off.), U.S.—Syn. Cotton Wool

The hairs of the seeds of *Gossypium Barbadosense* and of other species of *Gossypium* freed from fatty matter.

This is absorbent and is much employed as a wound-dressing. It is prepared by alternately treating bleached cotton with diluted hydrochloric acid and solution of soda and well washing afterwards. It is soluble in an ammoniacal solution of copper oxide.

The following surgical forms of **Cotton Wool Dressings** are in use. See also under the individual antiseptics for medicated preparations.

Bandages.—

Black Cloth, 6 yards, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, and 3 inches, are prepared for use as slings.

Buttercloth, 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, 4, and 6 inches (6 yards).

Calico, 1, 2, $2\frac{1}{2}$, 3, 4, and 6 inches (6 yards).

"Cataract" (of special form for bandaging after operation for).

Crepe, Geneva, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, and 3 inches wide and 8 inch binders.

"Velpeau, 2, $2\frac{1}{2}$, and $3\frac{1}{2}$ inches wide.

Crinoline, for silicating and Plaster of Paris, 1, 2, 3 and 4 inches wide.

Domette, 2, $2\frac{1}{2}$, 3, 4, 5, and 6 inches wide.

Elastic Circular Stocking, $2\frac{1}{2}$, 3, and 4 inches (any length).

Elastic, India Rubber Webbing, 1, 2, and 3 inches wide.

Flannel, $2\frac{1}{2}$, 3, 4, and 5 inches wide.

Gauze, Plain, Absorbent, 4 inches wide.

"Ideal" (a special elastic bandage), $2\frac{1}{2}$ and 3 inches wide.

Muslin, Check, for Plaster of Paris, 2, 3, and 6 inches wide.

Open Weave, white absorbent, 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, 4, 5, and 6 inches wide.

Plaster of Paris, 2, $2\frac{1}{2}$, and 3 inches wide. In air-tight containers.

Selvedge, white and grey, 2, $2\frac{1}{2}$, 3, and $3\frac{1}{2}$ inches wide.

Stockinette—See Elastic Circular Stocking above.

Triangular, Esmarch's.

Battist, Milne's, also named **Mosetig's Battiste**, the surgeon who first used it. A substitute for oiled silk, gutta-percha tissue, and jaconet. Can be boiled, and is spirit and grease proof.

Billroth's Cambric.—Consists of cotton fabric treated by a special process. It takes the place of Gutta Percha Tissue and Oiled Silk, being capable of sterilization.

Buttercloth. As a dressing for applying ointments, liniments, &c. Width 36 inches.

Cellulose Wadding.—A cheap absorbent dressing. Is prepared from wood fibre. **Cellulose Tissue** is in sheet form.

Eye Pads are ready cut, round or oval, consisting of a layer of wool between two sheets of gauze.

Felt, thick, coated with adhesive solution, in sheets 28 inches by 18 inches, and with soap plaster for bed sores.

Gauze Tissue, see Gauze and Wool Tissue.

Gauze, White Absorbent, is prepared in 6 yard pieces. *Tela Depurata P.G.* is similar.

Gauze and Wool Tissue, plain and medicated with Boric Acid, Carbolic Acid Iodoform, (P) Mercuric Iodide, (Q) Mercurio-Zinc Cyanide, Thymol, Picric Acid, are prepared.

Gauzes, Ribbon, as suggested by C. Stonham, have a woven edge and are used for plugging cavities and wounds.

The following are made in $\frac{1}{4}$ inch, $\frac{1}{2}$ inch, 1 inch, 2 inch widths, in 12 yard lengths:—

Alembroth, Aluminium Acetate (useful for foul wounds.—*L. i./03,936*), Boric Acid, Carbolic Acid, Chinosol, Creolin, Iodoform, (Q) Mercurio-Zinc Cyanide, (P) Mercuric Perchloride, also Non-Medicated.

Gauze Tampons, 3 inches long and $\frac{3}{4}$ to 1 inch in diameter (with thread attached), coated with soft soap, useful in obstinate constipation. Evacuation occurs in $\frac{1}{4}$ hour.—*Pres.*, Feb. 1907.

Handkerchiefs, Aseptic (Silky Fibre), are medicated with Eucalyptus and Pine Oil, and Non-Medicated in wallets.—Intended for phthisical sufferers.

Impermeable Piline.— $\frac{1}{2}$ the thickness of spongio piline of felt, and instead of the waterproof indiarubber backing of the latter, there is an antiseptic material, not affected by heat or strong spirit. Suitable for applying liniments in rheumatism, and where warmth is desired simultaneously.

Jute, in 1 lb. rolls for rough absorbent purposes.

Lamb's Wool. Antiseptic for tampons. As a treatment for prolapse of the uterus; applied every day by the patient. Does not absorb fluids and maintains size and gives support. May be impregnated with mercuric biniodide 1 in 10,000.

Pure Animal Wool. *Syn. THERMO-LAINE* has many advantages over Cotton Wool *e.g.* in the use of a gamgee jacket. Cotton prevents the escape of moisture. In prolonged operative work the long anæsthesia lowers bodily temperature, it is important to take every precaution to conserve the heat of the mutilated patient. When the lowering effects of the anæsthetic and the operation cause cold clammy perspiration to exude, gamgee tissue retains it and becomes of the nature of a refrigerator: here a wrap of sheep's wool would be preferable. Other uses, *e.g.* rheumatism, pulmonary affections suggest themselves.—*B.M.J. ii./09,1673*.

Laparotomy Pads consisting of gauze bags with slip-in rubber sheets. Size 7 by 8 inches.—*L. ii./07,300*

Lint (*vide also Steriloid Dressings*), absorbent, is made non-medicated also medicated:—Boric, 50% coloured pink. Iodoform, 10%. Non-Absorbent useful for local use.—*M.P.ii./03,395*. Styptic (15% Ferric Perchloride.)

Muslin, Nainsook, width 36 inches. Somewhat softer than buttercloth, is useful for ointments.

Sanitary Towels, Hygienic, for menstruation, of Sphagnum, (*q.v.*) are absorptive, deodorant and antiputrescent. Southall's, Nos. 0, 1, 2, 3, 4 and extra large, and the "Mene" are of cotton fabric. Maw's are in two brands, 'ordinary' and 'superfine.'

Sponges, Carbolised, are used in abdominal surgery, they have fallen into disuse but some surgeons still prefer them to cotton swabs.—

(1) About 2 to 3 inches in diameter.

(2) About the size of palm of hand.

(3) Large flat, about 8 inches in diameter.

Sir W. Watson Cheyne says it is not necessary to discard the use of these useful articles because they are spoilt by boiling. If immersed in suitable solutions for correct time (*e.g.* 1 in 20 Carbolic for 1 week) will be thoroughly sterilised. Much more suitable than gauze swabs for soaking up blood.—*L.ii./08,1800*.

Circular Gauze and Wool pads, about 3 inches in diameter. Also sterilised (*vide Steriloid Dressings*).

Spongio Piline.—Thick felt with waterproof india-rubber backing for applying warm moist dressings.

Tillman's Dressing is Cellulose Wadding *q. v.*

Tow, Flax, $\frac{1}{2}$ -lb. rolls.

Wool, Absorbent Cotton, (also non-absorbent).

Both the above also in thin sheets measuring 20 by 14 inches.

Wool, Hartmann's Wood Wool Dressings, *v. p.* 550.

Wool, Animal, see **Lambs' Wool.**

* "Steriloid" Dressings.

These dressings have been submitted to a temperature of 253° F. for 30 minutes at a pressure of 15 lbs. in an autoclave. Each parcel of dressing is wrapped by a patent method in wool, parchment wrapper and enclosed in an air tight dust-proof carton or hermetically sealed tin.

Bandages (in tins), 2, 2½, 3, and 4 inch.

Gauze, plain, absorbent, 1, 2, 6, and 12 yard cartons.

„ **Alembroth and Boric,** each 1 and 2 yards.

① „ **Cyanide,** 1, 2, 6, and 12 yard cartons.

② „ **Biniiodide,** 6 yards.

Lint, plain, absorbent, Alembroth, Boric, and ① Cyanide, each in 1 and 2 oz. cartons.

Wool, plain absorbent, 1, 2, and 8 oz. cartons.

„ **Alembroth, Boric, and ① Cyanide,** each in 1 and 2 oz. cartons.

③ **Swabs, Cyanide. Gauze,** 4 × 4 inches, 12 in carton.

In addition, Iodoform Gauze (2 yards) and Carbolised Wool, 50, 100, and 250 Gm. are wrapped with aseptic precautions in similar cartons, but are not heated.

Combined cartons contain 1 ounce of plain absorbent wool, with $\frac{1}{2}$ yard plain absorbent gauze sufficient for a minor dressing, and combined cartons containing Alembroth Gauze (6 yards) with wool and gauze tissue suitable for a major operation.

Swabs, cartons contain: 12 small round pads suitable for eye-work; 6 larger round pads (about 2 inches in diameter); 12 gauze, 6 inches square; 12 wool and gauze tissue pads, 3 inches square; tins contain 10 gauze covered swabs, 4 inches square; also tins containing 10 swabs 6 inches square (*vide* also **Triangular Swabs**).

④ **Swabs, Cyanide,** 12 in carton, 4 inches square.

Triangular Swabs have a pocket at one angle in which the finger or a probe can be introduced. For packing a cavity or wound during operation. In tins of 10 and 20 swabs. By counting the swabs left over the surgeon can be certain of not having left any in the wound.—Jackson Clarke, M.P.C., Aug. 12, 1903.

Eye Pads, 1 doz, in carton.

Towels (Tins of 4), 18 × 32 inch.

Wrappers 6 feet long with slit in same, 10 × 2 inches, for abdominal operations also 3½ feet long.

Abdominal Set in tin with key, contains 12 swabs 6 × 8 with tapes, 12 swabs 6 × 6, 4 towels, 2 thick pads 6½ × 8½ inches (as dressing), 1 bandage 4 inch, and 4 safety pins.

Eye Operation Set, No 1, tin containing 3 Sterile Sets of the following:—12 small eye swabs, 1 special eye pad, 1 × 2½ inch bandage. (A set can be removed without impairing the others in any way.)

Eye Operation Set, No 2, containing 1 × 2 inch bandage, 4 eye pads, 4 pieces gauze, 1 oz. wool.

Dental Dressings.

For Dental Use are prepared:—

Aseptic Dental Napkins to be used once and thrown away.

Absorbent Dental Rolls. As a substitute for the napkin or rubber dam. For covering the mouths of the salivary ducts; a section may be placed on either side of a tooth, or the entire roll may be bent round the

outside of the arch or under the tongue. No. 1, diameter $\frac{5}{8}$ inch; No. 2, $\frac{3}{8}$ inch; No. 3, $\frac{1}{2}$ inch; No. 4, $\frac{3}{4}$ inch; in $1\frac{1}{2}$ or 6 inch lengths.
Non-absorbent Dental Rolls.—To replace the rubber dam. In crown and bridge work. May be used in connection with the saliva ejector.
Sterilised Absorbent Pledgets for wiping out cavities.
Aseptic Absorbent Points are prepared for drying pulp canals.
Sterilised Bibulous Paper, in sheets, 3 inches by 10 inches.
Carbonised Cotton for filling pulp canals, and for treatment of exposed pulps.

Gossypii Radicis Cortex.

The root bark from *Gossypium herbaceum* (*Malvaceæ*) and other species contains about 10% acid resin.

Uses.—The following preparations are given instead of Ergot to check uterine hæmorrhage in all its forms. May relieve dysmenorrhœa.

Extractum Gossypii Radicis Corticis.—Semi-alcoholic.

Dose.—1 to 4 grains (0·065 to 0·26 Gm.) in pill.

Ⓜ **Pilula Gossypii Composita.**

Extract of Cotton Root, Extract of Hydrastis, Ergotin, of each 1 grain (or 1 gramme divided into 15 pills). **Dose.**—One, 3 or 4 times a day.

Extractum Gossypii Radicis Corticis Liquidum, I.C. Add (*q.v.*). **Dose.**— $\frac{1}{2}$ to 1 drachm. The bark exhausted with a mixture of Glycerin 1, Alcohol (90%) 3; 1=1.

Flavoring.—Syl Lavandulæ, Glyl or Syl Cinnamomi; Syrupus Aurantii.

Extractum Gossypii Seminis Pulverisatum.

POWDERED COTTON SEED EXTRACT. *Syn.*—*Lactagol.

Dose.—1 teaspoonful 4 or 5 times daily.

Said to increase the flow of milk and the nitrogenous constituents of same. Given in milk or cocoa (rubbed smooth in the cold), and the cup then filled up either hot or cold, stirring the while.—B.M.J.E, ii./o4, 48.

Tinctura Gossypii Radicis.

Dried Bark of Root of Cotton Plant 1, Alcohol 60% 4.

Dose.—1 drachm (3·5 Cc.) 3 times a day.

GRINDELIA (*Off.* in I.C. Add.) U.S.

Gum Plant.

The dried herbs *Grindelia robusta* and *G. squarrosa* (*Compositæ*)—the latter is most commonly used. The involucre, and often the leaves, are coated with a glutinous oleo-resin. The medicinal action is due to resins.

Uses.—Very useful in reducing the frequency and violence of the spasmodic attacks which occur in asthma, whooping-cough, and bronchitis, and is given in heart disease to slow and regulate the pulse.

Extractum Grindeliæ (by alcohol extraction).

Dose.—2 to 3 grains (0·13 to 0·2 Gm.) in a pill with lycopodium, three times a day.

Extractum Grindeliæ Liquidum, I.C. Add.

Exhaust herb with alcohol (90%), distil, add Sodium Bicarbonate to residue and water *q.s.* with alcohol (90%) one-fourth to make 1=1.

Dose.—10 to 20 minims (0·6 to 1·8 Cc.) at the onset of a paroxysm of asthma, repeated every half-hour or hour, in sweetened water or milk, else the resin separates and sticks to the vessel. Useful for whooping-cough.

For spasms of the larynx the liquid extract of *Grindelia* has decided sedative action upon the spasm of all muscles connected with the respiratory apparatus. —B.M.J. i./09, 1106.

Flavoring. Syl Pini (very good), Syl Lavandulæ; Syrupus Tolutanus.

GUAIACI RESINA (Off.) U.S.

The resin (a constituent to the extent of about 20%) obtained from *Guaiacum officinale* or from *Guaiacum sanctum* (*Zygophyllaceæ*). The resin contains chiefly (amorphous) guaiaconic acid and other constituents.

The heart wood of these trees is *Guaiaci Lignum* (Off.).

Dose.—5 to 15 grains (0·32 to 1·0 Gm.).

Uses.—Of great value in chronic rheumatism and lumbago, and for chronic sore throats; added to purgatives is useful in gouty persons, and for sluggish liver. It is a laxative in itself. Diminishes sugar in diabetics.

Soluble almost completely in ether, chloroform, absolute alcohol and in sal volatile.

Petroleum Benzine Solution, 1 in 5, should be colourless and not turned green by equal volume Cupric Acetate 1 in 1,000—absence of Rosin U.S. See also Naylor, P.J., July 28th, 1926.

Chelsea Pensioner, v. p. 657.

Tablets *Guaiacum Resin* and Sulphur 3 grains (0·2 Gm. of each, Useful for gout and rheumatism.

Capsules of *Guaiacum Resin* contain 5 grains.

Useful in rheumatism. The taste is disguised and the resin preserved.

Mistura Guaiaci. (Off.).

Dose.— $\frac{1}{2}$ to 1 ounce (15·0 to 30·0 Cc.).

Guaiacum Resin 100, Sugar 100, Tragacanth 16, Cinnamon Water 4,000. In acute tonsillitis.

Tinctura Guaiaci Ammoniata. (Off.)

Dose.— $\frac{1}{2}$ to 1 drachm.

Add *Guaiacum Resin* 2,000 to strong Ammonia Solution 750, and Alcohol 8,000. Allow to stand 48 hours, shaking frequently. Filter, dissolve in the filtrate Oil of Lemon 21, and Oil of Nutmeg 31, and make up to volume of 12,000 with alcohol 90%. U.S. has 1 in 5 of Sal Volatile. Average dose.—30 minims 1·8 Cc.).

Flavoring.—Syl Pini; Syrupus Zingiberis.

Tinctura Guaiaci, U.S. Average dose.—1 drachm. 1 in 5 alcohol (94·9% vol.), B.P.C. same strength but alcohol 90%.

Guaiacum combined with apiol to check painful menstruation may be given in malt extract, beginning a week beforehand, two or three times a day; also to relieve amenorrhœa.

Frochisci Guaiaci Resinæ. Three grains of Resin with fruit basis. T.H. has 2 grains.

GUARANA. U.S. P. HUNG.

Dose.—10 to 60 grains (0·65 to 4 Gm.) in powder, or infused in a cup of boiling water.

The seeds of *Paullinia Cupana*, *P. sorbilis* (*Sapindaceæ*), roasted and moistened with water, made into a hard paste, rolled into cylinders, and dried. Imported from Brazil. The drug contains 2·5 to 5 % Guaranine, which is identical with caffeine, *q.v.*, together with tannin, gum, &c. Is recommended for sick-headache. A nervine tonic. *Dose.*— $\frac{1}{2}$ to 5 grains (0·032 to 0·32 Gm.), or more.

U.S. has standard 3·5 % alkaloids.

Assay.—The alkaloids are removed by shaking with chloroform and ammonia. The chloroform is distilled from a measured volume of the liquid representing an equivalent of the drug. The residue is dissolved in a mixture of sulphuric acid and water, which solution is then treated with ammonia and successive quantities of chloroform. The chloroformic solution is carefully evaporated and residue weighed.

Elixir Guaranae, B.P.C.

Dose.— $\frac{1}{2}$ to 2 drachms. (1·8 to 7 Cc.)

Guarana, in No. 60 powder, 20, Light Magnesia 2·5, Oil of Cinnamon 0·05, Syrup 10, Alcohol 60 %, *q.s.* to 100. Macerate and percolate. Fluidextractum Guaranae, U.S.

Average dose.— $\frac{1}{2}$ drachm (1·8 Cc.), Standardised to 3·5 Gm. Alkaloids in 100 Cc. Prepared by percolation with Diluted Alcohol.

Tinctura Guaranae.

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Macerate Guarana 1, in Alcohol 60 %, *q.s.* to produce 4.

HAMAMELIDIS CORTEX ET FOLIA.**Witch Hazel Bark and Leaves (Off.).**

Dose of bark, twigs and dried leaves, 30 grains (U.S.).

The bark and leaves, fresh and dried, of *Hamamelis virginiana* (*Hamamelidaceæ*), Witch Hazel, imported from the United States, possess powerful astringent properties.

Uses.—To check hæmorrhages and excessive mucous discharges, and for piles. They form the basis of the American Specialities—★ Pond's Extract (*dose*, 10 drops half-hourly), and ★ Hazeline (*dose*, $\frac{1}{2}$ to 3 drachms). **Liquor Hamamelidis** (Off.). (B.P. gives no dose.)

Fresh Leaves 5, Water 10, Alcohol (90 %) 1. Macerate 24 hours and distil one-half.

Dose.— $\frac{1}{2}$ to 3 drachms (1·8 to 10·5 Cc.), and used externally for piles, and by rectal injection for internal piles. Will also check epistaxis, bleeding from tooth sockets, and is applied to bruises.

In piles, 5 minims, or more or less of a mixture of equal parts of the liquor and glycerin containing 10% of Phenol, injected into piles hypodermically with advantage.—M.P.i./07,397.

It is little more than a weak Solution of Alcohol.—P.J. ii./08,811.

The distilled preparation seems to possess very little physiological action, at least a very considerable quantity of concentrated distillate

injected into frogs and mammals produces no more effect than would be produced by similar amounts of distilled water. U.S.D.

U.S. employs dried bark; the fresh leaves are not officially employed there yet the B.P. directs the fresh leaves. This appears anomalous. The U.S. article in aroma and taste does not compare very favourably with Liquor Hamamelidis, *Off.* (which cannot be made in this country).

Is chiefly prepared in the states of Massachusetts, Connecticut and New York from the small twigs preferably in the fall, when the leaves are off. From a ton of twigs 50 to 80 gallons of distillate is produced, to which 5 to 10% of alcohol is added to prevent change.

Hazel Foam (Martindale). A soothing, non-greasy ointment basis.

May be medicated with all forms of antiseptics and skin applications, *e.g.*, Ichthyol 3%; Ichthyol 3 to 10% with Resorcin 5%; Salicylic Acid 1%; Liquor Carbonis Detergens 10%; Cade Oil 5%.

Extractum Hamamelidis Liquidum (*Off.*).

Hamamelis Leaves, in No. 40 powder, are percolated with 45% alcohol. The first portion is set aside, and the other after concentration is mixed with it, so that 1=1 of leaves. *Dose.*—5 to 15 minims (0.3 to 0.9 Cc.).

Flavoring. Syl Lavandulæ, Syl Menthæ Piperitæ; Syrupus Aurantii.

Fluidextract, U.S., is a glycero-hydro-alcoholic percolate 1=1.

P. Austr. 1=1 of leaves made with Alcohol 1, Water 2. Sp. Gr. 1.06 to 1.1.

Wool, Hamamelis, Absorbent, T.H. 1881.

Hamaine is Tincture, $\frac{1}{4}$ ounce, Glycerin 10 m., Wool 60 grains. Dry. Is used as an astringent dressing.

Hamamelin.—*Syn.* Hamamelidin.

Dose.— $\frac{1}{4}$ to 2 grains (0.032 to 0.13 Gm.) in pill. The powdered extractive from the bark, of a purplish-brown colour. It is also supplied commercially of greenish colour made from the leaf. It has been stated that the latter prepared by strong alcohol was more efficacious in suppositories than that from the bark. The green preferred.—P.J. ii./05,543; Brown preferred, —P.J. ii./05,573.

A Suppository of 1 to 3 grains with cacao butter is useful for piles.

Ⓟ **Compound Hamamelis Suppository.**—Hamamelin 1 grain, Orthoform 5 grains, Cocaine Hydrochloride $\frac{1}{4}$ grain, Opium Extract $\frac{1}{4}$ grain, Belladonna Extract $\frac{1}{4}$ grain, Cacao Butter to 60 grains. For internal hæmorrhoids.—P.J. ii./04,580.

Tinctura Hamamelidis (*Off.*).

Bark, in No. 20 powder 1, Alcohol (45%) *q.s.* to 10.

Dose.—30 to 60 minims (1.8 to 3.5 Cc.).

A valuable hæmostatic, very serviceable in hæmoptysis, hæmorrhoids, menorrhagia, in fact, in all passive hæmorrhage, and what is known as the hæmorrhagic diathesis. As an injection for bleeding piles, 1 drachm of the tincture in 3 ounces of cold water should be given as an enema, and retained, at bedtime or before breakfast, every day; or the Ointment (p. 358) applied locally.—R.

Is given quite irrationally to check bleeding from the lungs or other organs. The tannin to which its local action is due is converted into sodium gallate on reaching the blood—this substance has no remote astringent action.—B.P.C.

A lotion of 1 or 2 drachms with water to an ounce, is a useful application to bruises and small wounds.

Unguentum Hamamelidis (*Off.*).

Liquid Extract of Hamamelis 1, Hydrous Wool Fat 9; a better preparation is made of a basis of Soft Paraffin 1, and Hydrous Wool Fat 2, or with a mixture of Anhydrous Wool Fat 1 and Hydrous Wool Fat 2. For piles.

One week after making we found the formula using Paraffin was best.

'Collapsubes' of this are prepared with rectal tube for piles, *vide* also Hollow Suppositories.

Also **Ⓢ** 'Collapsubes' of above with Cocaine 2%.

Witch Hazel Plasters are made in rubber combination for covering varicose veins.

HYDRARGYRUM (*Off.*).

Hg = 198.8 (200 I. Wts.).

Antidotes to Acute Poisoning by Mercurial Salts.—Emetics by mouth, Apomorphine hypodermically; white of 1 egg for every 4 grains of Perchloride (avoid excess), or milk; reduced iron; alcohol or ether for collapse; and opium for pain.

Uses.—Purgative, cholagogue and antisyphilitic.

Hydrargyrum cum Creta (*Off.*). *Syn.* Grey Powder. *Dose.*—1 to 5 grains (0.065 to 0.32 Gm.).

Mercury 1, Prepared Chalk 2. Is said to become stronger on keeping by oxidation. That of U.S. is prepared with Mercury 38, Clarified Honey 10, and Prepared Chalk 57. Moistened *q.s.* and dried—has sweet taste and is somewhat damp.

Huile Grise, *Fr. Cx.* *Syn.* GREY OIL, OLEUM CINEREUM.

Dose.—An injection of 2 to 3 grains (0.13 to 0.2 Gm.) = $\frac{3}{4}$ to 1 grain Mercury approx. (0.04 to 0.065 Gm.), every eight days for 5 or 6 weeks—or up to seven divisions of the Barthelemy's syringe (*v. infra*), *i.e.*, 0.07 Gm. Mercury.

Mercury 40, Wool Fat 26, Vaseline Oil (*Fr. Cx.*) 60—all by weight. Measures 100, *i.e.*, 40% w/v. Mercury (0.4 Gm. in 1 Cc.).

Fr. Cx. gives method to produce a thoroughly sterile product.

In our last and previous Editions we gave a formula for Grey Oil (40% by weight of Mercury). This is now dropped to prevent multiplicity, and the above may replace.

Barthelemy's Syringe (used in France) is graduated so that when used with a 40% w/v. Grey Oil, 1 c gr. of Metallic Mercury is contained in each of its divisions; 14 c gr. or approx. $2\frac{1}{2}$ grains in the syringe-ful.—*L.i./c9* 499,647.

Fournier's Syringe is $\frac{1}{2}$ Cc. in capacity divided into 10 on the barrel so that each division represents 2 c gr. of mercury using the 40% w/v. product.

Levy-Bing-Lafay Syringe has piston rod graduated into 15 divisions, each of which represents 1 c gr. using the above.—*L.ii./c9*, 214.

A 10% preparation, *e.g.*, the *Injectio Hydrargyri Intramuscularis* (p. 359) suits the ordinary hypodermic syringe better, and is safer as being more accurately measurable.

Injectio Hydrargyri Intramuscularis "10%." *Syn.* INTRAMUSCULAR INJECTION OF MERCURY, LAMBKIN.—B.M.J. ii./05, 1257.

Form A.—Mercury 1 ounce (troy), Anhydrous Lanoline 4 ounces, Liquid Paraffin (Carbolised 2%) to 10 ounces (by volume).

This contains 1 grain in 10 minims,—the maximum dose once a week.

Physicians should specify '10%' to prevent confusion with stronger preparations using the above name in full.

Site of Injection.—An area around a point midway between the gluteal cleft and the anterior superior iliac spine is best.—L. ii./09, 216.

Examined microscopically the mercury globules must appear minute.

Experiments which we conducted showed that this suspending mixture is probably as useful as any. It holds up the mercury even in hot weather. We compared it *inter alia* with a medium made with 20% cocoa nut fat (solid) substituted for an equivalent of the Liquid Paraffin, but this was found to be too hard. We also compared it with that of 'Form B' *infra*, but came to the conclusion that the cocoa nut fat did not improve matters. There was no distinct precipitate at the bottom of a 12 by 1 Cm. column of the injection of Form 'A' kept at tropical heat for 2½ hours but a slight flocculency throughout. Some preparations yield a heavy precipitate under these conditions. For use in the tropics the subject is of importance—with a view to getting accurate dosage.

The following is a modification:—

Form B.—Mercury 1, Cocoa Nut Fat (Solid) 2, Anhydrous Lanolin 2, Vaseline Oil *q.s.* to 10 (carbolised 2%), but it is not quite so elegant as 'A,' having a tendency to become granular on keeping.

The preparation is slowly absorbed and practically painless. 50,000 injections with Form A were made without untoward result. (Nevertheless, caution is necessary.—W.H.M.). The glass syringe used is to be sterilised in Liquid Paraffin.—*c.f.* B.M.J. ii./05, 1257, 1348; P.J. i./08, 23. See also Mercurial Injections *infra*.

Sterules, Hypodermic of the above (Form A), contain 10 minims.

Diarrhœa may be caused by these injections and warded off by 5 grain Cachets of Bismuth Salicylate.—B.M. i./07, 732.

Mercurial Cream, Lambkin, is now a special preparation (1 grain in 10 minims) of a fatty basis containing **Palmitin** (from Palm Oil), stated to be allied to a constituent of the blood. In addition it contains Creosote and Camphoric Acid of each 10% (or 20% of the Compound) called ★ '**Creocamph.**' The Creosote and Camphoric Acid prevent the occurrence of pain sometimes supervening 3 or 4 days after the injection.—L. ii./07, 14.

For details and refs. as to priority in this formula *vide* Edn. xiii.

Before using Mercurial Cream, Lambkin begins with *weekly* injections of **Calomel Cream** containing 5% Calomel in the same vehicle. *Dose.*—10 minims=½ grain of Calomel. *c.f.* also **Injectio Hydrargyri Subchloridi Hypodermica**, p. 373.

Lambkin gives ¾ grain of Calomel once a week for four weeks and then continues with metallic mercury.—L. i./09, 396. He is of opinion that no salt of mercury comes up to Calomel for removing active signs of the disease, but the effect is only transitory in comparison with metallic mercury. Calomel suspended in Olive Oil is exceedingly painful. The addition of Creosote and Camphor produces analgesia—and can be given with impunity.

Does not agree with Lane's advice of $\frac{2}{3}$ grain Calomel once weekly for 15 or 16 weeks. He states a rest from treatment is necessary. After the Calomel to commence with as mentioned above, he gives the Salicylate. The maximum number of injections need never exceed eight, more often six. Then a rest period of two months from all injections is given.—B.M.J. i./09, 123.

Old people, broken down Alcoholics, those with renal disease, with Albumin in the urine, tubercular subjects, those with lead poisoning and gouty persons should not have the treatment.—B.M.J. i./07, 732.

Suppositories containing the 40% Grey Oil in various strengths have been used in syphilis. Efficacious, simple, and safe.—B.M.J. i./07, 731; and Bryant's Surgery, 4th Edition, Vol. I., p. 142.

Inunction better than injection.—B.M.J. ii./08, 108.

Syphilitic 'reinfection' after nine years. 'Remercurialisation' at successive and even distant intervals as important as revaccination.—L. ii./09, 1071

Gangrenous stomatitis: fatal case due to injections of grey oil.—the 10th case in the last few years.—L. ii./09, 406.

The evolution of syphilitic chancre is not influenced in any way by mercury injections.—Lane, Pr. Oct./07, 535.

Dangers of mercurial injections.—L. ii./08, 105.

Mercurial Injections (Summary).

Mercurial Injections may be divided into two classes—those containing :

- (i.) The soluble mercurial salts, which on the whole may be considered the safer of the two, and
- (ii.) Mercury and the insoluble mercurials suspended in oily liquids.

For further details of these solutions see body of text.

1.—Soluble Mercurials.

(The solutions and suspensions are supplied in 1 oz. wide-mouth stoppered bottles to admit of introduction of syringe.)

Ⓟ **Sal Alembroth.** *Dose.*—10 minims of 5% solution every fifth to seventh day. Rather painful, slowly eliminated, fairly rapid in action.

Hydrargyri Bromidum in solution with Sodium Bromide, comparatively painless, v.p. 364.

Ⓟ **Hydrargyri Cyanidum.** Almost painless, but very poisonous, may cause diarrhoea and albuminuria. With Acoin has been used successfully. v.p. 365.

Ⓟ **Hydrargyri Oxycyanidum** has the same faults as the latter, v.p. 365.

Ⓟ **Ragazzoni's Mercuric Iodide and Sodium Iodide Solution.**

Does not cause toxic symptoms. Its intramuscular use is painful. v.p. 367.

Hydrargyri Lactas. A soluble, safe salt, rapidly eliminated and hence repeated dosage necessary.

Dose.— $\frac{1}{4}$ grain in 15 minims. Irritating in trypanosomiasis.—L. i./08, 114.

Ⓟ **Hydrargyri Oxidum cum Asparagin.** To prepare this solution the oxide must be freshly precipitated. It simplifies matters to take the equivalent of mercuric chloride (269.18 : 214.68 HgO) and decompose with excess of sodium hydroxide, washing carefully by decanting. Our experiments show that 1 grain of mercuric oxide can be dissolved to form a permanent solution in 100 minims of saturated asparagin solution (1 in 50).

Dose.—10 minims, increased if necessary.

Ⓟ **Hydrargyri Oxidum cum Formamido** has no special advantages. v.p. 382.

Ⓟ **Hydrargyri Perchloridum.** Employed both as intravenous and intramuscular injection. Causes great pain and may set up a local brawny induration. An injection of 10 minims containing $\frac{1}{16}$ grain is used. c.f. p. 373.

Hydrargyrum Soziodol. Safe, efficacious, and painless. But it has objections.—*Vide* B.M.J. ii./05,1255. *Dose*.—10 to 15 minims intramuscularly, of a solution of the Soziodol Compound 2½ grains with Sodium Iodide 5 grains, in Water 190 minims, i.e., ¼ to ½ grain. v.p. 403.

Hydrargyri Succinimidum. Safe and comparatively non-irritating. *Dose*.—¼ to ½ grain in 10 to 15 minims water (2½ grains in 100 minims).

Campbell Williams favours the Succinimide, or the Soziodol. The former is probably the least painful—in general he prefers the intramuscular injection of soluble Mercurials combined with the internal administration of Mercury in the form of Calomel, and inunction with 5% Mercuric Oleate.

The soluble mercurials may be introduced into the system by Iontophoresis, *q.v.*

Soluble Mercurials, use of.—Beddoes, p. 93.

2.—Insoluble Mercurials.

Hydrargyrum suspended as grey oil. The mercury is probably converted into albuminate in the system. May be irritant in action and comparatively slow. The strength usually employed is 10 minims=1 grain mercury.

Hydrargyri Oxidum Flavum, Hydrargyri Benzoas, and Hydrargyri Tannas do not claim any special attention.

Hydrargyri Salicylas Neutrale.

Dose.—⅓ to 1 grain.

Suspended 10% in liquid paraffin. Non-irritant and effective.

Hydrargyri Subchloridum. Causes pain. Exerts a marvellously rapid remedial action on syphilitics. *Par excellence* for endarteritis and its sequelæ.

Best given as 10 to 15 or even 20 minim doses containing respectively ¼, ⅓, or 1 grain of the salt suspended (10%) in sterile olive oil. The larger doses with caution. Employ morphine ½ grain hypodermically to relieve pain.

Insoluble Mercurials, use of.—Beddoes, 95.

Intravenous Injections of Mercurials are said to be painless, have small dose, are certain of absorption, rapid of action, and do not salivate.

Difficulties of the method, of obtaining consent of patient, possible thrombosis, pyæmic infarction, necessary daily injection. Violent dysentery-diarrhœic symptoms or polyuria and even albuminuria may result.

The solutions of mercuric cyanide, oxycyanide, biniodide, succinimide and perchloride have been used.

Lane injected 20 minims of 1% solution (i.e., ½ grain), of mercuric cyanide daily or every other day—Campbell Williams, Clin. Jl., Jan. 10th 1906 (vol. xxvi., No. 13, 196). Further notes on the Intravenous method.—B.M.J. i./07,732.

The fate of mercury introduced into the organism. First a double salt is formed with Sodium Chloride. Then an albuminate is said to be formed.—B.M.J. i./07,733.

Mercury Amalgam.

This is one of the most popular of dental fillings.—“Black” Cosmos. Vol. xxxviii. page 991, suggests the following:—Silver 68·5, Tin 25·5, Zinc 1, Gold 5.

In use, the alloy is worked up in a glass mortar with an equal quantity of Mercury, and the excess of Mercury is squeezed out immediately before filling in. It is the general rule to employ a double filling, i.e., to insert an initial filling of zinc oxy-sulphate or oxy-phosphate, *q.v.*, and afterwards an amalgam whenever a metal filling is employed, and where the depth of the cavity will allow.

Lanolinum Hydrargyri, v.p. 89.

Linimentum Hydrargyri (Off.).

Strong Solution of Ammonia 10, Camphor Liniment *q.s.* to 45. Mercury Ointment 30, Camphor Liniment *q.s.* to 45 (fluid). Mix the two liquids.

Useful stimulant for enlarged joints and glands.

The following gives on trial a much better article:—Mix Solution of Ammonia 27½ with Camphor Liniment, 55 and triturate Mercurial Ointment 33 with the mixture.

Mercorettes. Oblong blocks containing 30 grains of mercury incorporated with 60 grains of Cacao Butter. For inunction. Free from objectionable odor.—L. ii./09, 302.

With brisk rubbing spreads over the skin and penetrates, leaving a clean surface. The firm consistence is agreeable in use.

By warming may be spread on the linen to form a mercurial plaster (non-adhesive) for use in synovitis, chronically enlarged glands, and arthritis, or for aborting boils and carbuncles.

In affections of the peritoneum involving the lower quadrants of the abdomen or pelvis Mercury is without rival. In appendicitis Mercury inunction reduces the pain, mitigates thirst, and effects copious evacuation and urination, also suitable in all cases of infection of the peritoneal serous membrane.—M. Arch. Jan. 05, No. 1, p. 2.

Pilula Hydrargyri (Off.), Blue Pill. *Dose.*—4 to 8 grains (0.26 to 0.52 Gm.).

Mercury 2 by weight, Confection of Roses 3, Liquorice Powder 1.

In raised arterial tension when indicative of danger, a pill twice or thrice weekly, followed by Saline is beneficial.—Brunton, L. ii./08, 1132; B.M.J. ii./09, 67.

Mercury should be given at once as soon as the diagnosis is made of a chancre exposed to view. In the climate of England the freshly made Metallic pill is the best. Begin with 3 grains a day after the first and last meal, and increasing the daily dose by 1 grain each week till patient is taking 2 grains thrice daily. An average dose is 2 grains twice a day.—Beddoes, 73.

When the wife has become pregnant after a chancre has appeared on the husband, and has become exposed to infection during pregnancy, Mercury should be given at once. Beddoes, p. 69.

Mercurial Bibs.

Made of felt impregnated with Mercury. No. 1 contains 10 Gm., No. 2 contains 25 Gm., No. 3 50 Gm. For introducing Mercury into the system. No new thing: was used early in the 18th Century.—B.M.J.i./07, 731.

Industrial Mercurial poisoning (preventive measures and treatment when set in). Potassium bromide and tincture of digitalis with solution of strychnine recommended.—L. ii./05, 823.

Mercurial treatment should not be overdone. Skin eruptions often yield to "X" rays.—B.M.J. i./06, 264.

Mercury-Vapour bath.—Beddoes, p. 104.

Mercuric Ethylene-diamine Sulphate. *Syn.* ★ **SUBLAMINE**
(*Very poisonous. To be supplied with caution, but it is legally neither (M) nor (P).*)

Contains 43% of Mercury. Soluble in 1.6 of water and about 1 in 200 of Alcohol, 90%. A non-irritant sublimate substitute, is used in solutions of 1 to 1,000; i.e., one tablet (*vide* below) to a quart

of water. This strength is recommended for hand disinfection; the same or half this strength for vaginal irrigation, and for intramuscular injection in syphilis.

Tablets of Sublamine. Red in colour, 15 grains each.

Mercuriol. *Syn.* MERCURAMALGAM.

An amalgam of aluminium, magnesium and mercury the latter to the extent of 40%. The mercury volatilises under influence of warmth, air and moisture. For syphilitic affections, carried as sachet.

* **Mercuriol**, *v.p.* 226.

A combination of mercury with nuclein. Used for gonorrhœal injections, $\frac{1}{2}$ to 2% solutions.

Has been given internally in syphilis in 2 grain doses.

Unguentum Hydrargyri (*Off.*).

Mercury 16, Lard 16, Suet 1, Mix *s.a.* F.I. requires 30% Mercury, *i.e.*, a reduction of rather more than $\frac{1}{3}$. Would affect strength of other preparations containing it.—C.R. Principally used for inunction in syphilis. To relieve local inflammation and to destroy pediculi on the skin.

Fr. Cx. (*Onguent Napolitain*). Mercury 1, Benzoated Lard 1.

Ph. Ned. 'UNGUENTUM NEAPOLITANUM' has Mercury 30, Wool Fat 5, Benzoated Lard 65, 'Fortius' is 50%.

U.S.—Mercury 50, Oleate of Mercury 2, Suet 23, Benzoated Lard 25.

Unguentum Hydrargyri Dilutum, **U.S.** Mercurial Ointment (*U.S.*) 67, Petrolatum 33.

Unguentum Hydrargyri Compositum (*Off.*). Mercury Ointment 10, Yellow Beeswax 6, Olive Oil 6, Camphor Flowers 3. *Scott's Dressing, modified.*

Employed for enlarged glands, chronic synovitis and syphilitic nodes.

Swelling of the ankles well treated by this dressing—recovery in 3 weeks after 3 years' suffering.—*L. ii./09, 295.*

Unguentum Hydrargyri Mitius, **B.P.C.** 1901. *Syn.* Blue Unction. **Unguentum Hydrargyri Dilutum**, **B.P.C.**, 1907. (Distinguish from the *U.S.* Ointment of the same name above.)

Mercurial Ointment 1, Lard 2, Mix. Used for destroying the *Pediculus pubis*.

In syphilis, inunctions with mercurials are for various reasons best at night. The *spirochæta pallida* appears to swarm at night in the tissues of indurated chancres, at any rate.

In syphilis, Mercury in the form of inunction is valuable—probably due to its preventing pupulation of the *Spirochaete*, on the surface of the body, a habitat which these organisms find particularly favourable for perpetuation of their species by transmission to another individual.—*L. i./09, 489.*

A case of pseudo-tubercles—the result of syphilitic meningitis—treated by inunction. Wasserman's test employed.—*B.M.J. i./09, 1403.*

Ⓢ **Hydrargyrum Ammoniatum** (*Off.*), **U.S.** **P.Dan.** (**Chloratum Amido Hydrargyricum.**)

Mercuric Ammonium Chloride, $\text{Hg NH}_2\text{Cl} \rightleftharpoons 249.93$ (251.486 *l. Wts.*). White Precipitate. A white powder. Insoluble in water but soluble in hydrochloric acid. Used in parasitic skin diseases as:—

Ⓢ **Unguentum Hydrargyri Ammoniatum** (*Off.*).

One in 10 of Paraffin Ointment. Useful in pruritus.—*M.P. i./07, 63.*

Ⓟ **Unguentum Hydrargyri Ammoniati Dilutum**, N.H.W. Equal parts of the above with soft paraffin (white).

Pustular eczema, resulting from pediculosis capitis in weakly children, well treated with equal parts of this ointment and olive oil, and enclosing in oiled paper cap.—B.M.J. i./09,1342.

Ⓟ **Unguentum Hydrargyri Ammoniati**, U.S.

1 in White Petrolatum 5, and Hydrous Wool Fat 4.

Tinea circinata can be rapidly cured by this ointment.—L. i./09,966.

Unguentum Prophylaxis. For prophylactic measures against syphilis. Metchnikoff suggests the use of Lanolin Ointments containing

Ⓟ White Precipitate 25%, Calomel 25%, and Ⓟ Mercurio-Salicyl Arsenate (*q.v.*) 25%. These are less irritating than 'grey ointment.' To be used by inunction for 4 or 5 minutes after coitus.—B.M.J. ii./07,1075; L. ii./08,407.

Not efficacious invariably with monkeys.—Neisser.

For use in the Navy—Calomel Ointment 33% made with Lanolin; 50% strength also mentioned in the same paper.—B.M.J. ii./08,394.

Medical men, students, and nurses advised to have the ointment handy to apply to any suspicious crack about the fingers, etc.

Gelatin Capsules of the ointment, with elongated points to be torn off, or 'Collapsubes,' are sterile, convenient, portable and cleanly.—L. i./06,1629.

Ⓟ **Unguentum pro Eczema** (Blackfriars H.), N.H.W.

Ammoniated Mercury 10 grains, Lead Acetate 10 grains, Zinc Oxide 20 grains, Mercuric Nitrate Ointment 20 grains, Soft Paraffin $\frac{1}{2}$ ounce, Lard $\frac{1}{2}$ ounce.

Ⓟ **Cremor Lowndes**.—Ammoniated Mercury Ointment 1, Zinc Ointment 3, Glycerin 2, *misce s.a.*—Squire.

Hydrargyri Benzoas. Mercuric Benzoate. Fr. Cx.

$\text{Hg}(\text{C}_6\text{H}_5\text{COO})_2 \cdot \text{H}_2\text{O} = 456.94$ (460.096 I. Wts.).

Dose.— $\frac{1}{80}$ to $\frac{1}{10}$ grain (0.0013 to 0.0065 Gm.).

A white crystalline powder, practically insoluble in cold water (not even with sodium chloride added, as recommended by some), soluble about 1 in 180 of Alcohol 90%. In pill for syphilis. Injected, large doses necessary and Cocaine may be added.—B.M.J. ii./05,1255.

Intramuscular injections in uterine hæmorrhage said to surpass Ergot.—B.M.J. ii./04,1085.

Fr. Cx. gives mode of preparation, employing Yellow Mercuric Oxide, Acetic Acid (glacial), and Sodium Benzoate.

Hydrargyri Bromidum, MERCURIC BROMIDE. $\text{HgBr}_2 = 357.5$ (359.84 I. Wts.).

Dose.— $\frac{1}{80}$ to $\frac{1}{4}$ grain (0.004 to 0.016 Gm.). Silvery Scales. Soluble to the extent of 1 in 250 water; decomposes on boiling.

In syphilis in solution with Sodium Bromide thus,—Mercuric Bromide 1.8 Gm., Sodium Bromide 1.03 Gm., Water 100 Cc. is employed in dose of 1 to 2 Cc. of the solution (=0.01 to 0.02 Gm. Hg.) intramuscularly into the buttock. A platinum-iridium needle is essential. Pr. Sept. 1907,440. A solution made in this way may be heated to 120° C. to sterilise. Said to be painless on injection, but stronger solutions are painful.—L. ii./07,1480

Hydrargyri Carbolas. Phenol Mercury.

Hg (C₆H₅O)₂.H₂O = 401.36 (404.096 I. Wts.).

Dose.— $\frac{1}{4}$ to 2 grains (0.032 to 0.13 Gm.) daily.

A whitish amorphous powder, obtained by double decomposition of mercuric chloride and an alcoholic solution of phenol in caustic potash.

In syphilis doses of 4 increased to 11 milligrammes.—L. i./06,1269.

***Mergal.**—Combination of cholate of mercury with albumen tannate Capsules; contain 0.65 Gm. of the mercury compound and 0.1 Gm. of the albumen body.

In various conditions in ophthalmic practice.—B.M.J.E. ii./08,84.

Asquirrol. Mercury Dimethylate, containing 56 % mercury. 1 Co. ampoules contain a 5 % solution.—P.J. i./09,328.

Hydrargyri Cyanidum, Cyanuretum Hydrargyri. FR.CX.

P. Belg., Hg.(CN)₂ = 250.5 (252.02 I.Wts.).

Applicable to Ireland.

Dose.— $\frac{1}{10}$ to $\frac{1}{4}$ grain (0.0032 to 0.016 Gm.). FR.CX. has *max. single dose* $\frac{1}{4}$ grain, max. during 24 hours $\frac{5}{8}$ grain approximately.

Is in anhydrous, white or colourless, prismatic crystals. **Soluble** 1 in 12 of water. (FR.CX. : Soluble 1 in 8 of water and 4 of glycerin.) It is not decomposed by alkalis; is poisonous, and has a nauseous metallic taste. It is used as a lotion to syphilitic sores, and given in pills of $\frac{1}{10}$ or $\frac{1}{12}$ grain twice daily. Used in diphtheria, $\frac{1}{250}$ grain frequently, with 1 minim Tincture of Aconite, in honey, employing also a gargle, 1 in 10,000.

In syphilis 20 minims of 1% solution daily.—B.M.J. i./07,732. We advise caution. Has also been used intravenously.

Detachment of retina treated by 1 in 2,000 solution in (Saline), with 1% Acoine to relieve pain, also with Dionine 1 to 2% added.—B.M.J. i./06,262.

Various eye affections treated by intravenous injection of 0.01 Gm.—Oph., May, 1906,300.

Injectio Hydrargyri Cyanidi et Acoin.

Dose.—10 minims (0.6 Cc. intramuscularly. Mercuric Cyanide 1, Acoine 0.4, Boric Acid solution 1% to 100. Dissolve the Cyanide in 30 of the liquid and the Acoine in the remainder. Mix. Has been employed with success in the treatment of syphilis.

Solubus Hydrargyri Cyanidi et Boracis.—Mercuric Cyanide 1 Gm., Borax 2 Gm., Potassium Chromate 0.075 Gm., Fluorescein 0.001 Gm.

One to be dissolved in a litre of water to produce an antiseptic solution for obstetric work.—L. i./08,876.

***Catheterpurin.**—A German pharmaceutical product for smearing on catheters. Stated to be a tragacanth paste with Mercuric Cyanide 1 in 500.

Hydrargyri Oxycyanidum, HgO.Hg (CN)₂ = 465.18 (468.02 I. Wts.). P. Helv. White micro-crystalline powder soluble 1 in 17 cold water. Is employed in syphilis. Should not be used in conjunction with Potassium Iodide. Sub-conjunctival injection.—B.M.J.E. ii./95,104.

In the treatment of syphilis during 1st week 0.05 Gm. in pill *pro die* as an average, to be taken when the stomach is full.—P.J. ii./09,426.

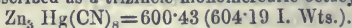
As a pigment 0.2 to 0.6 % solutions have been employed, 1 in 10,000 strength to 1 in 5,000 as bladder irrigant and 1 to 2 % for instruments, which it is said not to attack.

To prepare 1% solution extemporaneously.—Dissolve Mercuric Chloride 58, Mercuric Cyanide 5.4 Gm. in Water 800 about. Normal Potassium or Sodium Hydrate Solution 44.8 Gm. then added and water to 1,000 Gm. This contains also 0.25% Sodium Chloride, or if Potassium Hydrate be used, 0.32 Potassium Chloride.—Apoth. Zelt. 08,23,793; or P.J. ii./08,840.

Ⓢ Solubes are prepared 0.2 Gm. each, 1 in 2 litres = 1 in 10,000; 1 in 1 litre = 1 in 5,000; 1 in 20 Cc. = 1%; 1 in 10 Cc. = 2%.

A solution in conjunction with Acoine has been made the subject of a patent.—P.J. i./07,472.

Ⓢ Mercurio-Zinc Cyanide, LISTER'S ANTISEPTIC. A white powder obtained by precipitation from a cold saturated solution of the cyanide of mercury and potassium by adding a cold saturated solution of zinc sulphate in equi-molecular proportions, or by adding in similar solutions mercuric chloride to zinc and potassium cyanide. The maximum percentage of mercuric cyanide found is 38.5, and the body may be described as a trizincic monomeric octacyanide—



It decomposes somewhat in preparation, and is therefore of somewhat varying composition.—Dunstan, Proc. Chem. Soc., May 30, 08. It should contain at least 20% Mercury Cyanide, $\text{Hg}(\text{CN})_2$. If carefully made can be produced containing nearly 30%.

Method of manufacture.—The late W. Martindale suggested this salt for use in antiseptic surgery to Lord Lister.—B.M.J. i./07,795. For further information on this double Cyanide see B.M.J. '93, Feb. 18.

Solubility.—Very slightly in water, more so in dilute acids.

Is tinted with rosaniline, and used to impregnate gauze.

Ⓢ Mercurio-Zinc Cyanide Gauze, 3%, is the most popular dressing for applying direct to wounds. It is not so irritant as some of the other mercurial dressings and has the advantage of keeping well without the mercurial salt becoming reduced by the cotton. It is supplied in 6 and 12 yard pieces, and with cotton wool tissue in 1 lb packets. Is damped before use with 1 in 20 Carbolic Acid solution.

Ⓢ Mercurio-Zinc Cyanide Gauze Bandages, 2, 2½, 3, 3½ and 4 inches (6 yard).

Ⓢ Wool, Mercurio Zinc Cyanide, 3% strength.

Ⓢ Mercurio-Zinc Cyanide Cream may be made by triturating the powder with carbolic lotion, 1 in 20, *q.s.*, for applying to hairy parts adjacent to wounds.

Ⓢ Mercurio-Zinc Cyanide Paste. Mercurio-Zinc Cyanide 400, Tragacanth 2, Phenol 20, Water 800, mix. For a first field-dressing for wounds in war.—Cheatele.

Ⓢ Collapsible tubes of the Cyanide Paste soldered at both ends and flat in shape are supplied for soldiers' use, and as an emergency dressing, *e.g.* in motor-car medical outfits. The ends are easily torn off.

To insure a thin surface which will immediately dry, the paste must be rubbed on in as thin a layer as possible.

Ⓢ Lotion of Mercurio-Zinc Cyanide, of strength 1 in 5,000 to 1 in 1,000, is used for wounds. *Caution: Shake bottle—not dissolved.*

Ⓢ Gargle of Mercurio-Zinc Cyanide, 1 in 7,000, is employed for syphilitic sore throat. *Caution: As latter.*

Ⓢ Unguentum Hydrargyri et Zinci Cyanidi, R.O.H. 1 or 2 in 100 of Soft Paraffin (SILCOCK'S OINTMENT) or Lanolin. For syphilitic sores and eczema, also excellent for burns and for granular eyelids.

Ⓢ 'Collapsubes' these strengths and ¼ and ½% are prepared.

Ⓢ St. M.'s. H. has 1% in Unguentum Paraffini.

Hydrargyri Gallas. Mercurous Gallate.

$\text{Hg}[\text{C}_6\text{H}_2(\text{OH})_3\text{CO}_2]_2 = 534.34. (538.08 \text{ I. Wts.}).$

Dose.— $\frac{1}{2}$ to 1 grain (0.032 to 0.065 Gm.) in pill.

A dark green insoluble amorphous powder, useful in syphilis, as its absorption is rapid without purging.

Hydrargyri Iodidum Rubrum (Off.). Mercuric Biniiodide (Official Synonym).

$\text{Hg I}_2 = 450.6 (453.84 \text{ I. Wts.}).$

Dose.— $\frac{1}{2}$ to $\frac{1}{16}$ grain (0.002 to 0.004 Gm.). *Fr. Cx.: Max. single dose* $\frac{1}{2}$ grain; max. during 24 hours $1\frac{1}{4}$ grains approximately.

Ⓟ Pills contain $\frac{1}{50}, \frac{1}{40}, \frac{1}{32}, \frac{1}{16}, \frac{1}{8},$ and $\frac{1}{2}$ grain.

Ⓟ Tablets contain $\frac{1}{50}$ grain (0.0032 Gm.).

Red crystals *soluble* in solutions of other iodides, notably potassium iodide, and in solution of mercuric chloride, forming double salts *c.f.* Mercuric Potassium Iodide; also 1 in 25 of castor oil, or 100 parts of the latter will dissolve 8 of this iodide with 5 of perchloride of mercury, about 1 in 200 ether, in alcohol 1 in 300.

U.S. requires 98.5% pure.

Uses.—Is a powerful antiseptic, not so irritant as Mercuric Chloride.

Ⓟ Antiseptic Lotion for the hands ... 1 in 4,000

Ⓟ Collyrium 1 ,, 5,000

Ⓟ Wound Lotion 1 ,, 7,000

Ⓟ Vaginal Douche 1 ,, 10,000

Ⓟ Biniiodide ' Spirit Lotion 1 in 1,000 is employed.

In solution with sodium chloride is valuable for gonorrhœa, and as a pigment or spray for throat in scarlatina and diphtheria.—B.M.J. ii./91,834.

Injectio Hydrargyri Biniiodidi (pro vagina), L.L.

Mercuric Chloride 8 grains, Potassium Iodide 5 grains, water to 1 ounce. Diluted 1 drachm to a pint of water ("1 in 10,000.")

Tubercle of mucous membrane may be treated by causing a precipitation of Mercuric Iodide—*e.g.* in bladder cases a teaspoonful of 5% Potassium Iodide a quarter of an hour before "insufflation" of calomel or its injection as oily emulsion.—B.M.J.E. i/09,84.

Unguentum Hydrargyri Iodidi Rubri (Off.). 1 in 25 Benzoated Lard.

May be applied to small spots of tinea, but not to large surfaces. Too strong for general use on the skin.

Exophthalmic goitre, many cases improved by daily use of this ointment half strength.—B.M.J. ii./05,1249.

An unstable Ⓟ Yellow Mercuric Iodide also exists which easily reverts to the red condition.

Injectio Hydrargyri Iodidi Rubri Hypodermica (Ragazzoni). Dose.—2 to 6 minims. (0.12 to 0.35 Cc.)

Mercuric Iodide 1 grain, Sodium Iodide *q.s.*, in 64 minims.

In syphilis seldom gives trouble, and can be used in large doses.—Brit. Jl. Derm., Aug. 1905; but is painful.

Ⓟ Sterules, Hypodermic contain $\frac{1}{2}$ grain in 8 minims for a dose.

Ⓟ **Hydriodol, Mercuric Iodide Oil.**—*Syn.* Cypridol.

Dose.—3 to 6 minims. (0.18 to 0.35 Cc.)

Contains 1% of the Iodide in sterilised oil, for hypodermic injection by syringe with screw piston.

Detachment of the retina has been treated by 0.4% solution in sterile oil. An injection daily into the lumbar region after cleansing the skin with ether. Suspension during 20 days after 10 of treatment.

Ⓟ **Hydriodol Capsules** contain of the Oil = $\frac{1}{33}$ and $\frac{1}{16}$ grain of Mercuric Iodide, and given *per os* are slowly absorbed by the biliary and pancreatic secretions,—do not prove irritating to the digestive organs.

Ⓟ 'Collapsubes' of Mercuric Iodide Ointment 1% with catheter attachment, are useful for the treatment of gonorrhœa.

Ⓟ **OLEUM HYDRARGYRI BINIODIDI.** *Syn.*—HUILE D'IODURE MER-
CURIQUE. FR. Cx.

Dose.—17 minims (1 Cc.) containing $\frac{1}{16}$ gr. (0.004 Gm.) Mercuric Iodide.

Mercuric Iodide 4, Olive Oil purified and sterilised 920 by weight.

Dissolve at not exceeding 60° C.

Ⓟ **Pilula Arsenii et Hydrargyri Iodidi.**

Dose.—1 or 2, two or three times a day.

Arsenious Iodide, Mercuric Iodide, of each 1 grain, Distilled Water *q.s.* to dissolve, Sugar *q.s.* to make 12, two-grain pills (or 1 Gm. of each Iodide in 180 pills). May be combined with 2 grains of Iodide of Iron pill.

Ⓟ **Wool, Mercuric Iodide.** $\frac{1}{2}\%$ 1 lb. rolls.

Impregnate Absorbent Wool 400 under pressure with a Solution of Mercuric Iodide 1 and Potassium Iodide 1, and spread out to dry.

Ⓟ **Hydrargyri et Potassii Iodidum.**

$\text{HgI}_2\text{KI}, 1\frac{1}{2} \text{H}_2\text{O} = 642.15$ (646.884 I. Wts.).

MERCURIC POTASSIUM IODIDE (commonly known as 'Biniodide' when referring to Antiseptic Lotions,—made with the double salt. The name 'Biniodide' is strictly the official synonym for Mercuric Iodide, (*q.v.*).

Dose.— $\frac{1}{16}$ to $\frac{1}{2}$ grain (0.004 to 0.016 Gm.) in pill.

Antidotes.—Olive Oil, Milk, White of Egg, Petroleum Emulsion, warm draughts to encourage vomiting,—later Bismuth and Morphine.—*c.f.* B.M.J. ii./07, 1775.

In lupus erythematosus, 1 in 1,000 solution on gauze covered with protective (at night) acts like a charm. May have to be continued for months.—B.M.J. i./06, 120.

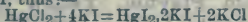
Has been administered for syphilis.

This Salt is manufactured from a hot saturated solution of Mercuric Iodide in Potassium Iodide: on cooling pure Mercuric Iodide first separates; Mercuric Potassium Iodide $\text{HgI}_2\text{KI}.1\frac{1}{2}\text{H}_2\text{O}$ then separates in yellow prisms. Naylor, P.J. i./08, 315, uses this method by dissolving Mercuric Iodide 45, Potassium Iodide $16\frac{1}{2}$ (*i.e.*, approximately equimolecular proportions) in water 30, boiling the mixture for a few minutes, allowing to cool for pure Mercuric Iodide to crystallise out, filtering and concentrating the filtrate. Collect the first crop of crystals, rejecting later portions which contain excess of Potassium Iodide. Another method is to use Alcohol 90% 20 instead of the water above mentioned, boil the salts with the Alcohol until almost entirely dissolved and crystallise.

This Salt is not soluble in water except in presence of Potassium Iodide, *i.e.*, sufficient at least to produce the body $\text{HgI}_2\cdot 2\text{KI}$, in other words, the theoretical amount 170 approximately of Potassium Iodide must be added to 647 (in round numbers) of the double Salt,—this can be easily shown by experiment, but even an excess on this amount is desirable in tablet making.

Soluble, however, in Alcohol 90%, 1 in 1 (without decomposition), 1 in 1 in Ether, and about 1 in 2 Glacial Acetic Acid. Brought into contact with water 2 ($\text{HgI}_2\cdot \text{KI} \cdot 1\frac{1}{2} \text{H}_2\text{O}$) decompose into $\text{HgI}_2\cdot 2\text{KI} = 780\cdot 06$ (785·88 I. Wts) and $\text{HgI}_2(+\text{Aq.})$. It is, therefore, impossible to prepare soluble Antiseptic Tablets of this substance alone.

The body $\text{HgI}_2\cdot 2\text{KI}$ is also formed in solution, when three times the weight of Potassium Iodide as of Mercuric Chloride are dispensed together,—theoretically the proportion is 2·45 to 1, thus:—



and this will produce the desired antiseptic effect providing the Potassium Iodide be pure. It makes no difference whether the Potassium Iodide is added to the Mercuric Chloride or *vice versa*.—P.J. ii./06,533,557.

For **(P) Nessler's Solution** *v.p.* 886.

(P) Mistura Hydrargyri Biniodidi, K.C.H.

Dose.—1 ounce (30 Cc.).

Solution of Mercuric Chloride 30 minims, Potassium Iodide 10 grains, Ammonium Carbonate 5 grains, Decoction of Cinchona to one ounce.

(P) U.C.H. has Solution of Mercuric Chloride 60 minims, Potassium Iodide 4 grains, Water to one ounce.

(P) St. M.'s. H. has solution of Mercuric Chloride 1 drachm, Potassium Iodide 5 grains, Glycerin 10 minims, Water to 1 ounce.

(P) L.H. has solution of Mercuric Chloride 1 drachm, Potassium Iodide 5 grains, Peppermint Water to $\frac{1}{4}$ ounce.

In syphilis the mercury in such a mixture is more rapidly eliminated than when mercury is given alone. The potassium iodide acts as a diuretic. This mode of administering mercury would therefore not readily commend itself.—Pernet. B.M.J. i./07,730.

Poisoning by Mercuric Potassium Iodide in compressed form.—B.M.J. ii./07,1775; i./08,20. Profuse salivation and pain in the upper abdomen, *c.f.* Antidotes above.

(P) Mayer's Reagent.

Mercuric Chloride 13·546 grammes, Potassium Iodide 42·8 grammes, Distilled Water to 1 litre.

This reagent gives a precipitate with alkaloids.

Formerly methods of volumetric estimation of alkaloids by means of the above were in vogue, but the composition of the precipitates is variable.—Ann. J1. Ph. Feb./08,66. Picronic Acid (*q.v.*) yields, however, a definite precipitate with all alkaloids and may be used for estimation.

(P) Pilula Hydrargyri Iodidi Rubri ($\frac{1}{2}$ gr.) et Potassii Iodidi (4 gr.). *Dose*.—1 twice daily.

(P) Soaps containing respectively 3, 1 and $\frac{1}{2}\%$ of Mercuric Iodide are prepared. Useful for eczema, acne, scabies, ringworm, and desquamation after fevers.

(P) Unguentum Hydrargyri et Potassii Iodidi, U.C.H.

Mercuric Iodide 1, Potassium Iodide 1, water 18, lard 85, Hydrous Wool Fat 50. B. S. H. has 5 grains each of the salts, Water *q.s.*, Lard 1 ounce.

(P) 'Solubes' Biniodide.

Contain Mercuric Potassium Iodide 8.75 grains (0.57 Gm.). One dissolved in 1 pint of water forms a solution of the strength of 1 in 1,000—suitable for wounds. For lotions and instruments this may be diluted with from 1 to 3 or more parts of water.

When asepsis in surgical operation doubtful, 1 in 2,000 Biniodide in Spirit always used.—B.M.J. i./09,1170.

(P) Liquor Hydrargyri et Potassii Iodidi Concentratus.

Mercuric Chloride 271 grains, Potassium Iodide 700 grains, Water to 10 ounces. One drachm of this with water to 20 ounces gives a 1 in 1,000 Mercuric Potassium Iodide Solution approx.—B.M.J. ii./06,1848.

Hydrargyri Iodidum Flavum. Yellow Mercurous Iodide.

$\text{Hg}_2\text{I}_2 = 649.4$ (653.84 I. Wts.); HgI U.S. = 324.4 (U.S. Wts.).
P. Austr.

Prepared by double decomposition between freshly made Mercurous Nitrate and Potassium Iodide. (Must not be confounded with the yellow variety of Mercuric Iodide.) *Dose.*— $\frac{1}{8}$ grain (0.008 Gm.).

Pills and Tablets contain $\frac{1}{8}$ grain. Is given for syphilis, but the following preparation is better known:—

Hydrargyri Iodidum Viride. (B.P. 1867).**Green Iodide of Mercury, Mercurous Iodide.**

Dose.— $\frac{1}{8}$ to 1 grain (0.01 to 0.065 Gm.). Pills contain $\frac{1}{8}$ and $\frac{1}{4}$, $\frac{1}{4}$ and $\frac{1}{2}$ grain, and Tablets contain $\frac{1}{8}$ grain,—with opium and pepper to prevent looseness of bowels. *Incompatible* with other iodides.

This salt should be kept from the light, be of a yellowish-green colour, and contain slight excess of mercury; otherwise, as the late W.M. showed, it is unstable and dangerous.—P.J. 1890,259; B.M.J. ii./90,642.

Under treatment of syphilis, in diabetic patient, by the green iodide amount of sugar fell from 6% to 1% without change of diet.—Pr.li.134.

For those who reside or have recently resided in hot climates Protoiodide of Mercury is the best preparation. The initial dose is $\frac{1}{8}$ grain in a pill thrice daily with gradual increase. Usual limit is 3 grains a day.—Beddoes 75.

Hydrargyri Lactas, Mercurous Lactate.

$\text{Hg}_2(\text{CH}_3\text{CH.OH.COO})_2 = 574.34$ (578.08 I. Wts.).

Dose.—Hypodermically $\frac{1}{4}$ grain (0.015 Gm.) in 15 minims (1 Cc.) of water per diem, *per os* $\frac{1}{8}$ grain (0.013 Gm.) well diluted.

A crystalline compound, containing about 65% of mercury, soluble in water, insoluble in alcohol 90%.

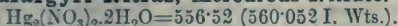
Mercurous Lactate can be produced by mixing boiling concentrated solutions of Mercurous Nitrate and Sodium Lactate—the salt throws out with $2\text{H}_2\text{O}$ in pink rosettes.

Can also be made (white, the more usual form) by dissolving freshly precipitated Mercurous Oxide 416 in Lactic Acid 180.

As an antisyphilitic on account of its safety and solubility. It is stated to be irritating in use in trypanosomiasis.—L. i./08,114.

Mercuric Lactate $\text{Hg}(\text{CH}_3\text{CH.OH.COO})_2 = 375.54$ (378.08 I. Wts.) can be prepared in solution strength 1 in 1 by dissolving freshly precipitated Mercuric Oxide 216 in Lactic Acid 10.

Some experimental work on this salt has been done by us—on evaporating a solution of this nature a gummy yellowish salt is obtained which is not entirely soluble again in water.

Hydrargyri Nitras, Mercurous Nitrate.

In colourless monoclinic crystals, generally either damp (from adhering acid) and soluble in water, or yellow tinted (from basic salt), then not perfectly soluble in water. Used for syphilitic sores, 1 in 30 or more, as a lotion or ointment, and occasionally internally in same dose as mercuric chloride.

Liquor Hydrargyri Nitratis Acidus. (Off.).

Used as a caustic for syphilitic warts, and lupus.

Urethral injection 1 in 1,000, or more, in gonorrhœa and for syphilitic sore throat as gargle.

The Fr. Cx. dissolves Mercury 100 in, Nitric Acid (Fr. Cx) 165, and Water 35, mixed, with slight heat and evaporates to 225 (all by weight). Sp. Gr. 2.246.

Unguentum Hydrargyri Nitratis. (Off.).

Syn. CITRINE OINTMENT.

Mercury 1, Nitric Acid 3 (fluid), Lard 4, Olive Oil 7 (weight).

Dissolve the mercury in the nitric acid without the aid of heat, agitating gently from time to time. Melt the lard and oil together on a sand bath, so that the mixture when transferred to a heated earthenware jar, capable of holding 10 times the quantity, shall be at a temperature of about 143.3°C . Add by degrees very carefully the cold mercurial solution, stirring constantly to promote disengagement of the fumes. After frothing has ceased, the mixture, which should have a temperature of not less than 93.3°C ., must be kept stirred until cold. The product should be firm in consistence and be of a pale lemon colour.

The Mercury Solution consists principally of mercurous nitrate before it is added to the fats. There being also an excess of acid present, the chemical action is thus intensified, and by the time the process is completed, by constant and vigorous agitation, all further chemical action will cease, and the ointment should keep of a good colour for months without generating more gases and thus becoming spongy. Its preparation by this, the official process, requires care, skill, and constant attention.

Suggested improved wording for B.P. monograph:—"Sufficient heat should be used to ensure vigorous chemical action" in place of specified temperature.—C.D. i./o6,110.

U.S. has Mercury 70, Nitric Acid 175, Lard 760.

Experiments by us at the end of 1909, with a view to determining the best mode of making this ointment, gave the following results after keeping one month:—

(1) Made exactly as B.P.—Good colour, very slightly gassy. A second (larger) batch at end of a fortnight was, however, distinctly gassy. It is 'tacky' on inunction.

(2) E.P. XIII. 'alternative process' lighter in colour than above. Slight separation, not quite homogeneous.

(3) B.P. but using Vaseline in place of Adeps. Result: White Vaseline gave a rather soft Ointment of good colour. Had frothed up considerably. Made with yellow Vaseline result far too dark.

(4) Exactly as 3, but using temperature 87°C . when adding (cold) Mercury Solution. Result: Soft and frothy, colour slightly better than No. 3 made with White Vaseline.

(5) Martindale's Formula. Using one third only of the B.P. quantity of Acid and a volume of water equal to volume of Acid to dissolve the Mercury (in the cold), also employing White Vaseline in place of the lard, and the temperature 87°C . for mixing. Stir until cool and smooth. There was no effervescence. Even this reduced quantity of acid is more than theory demands for making Mercurous Nitrate (and slightly more than theory for Mercurio Nitrate), but excess of acid appears to be necessary for keeping qualities. Furthermore the water we found was also desirable. The Mercury is finally in the ointment in

form of a mixture of Mercuric and Mercurous Nitrate. This ointment examined three months after making was of good colour. There was only slight gassiness but the ointment was somewhat granular. A fresh attempt on a fairly large batch, gave better result, and compared with a similar weight of B.P. formula (*vide antea*) as follows after three months :—

B.P. rising with gassiness, much more than new form. Colour good of both but the B.P. ointment turned dark greyish on the surface whilst our new form retained its citron yellow for 3 months. The new ointment is quite smooth and easily rubbed into the skin.

(6) **Squire's Process** in our hands also gave a fairly homogeneous ointment of good colour, but we think our own formula is better.

The principle on which the official ointment is made appears to be that the Nitric Acid acting upon the mercury in the cold produces Mercurous Nitrate and Nitrous Acid, an excess of Nitric Acid being present. On adding to the fat the Nitrous Acid forms elaidin, and the heat of the fat causes oxidation of the mercurous salt with formation of more Nitrous Acid from the excess of Nitric Acid present. The excess of Nitrous Acid is driven off in the form of Oxides of Nitrogen.

Aurinarium Unguenti Hydrargyri Nitratis contains $\frac{1}{2}$ grain of the official ointment—useful for chronic eczema of the meatus.

Unguentum Hydrargyri Nitratis Dilutum (Off.).

Mercuric Nitrate Ointment 1, Soft Paraffin (yellow) 4.

Found to separate at summer temperature. Mercuric Nitrate Ointment 1, Hydrous Wool Fat 1, Yellow Soft Paraffin 3 : Melt the two latter with gentle heat, remove from flame and add the first and stir while cooling. Keeps well.—C.D. i./10,57.

In tinea tarsi of great value, employed with a brush to the eyelids, also in chronic eczema and psoriasis.

In pustular eczema after removing crusts this checks further infection, then employ Lassar's paste and soothing lotions.—B.M.J. i./09,1342.

Unguentum Acidi Carbolici Compositum.

Mercuric Nitrate Ointment 2, Sublimed Sulphur $\frac{1}{2}$, Phenol 1, Olive Oil 1, Yellow Wax 1.—V.H.C.

Unguentum Metallorum, G.H.

Diluted Mercuric Nitrate Ointment, Lead Acetate Ointment, Zinc Ointment, of each equal parts.

Hydrargyri Oleo-Brassidas. *Syn.* Méroléol. Formed when Erucic Acid (obtained from Rape Oil) and Oleic Acid are allowed to react with Mercuric Oxide. The Erucic Acid passes in the process into its isomer Brassidic Acid. A transparent jelly rapidly absorbed, not so greasy as Ointments. Contains 30% Mercury. Not intended for injection. Does not stain nor produce stomatitis. 10, 15 or 20 Gm. to be rubbed in on 30 successive days according to susceptibility of patient. In addition to use in syphilis has been found good in parasitic skin affections. L.ii./09,311.

Capsules are prepared containing the jelly for inunction.

Guttæ Hydrargyri Nitratis, L.H. (Aural). Diluted Mercuric Nitrate Ointment 1 drachm, Olive Oil $\frac{1}{2}$ ounce, Liquid Paraffin to 1 ounce.

Aurinaria are prepared *q.v. above*.

Ⓟ Hydrargyri Peptonas. Mercury Peptonate.

Dose per os.— $\frac{1}{2}$ to $1\frac{1}{2}$ grains (0.032 to 0.1 Gm.), hypod. $\frac{1}{2}$ grain.

A brownish powder containing 10% Mercuric Chloride, soluble in water.

Ⓟ Hypodermic Sterules are prepared containing 15 minims of 1% solution = $\frac{1}{2}$ grain (0.01 Gm.) approx. in each. For injection in syphilis.

Fr. Cx. gives method of manufacture of the Solution.

① **Hydrargyri Perchloridum.** Mercuric Chloride (*Off.*); Hydrargyri Chloridum Corrosivum, U.S.; Corrosive Sublimate. $\text{HgCl}_2 = 269.18$ (270.92 I. Wts.) (268.86 U.S. Wts.).

Dose.— $\frac{1}{3}$ to $\frac{1}{10}$ grain (0.002 to 0.004 Gm.) increased to $\frac{1}{4}$ grain.

Fr. Cx. : *Max. single dose* $\frac{1}{4}$ grain. *Max. during 24 hours* 1 grain approximately.

In heavy colourless crystalline lumps or white powder.

Antidotes. Emetics, Apomorphine, white of 1 egg for every 4 grains of perchloride, *vide* also Poisons and Antidotes at end of book. Mercurial poisoning from surgical use of sublimate especially when left in wounds and cavities should be treated by diuretics. Stimulants for collapse and potassium chlorate for stomatitis.—L. i./09,562.

Soluble 1 in 17.9 water at 60° F., 1 in 3.64 of Alcohol 90% at 60° F., 1 in 4.35 Ether, B.P. (0.720) at 58.5° F.—P.J. ii./03,881, and 2 in 3 of Glycerin, *vide infra*.

The official preparations are ② *Lotio Hydrargyri Flava* (0.46 to 100, or 2 grains to 1 ounce Solution of Lime), and ③ *Liquor Hydrargyri Perchloridi* [Mercuric Chloride 1, Distilled Water 875 ($\frac{1}{16}$ grain in 1 drachm); *dose*, $\frac{1}{4}$ to 1 dr.]*

Incompatibles.—It precipitates most alkaloids from solutions, and should therefore not be ordered with them; the alkalis and the salts of silver and lead are attacked also. Steel surgical instruments should not be dipped in this solution. It forms insoluble compounds with albuminous fluids (*v. infra*), also incompatible with bodies containing tannin, soap, iodine and potassium iodide.

Uses.—Given in small doses in syphilis and has an antiseptic intestinal action and is employed in some forms of diarrhoea of infancy.—(R.), B.M.J.E. ii./04,60; L.ii./04,1405.

For syphilis routine treatment $\frac{1}{10}$ grain thrice daily. Soluble preferred to insoluble mercury.—B.M.J. ii./09,500.

The researches of Koch and others having proved this corrosive poison to be the most powerful antiseptic. Experiments have shown that 1 in 1,000 solution kills anthrax spores in 15 minutes. The bacilli themselves being killed by 1 in 15,000 in 1 minute. The growth of the bacilli in question is prevented by 1 in 500,000 strength.—Hale White. Solutions of it are much used as surgical dressings. A solution 1 in 1,000 of water, or preferably an equivalent of the strong ④ *Glycerin Solution*† (Perchloride, 2; Glycerin by weight, 3, dissolved without heat; heat reduces the salt to calomel), a fluid drachm, containing about 40 grains of the sublimate to

④ * *Van Swieten's Solution*, *Fr. Cx.* 0.1% by weight in water. *Max. single dose* 20 Gm. *Max. during 24 hours* 60 Gm. That of F.E. is one in 900 of water and 100 of alcohol; five of hydrochloric or tartaric acid added to 1 of sublimate said to prevent the precipitation of insoluble albuminate of mercury, and thus to increase and render its antiseptic power continuous.—B.M.J. i./88,148; P.J. 1239,841; *c.f.* also Hale White.

④† *Glycerinum Hydrargyri Perchloridi*, U.C.H. is 0.1%. L.H. the same in 50% Glycerin

④ *Glycerinum Hydrargyri Perchloridi Alcoholicum*, U.C.H.—Mercuric Chloride 35, Glycerin 50, Methyl Blue 0.05, Methylated Spirit to 100. For disinfecting Urine.

4½ pints, making strength 1 grain in 2½ ounces or 0·1% approx., suggested for military use.—B.M.J. i./84,365,1018. As dressings, lint, absorbent wool, gauze, or **Ⓟ Wood Wool**, *q.v.*, may be impregnated with ½% of each, corrosive sublimate and glycerin.

For eye lotions 1 in 4,500 parts of water, and for lotions for the nose and mouth and for vaginal leucorrhœa the same strength is suitable. R.O.H. gives 1 grain in 8 ounces of water for eye lotion.

Sublimate injection in the uterus produced abortion and death.—B.M.J. i./06,1063.

For gonorrhœa and gleet a lotion of 1 to 2 gr. in 8 ounces is recommended.

For ear discharges, syringing with 1 in 10,000 is antiseptic.

In syphilis the perchloride is found slow in action and is painful.

Further results in syphilis.—B.M.J. i./06,62.

To prevent syphilitic infection energetic washing with perchloride 1 in 2000 is advised, or the following :—

Mercuric Chloride 0·25, Sodium Chloride 0·5, Water 2, Absolute Alcohol 0·5, Glycerin 100, or instead of the Glycerin 100, Paraffin Ointment 80 with Glycerin 20 to be used.—B.M.J. ii./08,1087.

In operating on cataract 576 cases low percentage of eyes lost by supuration was due to use of 1 in 2,000 perchloride douche in conjunction with 4% cocaine solution.—L. ii./09,1129.

The elimination of mercury in the urine of syphilitics is slower than with the normal being, this fact has been used as a mode of diagnosis.—L. ii./08,1810.

Preparations containing Mercuric Chloride administered in treatment of syphilis.—Beddoes 76.

Horticultural use, as a wash.—P.J. ii./08,722.

Ⓟ Mistura Hydrargyri Perchloridi, E.L.—Solution of Mercuric Chloride 10 minims, Water to 1 drachm.

Ⓟ Gargarisma Hydrargyri Perchloridi, St. M.'s H. (1 in 1,800). Mercuric Chloride ¼ grain, Hydrochloric Acid 1 minim, Glycerin 30 minims, Water to 1 ounce.

For influenza, sore throat, especially quinsy, Solution of Mercuric Chloride 1, Acid Infusion of Rose Petals 1. One tablespoonful in a teacup of hot water as gargle.—C.D. i./08,85.

Ⓟ Lotio Hydrargyri Acetica.

Mercuric Chloride 1, Acetic Acid 75, Glycerin 75, Alcohol (90 %) 250, Rose Water 500. To destroy pediculi and detach their ova.

Ⓟ Lotio Hydrargyri Perchloridi, U.C.H. Mercuric Chloride 0·2% coloured with methyl blue.

Ⓟ Lotio Hydrargyri cum Acido Carbolico, E.L.—For pediculi, Solution of Mercuric Chloride 1, Dilute Acetic Acid 2, Turpentine Oil 6, Phenol Solution (1 in 40) to 24.

Ⓟ Lotio Parasiticidus, St. M.'s H.

Mercuric Chloride ¼ grain, Acetic Acid 2 drachms, Water to 1 ounce.

Ⓟ Pigmentum contra Tineam.

Mercuric Chloride 1, Salicylic Acid 9, Phenol 10, Glycerin 80. Efficient in ringworm.

Ⓟ Mackenzie's Eye Wash.

Sublimate 1, Ammonium Chloride 6, Belladonna Extract 10, Coccus

Cacti 1½, Proof Spirit 55; rub together and add water to 330. Mix. with equal parts of boiling water to bathe the eyes.—I.M.G., Nov. 1907, 409. *Caution.*—*This will be about five times as strong as usually employed in eye work.*

(P) Pills contain $\frac{1}{10}$, $\frac{1}{12}$, $\frac{1}{16}$, $\frac{1}{18}$, and $\frac{1}{20}$ grain.

(P) Pilules de Chlorure Mercurique Opiacées. Dupuytren's Pills.—FR. Cx.

Mercuric Chloride 1. Opium Extract 2. Extract of Agropyrum 2 (Extrait chiendent), Licorice Powder q.s. Each pill contains Mercuric Chloride 0.01 Gm. and Opium Extract 0.02 Gm.

(P) Ophthalmic discs contain $\frac{1}{100,000}$ grain.

(P) Sublimate Disinfectant.—*Local Government Board.*—L.ii./92,682; B.M.J. ii./93,18.

Sublimate $\frac{1}{2}$ ounce, Hydrochloric Acid 1 ounce, Soluble Aniline Blue 5 grains, Water 3 gallons.

Charta Hydrargyri Bichlorati. Fr. Cx. PAPIER AU SUBLIMÉ CORROSIF.

Filter paper washed in very dilute hydrochloric acid, then in distilled water dried, cut into pieces 10×5 Cm., and soaked each in 1 Cc. of a solution of Mercuric Chloride 1, Sodium Chloride 1, Water to 4 and dried. Each sheet will contain 0.25 Gm. of Mercuric Chloride suitable for dissolving in a litre of water, making a 1 in 4,000 solution.

(P) Perchloride *'Solubes' are made of three sizes, combined with sodium chloride, and coloured blue. They are convenient for surgical purposes, the *largest* containing 17½ grains, making 20 ounces, 1 in 500; the *next smaller* containing 8.75 grains, for 20 ounces of lotion, 1 in 1,000. These may be further diluted with from one to three or more parts of warm water. See strengths of solutions for use, *infra*. The *smallest* ($\frac{1}{2}$ grain) produce a solution of 1 in 4,500 when dissolved in a tumbler of warm water, suitable for ophthalmic work.—L. ii./90,72; P.J. ii./90,83.

* 'Solubes' signify material for preparation of solutions of definite strength for external or local use. For complete List consult Index.

Strengths of Solutions for use.

Solutions 1 in 10,000 to 1 in 1,000 may be used for infected linen, the walls and floors of infected rooms, the hands of surgeons and gynecologists, and as a lotion to superficial wounds. For continuous applications, 1 in 10,000 forms an active lotion, and 1 in 500, with the same quantity of permanganate of potassium, is an efficient disinfectant of an equal bulk of liquid faecal infected discharges, if in contact for two hours.

There is risk of poisonous effects from vaginal injections of 1 in 1,000; watch for the occurrence of diarrhoea.

Sir W. Watson Cheyne's Lecture on the Treatment of Wounds. 1 in 2,000 solution useful for the hands and to rinse away blood from wounds—not necessarily for deluging the wounds themselves.—L.ii./08,1797.

(P) C.H.W. has Injectio 1 in 4,000 and Injectio Fortior 1 in 2,000.

(P) Tablets, $\frac{1}{100}$, $\frac{1}{32}$, $\frac{1}{16}$ and $\frac{1}{8}$ grain are for internal administration.

(P) Hypodermic Tablets, $\frac{1}{100}$, $\frac{1}{16}$, $\frac{1}{32}$ grain.

(P) Wool, Perchloride ('Sublimate') 2% 1 lb. rolls.

To prepare, impregnate Absorbent Cotton 100 with 200 of a solution of 'perchloride' 4 and glycerin 2, press to 200 and dry it spread out. Weaker strengths can be prepared on the same lines with less perchloride.

(P) **P. Jap.** uses Mercuric Chloride 2, Potassium Chloride 2, Water 1,500, Wool 1,000; *i.e.*, 0.2%.

Poisoning by $2\frac{1}{2}$ grains accidentally contained in a headache powder. Treated by Olive Oil, Magnesia and emetics. Lived 21 days.—B.M.J. i./05,767.

Recovery after $43\frac{1}{2}$ grains, Carron Oil made with Cod Liver Oil given.—L. ii./06, 653.

Tinea destroyed by solution of 3 grains in an ounce of spirit of nitrous ether.—B.M.J. i./85,434.

Anthrax successfully treated by Hypodermic injection of 1 in 1,000 solution.—B.M.J. ii./90,16; L. ii./91,658.

Lupus, in initial stage, subcutaneous injection of 1% solution into affected tissue successful.—L. ii./95,965.

Leprosy relieved by $\frac{1}{2}$ grain per week subcutaneously.—L. ii./96,364.

Empyema, three tappings and two injections of $\frac{1}{2}$ grain. Perchloride in $2\frac{1}{2}$ ounces of water with marked improvement.—B.M.J. i./03,78.

For nævi, a 6% Solution of Perchloride in Collodion.—B.M.J.E. ii./03,96.

Bilharziosis (endemic hæmaturia).—Associated with this disease is almost invariably the appearance of blood and pus in the urine. Mercuric chloride intravenously is given with good results, the solution consisting of 1 mgr. of Perchloride in 5 minims of normal saline solution.

Skin Infection of bilharziosis, Theory of.—B.M.J. i./09,773.

Eggs of *Bilharzia* demonstrated in Mummies' kidneys.—B.M.J. i./10,16.

In bilharziosis the internal administration of the Liquid Extract of Male Fern in doses of 1 Gm. thrice daily, "often acts like a charm" in controlling and abolishing the hæmorrhage in a day or two.—Brooke, 148.

In the Zambesi district, the Wortabel treatment with spirit of turpentine with thymol added.—L. ii./07,923.

Etiology of the disease still in need of elucidation.—B.M.J. ii./08,1355.

Acute myelitis (so called) may in some cases be meningeal in origin and may be cured by laminectomy and freedrainage of the subdural space—no risk in washing out the theca with Perchloride Solution as strong as 1 in 500 followed by 1 in 2,000 solution some of which to be left in the wound when closing up.—B.M.J. i./09,513.

Typhoid treated by Intravenous injection of perchloride. Dose employed was 1 cgr. but 2 cgr. have been used in syphilis.—B.M.J.E. i./09,28.

(P) **Sal Alembroth.**—*Syn.* Ammonio - Mercuric Chloride.

$\text{HgCl}_2 \cdot 2\text{NH}_4\text{Cl} \cdot \text{H}_2\text{O} = 393.32$ (395.94 I. Wts.).

May be made by mixing solutions of equivalent quantities of Sublimate and Ammonium Chloride and evaporating; 3 grains represent approximately 2 grains of sublimate. In flattened crystals. Is a powerful antiseptic, but does not combine with albumin so quickly, and hence is not so irritating. *Uses.*—In medicating dressings (which are dyed blue), also as an intramuscular injection for syphilis.

Soluble 2 in 1 of Water; 1 in 4 of Alcohol 90%, also in Glycerin.

This salt was contained in the B.P., '85 Liquor Hydrargyri Perchloridi.—W. Martindale, P.J./1870,544.

(P) **Hypodermic Injection of Sal Alembroth.**

Sal Alembroth 5, Sterile Water 100. *Dose.*—10 minims.

Ⓟ **Bandages**, Alembroth Gauze, 6 yds., 3, 4, 5 inches wide.

Ⓟ **Gauze**, Alembroth, containing 1% of Sal Alembroth, is in 6 yard pieces, tinted with aniline blue. It is also supplied with cotton wool gauze tissue of 2% strength in 1 lb., $\frac{1}{2}$ lb., and $\frac{1}{4}$ lb. packages.

Ⓟ **Gossypium Sal Alembroth**. B.P.C. *Syn.* BLUE WOOL. Absorbent containing 2%, 1 lb. rolls.

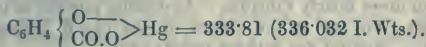
Impregnate Cotton Wool 98, with water 200 containing Sal Alembroth 4 and Anilin Blue *q.s.* Press until it weighs 200 and dry.

Hydrargyri et Potassii Hyposulphis.

Dose.—Hypodermically $\frac{1}{8}$ grain (0.01 Gm.). Sterules are prepared.

Hydrargyri Salicylas, Hydrargyrum Salicylicum, P.G. iv. P. Jap.

Dose.— $\frac{1}{2}$ grain (0.02 Gm.) (internally). Intramuscularly $\frac{1}{10}$ grain in 10 minims Liquid Paraffin (*vide* also *infra*). (Cocaine Salicylate may well be added).



A white powder containing about 59% of mercury, very slightly *soluble* in water (but soluble in solutions of sodium hydrate and sodium carbonate), scarcely soluble in alcohol 90%. *Used* as an antiseptic and antisyphilitic, and as a dusting powder or ointment for sores. Should not be given in large doses with potassium iodide.

This is the basic mercuric salicylate as distinguished from the neutral or normal salt (*vide* below). Hydrogen sulphide distinguishes easily, the normal salt being precipitated at once, the other slowly. Two mercurous salts are also known.—Y.B.P. 1903, 294.

As an injection for gonorrhœa 15 minims of a mucilage suspension 1—300, has been used.

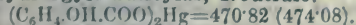
Mercury Salicylate in treatment of Syphilis.—Beddoes *p.* 76.

Neisser's Method of treating syphilis is to commence with injection of this salt, then with the Thymolacetate, finally Calomel.—B.M.J. i./07, 732.

Initial dose should be $\frac{1}{2}$ grain in Liquid Paraffin 5 minims, after 2 days $\frac{3}{4}$ grain is given. Treatment lasts over two years. This Salt preferred amongst the insoluble salts.—L. i./07, 308.

U.S.D. says $\frac{1}{2}$ grain with $\frac{1}{2}$ grain of Potassium Carbonate is well borne.

Hydrargyri Salicylas, Neutrale.



Dose.—Hypodermically $\frac{1}{10}$ to 1 grain suspended 1 in 10 in Liquid Paraffin. Comparatively non-irritant.

Prophylaxis of syphilis. The following jelly supplied in *Collapsus* is used for smearing over the parts, it is not too strong for application to the tongue and other mucous surfaces. *N.B.*—*With caution.*

Neutral Mercury Salicylate 10, Irish Moss 5, Water 85.—Beddoes *p.* 36.

Hydrargyri Subchloridum, Mercurous Chloride, *Syn.* CALOMEL (*Off.*), Mercurius Dulcis, Ph. Ned. $\text{Hg}_2\text{Cl}_2 = 467.98 \text{ (470.92 I. Wts.)}$ $\text{HgCl} = 233.68 \text{ U.S. Wts.}$

Hydrargyri Chloridum Mite. U.S. *Syn.* PRÉCIPITÉ BLANC (distinguish from British White Precipitate, *p.* 363).

P. HUNG. has *Hydrargyrum Chloratum mite Sublimatione paratum* also *vapore paratum*.

Dose.— $\frac{1}{2}$ to 5 grains (0.032 to 0.32 Gm.). U.S. *average laxative* 2 grains, *alterative* 1 grain. FR. CX. has maximum single dose 15 grains, maximum during 24 hours, 15 grains.

Heavy white powder. *Insoluble* in water, ether or alcohol.

Incompatible with acids, alkalis (*see* *Lotio Nigra* p. 379), with sodium and potassium chloride and with bromides, iodides, sulphur, cherry laurel water, and antipyrine.

Uses.—Alterative and purgative. Was always considered a cholagogue, but at the present time is thought to empty the gall bladder only and not to increase the actual amount of bile formed. Most useful purgative for congested liver and dyspepsia generally. To be given at bed-time, followed by morning saline draught. Useful where there is intestinal putrefaction, *e.g.*, in dysentery, faecal accumulation, typhoid. For torpid liver $\frac{1}{2}$ grain doses hourly valuable. As dusting powder to ulcers and many skin diseases (but not to the cornea of the eye if Potassium Iodide is being given). Applied dry relieves pruritus ani.

Calomel in very large doses (100 to 150 grams) was given on the first day of acute peritonitis, and if the stomach were rebellious free inunction of calomel was made use of instead.

Large doses ($\frac{1}{2}$ to 1 grain) of Calomel immediately after a major surgical operation, *e.g.*, for peritonitis.—M.P., Feb. '07, 177.

Use combined with Potassium Iodide or Sarsaparilla (Zittmann's weak decoction).—L. i./07, 729.

For neurasthenia and neuralgia, intestinal antiseptics is required. Begin with full doses of Calomel.—B.M.J. i./06, 492.

In optic neuritis weekly injections of $\frac{3}{4}$ gr. successful.—B.M.J.E. ii./04, 72.

In syphilis Calomel fumigations sometimes excellent.—B.M.J. i./07, 731.

Asthma is relieved by $\frac{1}{2}$ to 2 grain doses. A patient takes $\frac{1}{2}$ grain when she feels the slightest "tightness in her chest."—B.M.J. ii./09, 882.

In chronic ulceration of rectum 10 grain doses followed by 3 or 5 grain doses if improvement.—Pr. Aug. '09, 152.

Injectio Hydrargyri Subchloridi Hypodermica.

In syphilis, Calomel 10 grains, suspended in Liquid Paraffin containing 2% carbolic acid $\frac{1}{2}$ ounce. 10 minims to be injected once a week. Calomel is quickly absorbed but intensely painful, best used only as heroic measure.—B.M.J. ii./05, 1255. Instead of Liquid Paraffin, Sterile Olive Oil can be used. 10 to 20 minim doses of a 10% suspension are employed. Morphine $\frac{1}{4}$ grain should be given afterwards to relieve pain.

Calomel injected with Oil in this way is partly converted into a soluble compound (probably Mercuric) and absorbed by the lymphatics and blood vessels and is partly taken up by Leucocytes and converted into a soluble compound within these.—Marshall, '08.

Calomel thought to be less painful than Mercury which, however, is stated to be painless! The following is used:—Calomel 4 or 5 Gm., Anhydrous Camphorated Lanolin (5%) and Castor Oil (Camphorated 5%) in proportions of 1 to 3 *q.s.* to 10 Cc.—*i.e.* an approximately 40% preparation. For injection dose equal to 0.12 Gm. of Calomel.—B.M.J.E. i./09, 67.

In tuberculous subcutaneous injection of 0.05 Gm. every eight days, observing effects.—B.M.J.E. ii./06, 60.

Prophylactic against syphilis. Use of Calomel 1 in Lanolin 3—Metchnikoff.—L. i./06, 1629.

Enuresis, give $\frac{1}{2}$ grain daily to regulate bowels.—B.M.J. i./o6,905.

In raised arterial tension where indicative of danger, $\frac{1}{2}$ or 1 grain pill once or twice weekly followed by saline in the morning keeps down pressure. Brunton.—L. ii/o8,1132; B.M.J. ii./o9,67.

Lambkin prefers injection to inunction as easier to carry out. Usually starts with $\frac{3}{4}$ grain once a week for 4 weeks and then continues with metallic Mercury.—L. i/o9,396.

In syphilis (malignant cases) Sir F. Semon treats with Calomel Injections and with Sarsaparilla rather than with Iodides.—L. i/o9,396.

The French Army regulations direct:—washing with warm Potassium Permanganate Solution 1 in 5,000 and 1 drachm of 30% ointment applied.—Beddoes p. 36.

Suspicious cracks or hangnails should have this ointment well rubbed in:—Calomel 33, Vaseline 10, Anhydrous Lanolin 57.—Beddoes p. 36.

Calomel Tableta, $\frac{1}{10}$, $\frac{1}{8}$, $\frac{1}{4}$, 1, 2, 3, 4 and 5 grains.

Ⓢ Lotio Hydrargyri Nigra (Off.). BLACK WASH.

Mercurous Chloride 30 grains, Glycerin $\frac{1}{2}$ ounce, Mucilage of Tragacanth, 1 $\frac{1}{2}$ ounces, Solution of Lime *q.s.* to 10 ounces (about 1 in 150). Contains Ⓢ Mercurous Oxide* $\text{Hg}_2\text{O} = 413.48$ (416.00 I. Wts.).

Ⓢ Unguentum Cinereum containing Mercurous Oxide 1 in 10 or 20 of lard, has been prescribed for syphilis—distinguish from Oleum Cinereum *q.v.*

Ⓢ Gargarisma Hydrargyri Composita.

Black Wash 1 ounce, Potassium Chlorate 10 grains, Water 1 ounce. For syphilitic throats.

Pilula Hydrargyri Subchloridi Composita.—*Syn.* PLUMMER'S PILL (Off.).

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Mercurous Chloride 25, Sulphurated Antimony 25, Guaiacum Resin 50. Castor Oil (by weight) 10.3, Alcohol (90%) 3 or *q.s.*

Is indigestible. Better to prescribe Mercurous Chloride, Sulphurated Antimony of each 1 grain, Guaiacum Resin 2 grains, Syrup of Glucose *q.s.*—L. ii./o6,1506.

This excipient crumbles.—P.J. i./o7,3. Replace the pill by a compound powder.—P.J. ii./o7,84. It is, however, possible to make a pill with the proper excipient, easy of manipulation, to keep well and to disintegrate rapidly.

Pulvis Basilicus.

Dose.—For a child of 2 years, 4 grains (0.26 Gm.); of 6 years or upwards, 8 grains (0.52 Gm.).

Mercurous Chloride 3, Scammony 3, Acid Potassium Tartrate 3, Jalap 1, Ginger 1, Antimonial Powder 1.

Unguentum Hydrargyri Subchloridi.—*Syn.* CALOMEL OINTMENT. (Off.).

Mercurous Chloride 1, Benzoated Lard 9. A skin application which may relieve itching.

Calomel Cream, L.L. Calomel 10 grains to Vaseline 1 ounce. Distinguish from that of Lambkin—*q.v.*

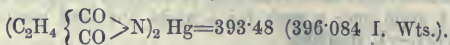
Hydrargyri Subchloridum Crystallisatum.

Manufactured by adding Lithium Sulphate solution to Mercuric Chloride solution. The precipitate of ordinary Calomel first formed is filtered off and the liquor evaporated at low temperature. Scales of Calomel then

*NOTE.—Ⓢ "Precipitate, Red and all Oxides of Mercury."

form (Sp. Gr. 4.5 to 5, ordinary Calomel is 6.5 to 7). Is recommended for eye work either as dusting powder or Ointment 1 to 10%.—L. i./07, 1624.

Hydrargyri Succinimidum, Imido-succinate of Mercury.



Prepared by adding freshly precipitated Mercuric Oxide to warm aqueous Succinimide Solution.

A white silky powder, soluble in water about 1 in 28. Hypodermic injection in syphilis, in 2½% solution = slightly over 1% of mercury. Addition of cocaine nitrate diminishes pain.

Our experiments showed it to be somewhat more soluble in normal saline—i.e., 1 in 25 still more in 10% Sodium Chloride Solution, i.e., 1 in 9, 1 in 14 of 5%, also 1 in 6 of 30%.

Dose.—By injection, ¼ to ½ grain (0.016 to 0.02 Gm.).

Sterules, Hypodermic of Mercury Succinimide, contain ⅓ grain with Cocaine Nitrate ⅓ grain.

Pulmonary tuberculosis treated by ½ grain in 10 minims of water every other day for 30 injections. Followed by Potassium Iodide 5 grains thrice daily for a fortnight, then one week's rest, injections resumed and so on. The Bacilli in sputum decreased.—L. ii./09, 141.

Ⓢ Unguentum Rubrum (Blackfriars).—N.H.W.

Vermilion 6 grains, Red Mercuric Oxide 6 grains, Creosote 2 minims, Lard to 1 ounce.

Hydrargyri Sulphas. Mercuric Sulphate.

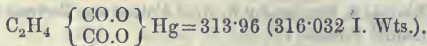
Syn. Hydrargyri Persulphas. $HgSO_4 = 294.14$ (296.07 I. Wts.).—

B.P. 1885. *Dose.*—2 to 5 grains (0.13 to 0.32 Gm.).

A white powder (made by dissolving Mercury in boiling strong Sulphuric Acid); water decomposes it with formation of yellow Turpeth Mineral (Hydrargyri Subsulphas Fr. Cx. or Mercuric Oxsulphate), $HgSO_4 \cdot 2HgO = 723.5$ (728.07 I. Wts.).

A prompt emetic in *Dose* 2 to 5 grains which has been given to children in croup and diphtheria to expel false membrane. Does not produce purging.

Hydrargyri Succinas.



Dose.—¼ to ½ grain (0.016 to 0.02 Gm.).

White Powder *soluble* in Normal Saline Solution 1 in 40, 1 in 7 of 5% Sodium Chloride Solution, 1 in 5 of 10% Sodium Chloride, 1 in 2 of 30% Sodium Chloride Solution by experiment. The first solution may be used for injection—practically insoluble in plain water.

Mercurous Sulphate, $Hg_2 SO_4 = 492.94$ (496.07 I. Wts.).

A whitish crystalline powder slightly soluble in water and in dilute nitric acid. This salt, as also Mercuric Sulphate mixed with Potassium Bisulphate, are used for construction of electrical cells.

Unguentum Hydrargyri Sulphatis Flavi (Turpeth Mineral Ointment, Bazin's Ointment).

Yellow Mercuric Sulphate 15 grains, Benzoated Lard 1 ounce. Used for ringworm.

Hydrargyri Tannas, Mercurous Tannate.

Dose.— $1\frac{1}{2}$ grain (0.1 Gm.) in a pill. Should it cause diarrhœa in weakly patients add $\frac{1}{2}$ grain of tannic acid to each, or $\frac{1}{12}$ grain of powdered opium.

In dark green, odourless and tasteless powder or scales, containing 50% of mercury. It is not soluble or materially affected by diluted hydrochloric acid, but is decomposed by alkalis. Chemical composition varies. Pills are made containing 1, 2, 3, and 4 grains.

Ⓐ Unguentum Hydrargyri Oxidi Flavi. (Off.)

Ⓐ Yellow Mercuric Oxide [$\text{Hg O} = 214.68$ (216.0 I.Wts.)] made by precipitating Mercuric Chloride with Sodium Hydroxide Solution] in very fine powder 1, Soft Paraffin, yellow, 49. The powder and the resulting ointment should be neutral to moistened litmus paper. *Incompatibility.*—Should not be used whilst patient is taking Iodide—violent irritation may be produced.—B.M.J.E. i/09, 84. *Used* for inflamed eyelids. **Ⓐ Pagenstecher's Ointment** is 4%, i.e., double this strength; ointments of 1.25, 2.5, 5, and 10% are also prepared.

Eczema is well treated by the 0.25% ointment.

In syphilitic sores.—Beddoes p. 87.

Other Methods of Manufacture.—

(a.) We recommend the Yellow Mercuric Oxide to be freshly precipitated and converted into ointment without preliminary drying. This produces a perfectly smooth ointment free from grit. It can be effected by taking the equivalent of Mercuric Chloride to start with. To manufacture say 10 lb. of the Ointment of 10% strength, 214.68 parts of HgO are produced from 269.18 of

HgCl_2 therefore $\frac{269.18}{214.68} = 1.254$ lb. of Corrosive Sublimate will produce 1 lb. of

Yellow Mercuric Oxide on precipitation with Sodium Hydroxide (Solutions must be very dilute). This is carefully washed until the washings do not react with either Silver Nitrate or Phenolphthalein, and pressed in suitable linen free from "fluß," and finally in this moist condition is made up to 10 lb. with Paraffinum Mollè (Yellow should be quite as suitable as white). The amount of moisture in the precipitate is easily ascertained and allowance made for, and is reducible, by pressing, to a very small amount. Weaker strengths can then be prepared from this 10% bulk, as desired, by dilution with Paraffinum Mollè. If kept exposed to light, Yellow Ointment may turn dark on the surface. If desired, the ointment may be kept under water, or be placed in 'Collapsaubes' (strengths as above mentioned). We have examined the contents of such Collapsaubes two years after preparation and find same in good condition.—W. H. Martindale, Oph., Nov., 1906; L. ii./06, 1459.

(b.) Hoffman (Pagenstecher's Apotheker at Wiesbaden) used freshly precipitated Oxide working in the dark with very dilute solutions of Mercuric Chloride and Caustic Soda, and dehydrated the moist precipitate by washing with Alcohol and then with Ether.

(c.) U.S. has Yellow Oxide 1, Water 1, Hydrous Wool Fat 4, Petrolatum 4, and directs that the Yellow Mercuric Oxide be triturated with the water until the mixture is perfectly smooth—the hydrous wool fat is then added in divided portions, and the Petrolatum thoroughly incorporated. (A similar method is also employed for Red Mercuric Oxide Ointment.—U.S.)

Red Mercuric Oxide 10, Castor Oil 10, Petrolatum 85. Cover with water to prevent access of air.—P.J. ii./03, 553. Has been tried.

(d) Make moist on the lines of (a) but heat @ 110°C , the ointment after incorporating the Paraffin to drive off moisture.—P.J. ii./06, 514.

U.C.H. has 1·5% in Yellow Soft Paraffin, C.X. 1%.

The ash in Mercuric Oxide is often as much as 0·5%. Limit should be stated in B.P. U.S. allows 0·1% mineral matter.—P.J. i./07,129.

Ⓟ **Injectio Hydrargyri Oxidi cum Formamido** [the amide of Formic Acid, $\text{H.CO.NH}_2 = 44\cdot73$ (45·034 Wts.)]. Supplied in 1, 2, and 10% solution (of the oxide).

Dose.—15 minims (1 Cc.) of the 1% solution = $\frac{1}{8}$ grain (0·01 Gm.). The 2 and 10% solutions are for dilution at time of use.

Ⓟ **Unguentum Hydrargyri Oxidi Rubri.**

Syn. RED PRECIPITATE OINTMENT. (*Off.*)

Red Mercuric Oxide, in very fine powder, 1, Paraffin Ointment 9. For use in chronic skin affections.

The Yellow and Red Oxides are chemically identical.

The red is crystalline, and the yellow amorphous by precipitation.

Ⓟ U.S. has Red Oxide 1, Water 1, Hydrous Wool Fat 4, Petrolatum 4.

Ⓟ **Unguentum Rubrum cum Cantharide.** V.H.C. Red Mercuric Oxide 1 drachm, Vinegar of Cantharides 1 drachm, Soft Paraffin to 1 ounce.

Hydrargyri Sulphidum Rubrum. *Syn.* VERMILION, CINNABAR.

$\text{HgS} = 230\cdot62$ (232·07 I. Wts.). Brilliant red powder insoluble in water and dilute acids prepared by subliming a mixture of Mercury and Sulphur. Both this and the black variety, **Hydrargyri Sulphuretum cum Sulphure** of same composition are not now employed therapeutically to any extent.

Hydrargyri Naphthol-acetas Mercuric-β-Naphthol Acetate,

$\text{Hg.C}_{10}\text{H}_7\text{O.CH}_3\text{COO} = 399\cdot36$ (402·08 I. Wts.)

And the **Thymol Acetate** $(\text{CH}_3\text{COO})_2\text{Hg}$ $(\text{CH}_3\text{COO.C}_{10}\text{H}_{13}\text{O})\text{Hg} = 721\cdot32$ (726·176 I. Wts.). are insoluble powders with *Dose*.— $\frac{1}{2}$ to 1 grain (0·032 to 0·065 Gm.). Schmidt gives *method of manufacture*.

They are antisypilitics. The latter has been used as an intra-muscular injection suspended 1 in 10 in liquid paraffin.

Ⓟ **Hydrargyri Sulphocyanidum.** *Syn.* Mercuric Rhodanide $\text{Hg}(\text{CNS})_2 = 314\cdot14$ (316·16 I. Wts.)

White powder slightly soluble in water. Swells up on burning, producing "PHARAOH'S SERPENTS."

HYDRASTIS RHIZOMA (*Off.*).

Syn. GOLDEN SEAL.

Dose.—10 to 30 grains (0·65 to 2 Gm.).

The dried rhizome and rootlets of *Hydrastis canadensis* (*Ranunculaceæ*).

U.S. is standardised to 2·5% Hydrastine.

A lower limit than this as suggested by the White Cross Society of little value.—Umney, C.D. ii/09,580.

Assay Method.—The drug in No. 60 powder is treated with ether, ammonia and water. A volume of the filtrate is shaken out with sulphuric acid and water. The acid solution is rendered alkaline with ammonia and shaken out with ether, the ethereal solution is evaporated and the residue weighed.

Rapid estimation method.—P.J. ii./05,580.

Uses.—*Internally* it possesses tonic stomachic properties, being useful in general debility,—action not unlike that of quinine. Is used in intermittent fevers. It causes uterine contraction. Contains in addition to Hydrastine (1·5 to 3%) a quantity of Berberine, *q.v.*

In gastric catarrh from chronic alcoholism is about the best substitute for the stimulant when this is abandoned.

It is useful in fibroid tumours; does not cause painful contractions. Local application is often successful in chronic pharyngitis.

In goitre it is successful.

As a lotion it is employed in chronic inflammation of the mucous membranes, also for cracks and fissures of the nipple.

Externally stimulates unhealthy ulcers, and as a lotion (1 in 20 liquid extract) checks profuse local sweating, and employed in acne and seborrhœa, and stops nose bleeding. In gonorrhœa, more particularly the late stages, Hydrastis both locally and internally is of value; as an injection 1% solution of the liquid extract (or combined with 1% of Protargol and 5% Glycerin) is recommended.—H.

Ⓔ Infusion of 1 drachm in 8 ounces boiling water useful in vaginal gonorrhœa and leucorrhœa.—H.

Ⓔ **Extractum Hydrastis Liquidum.** (*Off.*)

Dose.—5 to 15 minims (0·3 to 0·9 Cc.).

Hydrastis in No. 60 powder, with 45% alcohol (30% better.—Dott, P.J., July 28, 1906), prepared as Extractum Hamamelidis Liquidum; 1=1 of rhizome.

Flavoring.—Syl Lavandulæ, Gyl or Syl Pini, (in bold dose); Elixir Aurantii, Syrupus Limonis.

Ⓔ Capsules are prepared each equivalent to 30 minims.

There appears to be considerable loss in alkaloid in extracting the drug for Liquid Extract. Judging from Mann's figures—about 2% should be expected in a well made extract.—P.J. i./09,366, C.D. i./09,426.

Ⓔ Fluidextractum Hydrastis, U.S., 1=1. *Average dose.*—30 minims (1·8 Cc.). Glycero-hydro-alcoholic percolate standardised to 2% hydrastine. The P.G. preparation is of the same standard. P. Austr. has 10% of glycerin.

Ⓔ Ph. Ned. prepares 1=1. Tartaric Acid 0·25% is employed with alcohol to extract. Standard 2% Hydrastine.

Fr. Cx. extracts with 70% alcohol, and requires 2% 'Hydrastine.'

In pruritus ani for the varicosity of piles inject daily one or two ounces of the following, mixed:—Liquid Extracts of Hydrastis 2, Hamamelis 16, Ergot 2, Compound Tincture of Benzoin 2.—M.A. 1906,410.

Ⓔ **Mistura Hydrastis et Ergotæ.**

Liquid Extracts of Hydrastis and Ergot of each 30 minims, Chloroform Water to 1 ounce for a dose.

This is one of the most powerful remedies for menorrhagia, and so also is a mixture of Hydrastis and Hamamelis.—W.W.W.

Ⓔ **Mistura Hydrastis Composita, W.**—Liquid Extract of Hydrastis and Liquid Extract of Hamamelis each 15 minims, Cinnamon Water to 1 ounce.

Ⓔ **Extractum Hydrastis.**—Prepared by removing spirit from the liquid extract. *Dose.*—2 to 5 grains (0·13 to 0·32 Gm.).

Fr. Cx. prepares with 60% alcohol and evaporates to soft extract. **Glycetractum Hydrastis**, v.p. 344.

Ⓕ **Hydrastina, Hydrastine, U.S.** Fr. Cx.

$C_{21}H_{21}NO_6=380\cdot33$ (383·178 I. Wts.; 380·32 U.S. Wts.).

Dose.— $\frac{1}{2}$ to 1 grain (0·032 to 0·065 Gm.). Fr. Cx. has max. single dose $1\frac{1}{2}$ grains. Max. during 24 hours $4\frac{1}{2}$ grains approx.

Pills containing $\frac{3}{4}$ and 1 grain are made.

An alkaloid in white prismatic crystals, slightly soluble in water, but soluble in alcohol 90% 1 in 150, chloroform 1 in 2, and ether about 1 in 90; taste very bitter.

To distinguish from Hydrastinine:—A crystal dissolved in dilute sulphuric acid and 1 in 10 solution of potassium permanganate added, blue fluorescence develops. (U.S.)

Has been found to produce uterine action and induce abortion, without danger to the patient, injected hypodermically.—L.i./86,991.

Ⓖ **Hydrastinae Hydrochloridum, P. Belg.** $C_{21}H_{21}NO_6.HCl=416\cdot52$ (419·646 I. Wts.) + Aq.

Dose.— $\frac{1}{2}$ to 1 grain (0·032 to 0·065 Gm.).

A crystalline soluble salt; is used like the alkaloidal base, and is said to act as an expectorant.

General research on the action of Hydrastine Hydrochloride.—B.M.J. ii./98,1052.

Ⓖ **Tablets, Hydrastine Compound.**—Hydrastine Hydrochloride $\frac{1}{4}$ grain, Ergotin $\frac{1}{2}$ grain, Cannabin Tannate $\frac{1}{2}$ grain. Efficient in checking menorrhagia, &c., post-partum hæmorrhage.

Ⓖ **Hydrastinae Tartras Acidus.**

$C_{21}H_{21}NO_6.(CHOH_2).COOH.COOH.4H_2O=600\cdot77$ (605·29 I. Wts.).

Dose.— $\frac{1}{2}$ to 1 grain (0·032 to 0·065 Gm.).

In fine white needles, sparingly soluble in water.

Ⓖ **Hydrastinine Hydrochloricum, P.G. iv., U.S.** Fr. Cx. Ph. Ital.

$C_{11}H_{11}NO_2.HCl$ (Schmidt and U.S.)= $223\cdot9$ (225·566 I.Wts.

Dose.— $\frac{1}{2}$ grain (0·032 Gm.). *Per os* or hypodermically in 10% solution. Fr. Cx. has Max. single dose $\frac{3}{4}$ grain, Max. during 24 hours $2\frac{1}{4}$ grains approx.

A salt of Ⓖ **Hydrastinine**, $C_{11}H_{11}NO_2=187\cdot71$ (189·098 I. Wts.) + Aq. (Fr. Cx.). An oxidation product of Hydrastine, is allied to Cotarnine, q.v. (consult Schmidt for *method of manufacture*).

In pale citron yellow crystals, **soluble** 1 in 1 of water (with blue fluorescence when considerably diluted).—M.Pt. 212° C. Has been used for internal hæmorrhage hypodermically. Useful in menorrhagia and dysmenorrhœa.

Ⓔ **Sterules, Hypodermic of Hydrastinine Hydrochloride** contain $\frac{1}{4}$ grain.

Hydrastinine is probably the active constituent of the drug. It acts immediately, while other preparations require some days' administration before any decisive effect is produced.

Purulent ophthalmia neonatorum well treated by 1% solution containing 0.1% Morphine Sulphate.

Ⓟ **Hydrastinum** *Syn.* EXTRACTUM HYDRASTIS, B.P.C.

Dose.— $\frac{1}{2}$ to 2 grains (0.032 to 0.13 Gm.) in pill.

This is made by extracting with 90% alcohol. Should contain 20% of total alkaloids, of which $\frac{2}{3}$ should be Hydrastine.—P.J.ii./OI,140. It is of yellow colour.

Uses.—Aperient, cholagogue, stomachic, and tonic; is also used as a dressing to ulcers, acting as an antiseptic.

3 to 6 grains in a pill, followed by Effervescing Sodium Sulphate, is a useful biliary stimulant.

Ⓟ **Tinctura Hydrastis** (*Off.*).

Dose.—30 to 60 minims (1.8 to 3.5 Cc.).

Hydrastis, in No. 60 powder, 1 in 10 of Alcohol (60%). U.S. 1 in 5 of a mixture of Alcohol 94.9% by volume and water in proportion of 650 and 350. Standardised to contain not less than 0.4% Hydrastine.

Fr., Cx.—1 in 5 by weight. Not standardised.

Flavoring.—As Extractum Hydrastis Liquidum *q.v.*

Ⓟ **Liquor Sedans.** *Dose.*— $\frac{1}{2}$ to 1 drachm (2 to 4 Cc.).

A specialty said to contain in 1 ounce Hydrastis (represented by whiter alkaloid Hydrastine) 60 grains; Black Haw (*Viburnum Prunifolium*) 60 grains; Jamaica Dogwood 30 grains; with aromatics. To restrain nervous irritability and as ovarian and uterine anodyne.

HYDROGENII PEROXIDI LIQUOR. (*Off.*).

$H_2O_2 = 33.76$ (34.016 I. Wts.).

Syn. Aqua Hydrogenii Dioxidii, U.S. Hydrogenium Hyperoxydatum Solutum, P. Austr. Soluté officinale d' Eau Oxygénée. Fr. Cx. 12 vol.

Dose.— $\frac{1}{2}$ to 2 drachms (1.8 to 7 Cc.).

May be prepared by the action of diluted mineral acid (especially sulphuric acid) on barium peroxide in presence of water.

The official solution should contain ten volumes of available oxygen when decomposed—i.e., 1 Cc. will evolve 10 Cc. of oxygen, or 1.45% of its weight = 3.04% by weight H_2O_2 . It has the second atom of oxygen in a very loose state of combination. It is also made two, three, and ten times (*Perhydrol, 30% wt. 100% vol.) this strength.

Perhydrol has Sp. Gr. 1.115 to 1.119, and freezes at 25° C, and has *dose* of a 10% dilution, 1 to 4 drachms further diluted.

Hydrogen Peroxide is produced naturally in many ways, as by the oxidation of oil of turpentine, oil of eucalyptus, &c., is contained in 'Sanitas,' *q.v.* The solution is used for bleaching ladies' hair. It has a harsh, bitter taste.

Incompatibility.—It readily decomposes, especially in contact with a metallic oxide, such as that of silver or manganese, these if moist and freshly precipitated cause oxygen to be briskly evolved from it. Ether restrains this decomposition, and is used for making Ozonic Ether,

Further incompatibilities are Alkalis, Ammonia, Arsenous Salts, Carbolic Acid, Glycerin, Hypophosphites, Iodides, Mercurous Salts, Potassium Bromide, Chlorinated Soda and Chlorine Water.

In the official process of estimation, saturated magnesium sulphate solution is better than sodium chloride solution.

Iodometric Determination.—Y.B.P. 1901,71.

Rapid Method of Estimating:—Titrate 2 Cc. in presence of a little dilute Sulphuric Acid with a solution of Potassium Permanganate 5.62 Gm. per litre until decolourised. Each volume of this solution is equivalent to an equal volume of Oxygen. 1 Cc. of 10 volume H_2O_2 decolourises 10 Cc. of the Permanganate, and 1 Cc. of 20 volume will decolourise 20 Cc. of it.—C.D. i./06,211. We may append explanation:— $2 KMnO_4 = 5$ atoms oxygen $\therefore 313.74$ Gm. = 55.8 litres Oxygen, i.e., 5.62 Gm. = 0.999 litres Oxygen, \therefore 1 Cc. of the Permanganate Solution of this strength = 1 Cc. of Oxygen.

Assay of Peroxide and amount of Acidity.—M. 1908; P.J. ii./08,460.

Preservatives.

Benzoic Acid 0.05% added to Hydrogen Peroxide Solution is said to be a good preservative.

A little phosphoric acid is sometimes added as preservative. Acetanilide has also been employed and is said to be useful. It is first converted into anilin acetate and then oxidised to nitro-benzol which is recognised by the odour developed.

Uses.—Internally is non-poisonous and has been given in diabetes, uræmia and epilepsy, also for pertussis, flatulent dyspepsia and enteric fever. For diarrhœa, vomiting of pregnancy, furunculosis and diphtheria. Is useful for assisting in removing surgical dressings which adhere obstinately. It is valuable as a pigment or spray for diphtheria, tonsillitis, laryngeal tuberculosis, putrid bronchitis and non-syphilitic ozæna. For tuberculous and syphilitic ulcers, gangrene, malignant pustule and for purulent discharges is antiseptic, is astringent, e.g., in epistaxis, and styptic in removing polypi. Does not precipitate albumin. May be used locally for inoperable uterine cancer, chilblains, lupus, favus and other skin affections, also in gonorrhœa (up to 10 volume strength) occasionally. Wasp and hornet stings are at once relieved.

Guttæ. Otitis may be treated with 10 to 15%, and diphtheritic conjunctivitis with a 3% lotion. Empyemal cavities have been washed out with diluted solutions, but danger has arisen from embolism by the oxygen evolved.

Also employed well diluted in erysipelas, and as an enema in dysentery.

Discharging ears. After syringing out with weak boric acid lotion fill the meatus with the *Off.* Liquor diluted with equal volume of water (if not diluted it is stated to be painful). Allow to remain in 15 minutes, syringe out again and dry carefully. Hydrogen peroxide is extremely useful as the first dressing after a radical mastoid operation.—B.M.J. ii./09,1323.

Diphtheritic throats may well be swabbed with 10% dilution of Perhydrol. Bandi's Serum also used in conjunction.—B.M.J.E. ii./08,95.

Scarlatinal otitis. When the discharge is thick and offensive nothing to equal the instillation of pure hydrogen peroxide (20 vols. strength).—Pr. Nov. '09,693.

In hay fever nasal spray of Hydrogen Peroxide has proved efficacious.—Pres. 1910, p. 5.

Not suitable for disinfection of drinking water, but suitable for sterilising instruments.—B.M.J. ii./09,1376.

As *Diagnostic for Stomach Ulcers*.—Merck states that pain and burning sensation after consumption of perhydrol point to the presence of ulceration.

Gargarisma Hydrogenii Peroxidi.

Hydrogen Peroxide Solution 1 drachm, Sodium Chloride 5 grains, Glycerin 30 minims, Water to 1 ounce. (*Caution*.—*In a strong bottle*.)

In ulcerative stomatitis diluted 2 to 3% as a mouth wash; also applied to suppurating buboes and gangrenous or serpyginous forms of soft chancre, comedones, acne and syphilides. For cystitis, an injection 1 to 3% of the solution; in chronic gonorrhœa $\frac{1}{2}$ to 1% generally combined with 1 in 1,000 to 1 in 4,000 solution silver nitrate, good results.—B.M.J.E. 1/94, 23; 1/05, 60.

A warm bath of 5 to 10 volume Hydrogen Peroxide useful to loosen the toughened masses of discharge in chronic cases of suppurative middle ear diseases. Will cure the most obstinate cases.—B.M.J. 1/07, 629.

Otorrhœa with slight discharge in scarlet fever heal by irrigating with: then drop in 3 drops of Absolute Alcohol and leave in a minute.—Barwell, Pr. Dec. 07, 840.

For painful ulcers of the mouth in syphilis applications of Hydrogen Peroxide (10 volumes) is useful.—Beddoes, p. 64.

Tetanus Bacilli can be destroyed with hydrogen peroxide when they can be reached.—B.M.J. ii./09, 368.

Chilblains well treated with the 10 volume preparation diluted with equal volume of boiled water (still hot) as lotion for 15 to 20 minutes twice daily.—B.M.J. i./09, 276.

Dental Use.—The 20-volume strength can be used for acute or chronic periodontitis and gouty periodontitis by syringing out pockets around affected teeth after removing any calculus or other matter. May also be used for septic root canals.

***Dioxogen.** A coined name for 3% Hydrogen Peroxide solution.—L. ii./04, 1576.

***Glycozone.**—Analysis gave Glyceric 90%, Glyceric Acid 5 %, small amount of water and traces of undetermined matter. Absence of peroxides was demonstrated.—P.J. ii./09, 21.

Ozonic Ether.

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

A solution of about 1·2% by weight of H_2O_2 in ether (*i.e.*, 4 volumes approximately). It is *soluble* in water in all proportions up to three times its volume, possesses properties similar to the above, and is more stable. In conjunction with Tincture of Guaiacum, it is employed as a test for blood, v.p. 865. Has been given internally for diabetes and whooping cough, and Ozonic Ether has been used locally for scarlet fever.

Under the name Pyrozone, is used by dentists for bleaching teeth which have become discoloured from death of the pulp, etc.

Method of Dental Use.—Isolate the tooth with rubber dam, and seal the apex with gutta-percha. The pyrozone is placed in the cavity on a pledget of cotton wool and volatilised with an air blast from the hot air syringe. Continue treatment for $\frac{1}{2}$ -hour when a small amount may be retained in the cavity by a filling of gutta-percha or oxyphosphate. Use with caution in living teeth.

Hydrogenii Peroxidum Boratum. — BORATED HYDROGEN PEROXIDE.

Neutralise carefully (using Phenolphthalein as indicator) any desired quantity of Hydrogen Peroxide (previously examined to ensure correct strength) with caustic soda. Then add 3% boric acid in the cold.

Liberates oxygen on coming in contact with blood or other organic matter. Is particularly suited for a mouthwash for buccal and pharyngeal inflammation. Keep in ampoules or stoppered bottles.—F.N. 1908,70.

In solutions thus prepared showed, we found, no material loss or decomposition on keeping for some little time,—the 10-volume preparation yielded 1.35% and the 20-volume 2.52% oxygen.

Loss of sense of smell was cured in the knowledge of the writers by the use of this preparation as a nasal lotion.

Magnesii Peroxidum is contained in “*HOPOGAN” and MAGNESIUM *PERHYDROL.

Dose.—“One third to one whole teaspoonful.”

Consists of a white tasteless powder, insoluble in water, containing 15% of Magnesium Peroxide, $MgO_2 = 55.94$ (56.32 I. Wts.), with Magnesium Oxide, and is for use where increased oxidation is desired; given for weak digestion, anæmia, and in diarrhœa, phthisis, vomiting, anorexia, flatulence and pyrosis. Tests suggested.—P.J. ii./04,85.

5 to 10% added to precipitated or prepared chalk powder makes a good dentifrice.—P.J. i./07,284. Tablets contain 0.3 Gm.

Magnesium Perhydrol 15% and 25% is similar; useful in uric acid diathesis. In typhoid and as a water steriliser.—M. '08,260.

Zinci Peroxidum. *Syn.* *EKTOGAN, *DERMOGEN. $Zn O_2 = 96.67$ (97.37 I. Wts.).

A white powder insoluble in water. Used locally in skin affections. Promotes healing of chronic ulcers. For burns and wounds generally.

Incompatible with Sublimate.

Zinc Perhydrol is similar (50% pure). 10% ointment or dusting powder are used.

Unguentum Zinci Peroxidi L.H. has 20 grains with Soft Paraffin to 1 ounce.

Unguentum Zinci Peroxidi Forte L.H. 40 grains to the ounce.

Sodii Peroxidum, Sodium Dioxide, F.E.

$Na_2O_2 = 77.52$ (78.0 I. Wts.).

A white amorphous deliquescent powder, dissolves in water with production of heat and evolution of oxygen. 1 part mixed gradually with 8 of ice forms a bleach and antiseptic which has been used in dentistry.

Anhydrous Soap containing 10 to 20% Sodium Dioxide and made into a paste with liquid paraffin, was used by Unna with success in acne.

Cubes of Sodium Peroxide. *Syn.* OXYLITHE.

Commonly known as “Solid Oxygen.” Are supplied for producing oxygen in a patented **Oxygenator**. This is capable of producing 25 cubic feet of pure oxygen when fully charged.

An ‘Automatic Oxygen Generator’ of smaller size and same principle has been placed on the market. Produces, it is stated, up to 3½ cubic feet (100 litres approx.) without recharging.

Oxygen, *vide* p. 509.

ⓈHYOSCINA.

$C_{17}H_{21}NO_4 = 300.93$ (303.178 I. Wts.) (+ Aq.)

A thick syrupy alkaloid, contained in *Hyoscyamus niger*, different species of *Scopola*, *Datura alba*, the flowers of which yield 0.5%, and other solanaceous plants.

It may be obtained from the Mother liquors of the preparation of Hyoscyamine. It is chemically and physiologically equal to Scopolamine. Schmidt doubts the existence of Hyoscine (Ladenburg) and describes Scopolamine base and salts only. Hyoscine Ladenburg has the formula $C_{17}H_{23}NO_3$. The official name for the substance Scopolamine Hydrobromide is Hyoscine Hydrobromide. Schmidt states *Atropa Belladonna* apparently contains small quantities of Scopolamine. For the purposes of the Poisons and Pharmacy Act 1908 we consider hyoscine as a 'belladonna alkaloid.'

For further details of the chemistry of this and allied alkaloids Schmidt and Ph. should be consulted. See also Lævo-Scopolamine, p. 391.

Uses.—Hyoscine is a powerful narcotic, especially useful in cases of insomnia, in calming excitement and delirium and producing sleep in acute mania. In such cases even double doses may be given. It is said to have no influence on the respiration, but to increase the action of the heart and circulation. As little as $\frac{1}{800}$ grain dilates the pupil in 18 minutes. The mydriasis is brief. It does not cause dryness of throat. Should be avoided in acute glaucoma.

Relieves chorea, asthmatic attacks, pertussis and paralysis agitans, and the tremor of alcoholic excess.

In treatment of morphine and cocaine habits has been used but apparently not without danger.

Nocturnal spermatorrhœa is checked by $\frac{1}{800}$ to $\frac{1}{180}$ grain doses in Chloroform Water by the mouth.—W.W.W.

In the treatment of diathermasia (thermal stroke in the tropics) Quinine is of no use if malaria has been excluded. Strychnine should be avoided. The patient should be placed in an ice pad, and a hypodermic injection of $\frac{1}{8}$ th grain of Hyoscine Hydrobromide should be given to quiet the intense cerebral hyperactivity. For irregular or thready pulse $\frac{1}{160}$ grain Digitalin is useful. After diaphoresis small doses of Ammonium Bromide may be given.—Brooke, 175.

As **Antidote** Pilocarpine or Caffeine should be administered, also Tannin and Tea, after emetics and use of stomach pump.

Ⓢ**Oleum Hyoscinae**, 1% in Castor Oil. Causes a mydriasis which is certain, quick in onset, and of transient effect. Ⓢ**Unguentum Hyoscinae**, Hyoscine $\frac{1}{2}$, Lard 99 $\frac{1}{2}$, heat to dissolve. (R.O.H. has Hyoscine Hydrobromide $\frac{1}{2}$, Glycerin *q.s.*, Soft Paraffin 100.)

Ⓢ**Hyoscinae Hydrobromidum** (*Off.*). Scopolaminum Hydrobromicum, P.G. iv., U.S., Ph. Ned. $C_{17}H_{21}NO_4 \cdot HBr \cdot 3H_2O = 434.92$ (B.P. and U.S. Wts.) (438.154 I. Wts.). P. Helv., P. Jap., P. Dan.

In white rhombic crystals, soluble 1 in 4 of water (or less), 1 in 14 of alcohol. Melts at 193° to 194° C. (*Off.*); 180° C.—P.G. iv.; 191 to 192° C. U.S. **Dose.**— $\frac{1}{800}$ to $\frac{1}{180}$ grain (0.00032 to 0.00065 Gm.), increased to $\frac{1}{60}$ grain.

The pure salt (water free) has O.R. for a 6.5% solution at 15.8°C $[\alpha]_D = -25^{\circ}.45'$ though in commerce often less owing to presence of inactive scopolamine.—Schmidt. See also Lævo-Scopolamine, p. 391.

① Guttæ Hyoscine, R.O.H., 0.5 in 100.—St. Thos. H., 0.5 or 1%.

① Lamellæ for ophthalmic use contain $\frac{1}{600}$ and $\frac{1}{200}$ grain.

① Guttæ Hyoscine et Cocaine, St. Thos. H.

Hyoscine Hydrobromide 0.5, Cocaine Hydrochloride 1.0%

① Injectio Hyoscine Hypodermica. 1 grain in 1,000 minims
Dose.—5 to 10 minims.

① Liquor Hyoscine Hydrobromidi, 1 in 1,000 of chloroform water
Dose, 3 to 15 minims (0.18 to 0.9 Cc.).

① Pilula Hyoscine Hydrobromidi, $\frac{1}{150}$ grain.

① Hypodermic Tablets, $\frac{1}{200}$, $\frac{1}{100}$ and $\frac{1}{75}$ grain in each.
Severe poisonous effects from $\frac{1}{12}$ grain.—L. i./04,24.

① Scopolamine-Morphine Anæsthesia (Schneiderlein). Scopolamine Hydrobromide $\frac{1}{200}$ to $\frac{1}{64}$ grain (B.M.J.E. ii./01,44) or more, and a salt of Morphine $\frac{1}{7}$ to $\frac{1}{2}$ grain are injected on the evening before the operation, and a similar or higher dose in the morning before the operation. This alone may suffice to produce deep sleep. If not, ether or chloroform may be given until complete anæsthesia occurs. Patients sleep for hours through the first painful periods after the operation.

Scopolamine Hydrobromide $\frac{1}{50}$ grain, Morphine Hydrochloride $\frac{1}{5}$ grain in 15 minims of water at 4, 2, and 1 hour before the operation. Anæsthesia lasts 24 hours.—B.M.J. i./05,445. Volkman's method is similar. $\frac{1}{100}$ grain with $\frac{1}{8}$ grain, also $\frac{1}{250}$ grain with $\frac{1}{12}$ grain respectively.—L. i./06,24. There is marked reduction in the liability to vomit.

Korff gives a large cup of coffee one hour before the first injection, $\frac{1}{3}$ of the dose ($\frac{1}{64}$ grain Scopolamine and $\frac{1}{3}$ grain of Morphine) 2½ hours before operation, the second $\frac{1}{3}$ dose one hour later, and the last third of the dose $\frac{1}{2}$ hour before operating.—B.M.J.E. i./07,48. The method is suitable for relieving the pain of childbirth.—B.M.J.E. ii./07,10.

Krönig's Method.

First a dose of $\frac{1}{140}$ grain Scopolamine and $\frac{1}{6}$ grain Morphine. A second injection one hour afterwards of $\frac{1}{40}$ to $\frac{1}{200}$ grain, and in a further half hour test patient's perceptive powers.—B.M.J.ii./08,805; L.ii./08,545,546.

In obstetric work the best dose is said to be $\frac{1}{100}$ grain Scopolamine, and $\frac{1}{6}$ grain Morphine given towards the end of the first stage of labour when pains coming regularly every few minutes. Occasionally second dose of Scopolamine $\frac{1}{200}$ grain required, but no Morphine.—L.i./09,1459.

Scopolamine-Morphine Narcosis during labour.—Annus Medicus, L.ii./09,1892.

As preparation for inhalation anæsthesia, 770 cases treated with single injection of $\frac{1}{250}$ grain Scopolamine and $\frac{1}{6}$ grain Morphine. On the night before operation 7½ to 15 grains of Veronal given, next morning $\frac{3}{4}$ to 1 hour before operation, the above combination. Billroth's mixture used for inhalation, and later Ether. Vomiting seldom occurs in the method.—B.M.J.E. ii./09,12.

100 cases of this method of anæsthesia. The method is ideal for the patient, who is spared preliminary nervous tension. Amount of anæsthetic lessened by half. Long and peaceful sleep follows. The evening before the operation give 10 grains of Veronal; two hours before the operation $\frac{1}{2}$ grain Morphine with $\frac{1}{16}$ grain Scopolamine, an hour later half this dose. At the operation Ether as general anæsthetic.—B.M.J. ii./09,332; L. ii./09,539.

Present experience shows that the production of complete loss of consciousness so as to enable a major operation to be conducted is dangerous. It is better to employ the method in sufficient dosage to produce drowsiness, and to follow with a general anæsthetic at the time of the operation. Veronal at bedtime and $\frac{1}{2}$ an hour before the operation; Morphine $\frac{1}{2}$ grain with Scopolamine $\frac{1}{16}$ grain is recommended. There is almost complete absence of post-operation vomiting. Half a dose of each, or less, may be given if necessary after 1 hour.—Leedham Green.—B.M.J. ii./09,962.

Scopolamine $\frac{1}{4}$ grain, with Morphine, $\frac{1}{2}$ grain, 2 hours before operation.—L. ii./09,1501; see also L. i./09,1459; B.M.J. ii./09,1408.

The physiological effects of Hyoscine have been studied by Webster with a hope of finding anything in the way of diminishing chances of heart failure during Chloroform anæsthesia. He concluded that though Hyoscine and allied drugs have an effect in diminishing vagus inhibition, yet any advantage gained is more than counterbalanced by their depressing influence on cardiac action.—Pr.Feb./09,233.

For further points on the procedure *vide* B.M.J. ii./08,1044.

MacNaughton Jones uses $\frac{1}{2}$ grain Morphine and Scopolamine, $\frac{1}{16}$ grain with Chloroform the night before operation, and next morning, after thoroughly emptying the bowel, a further dose of the same quantity, and from half to one hour before operation *Atropine* $\frac{1}{16}$ grain with *Strychnine* $\frac{1}{16}$ to $\frac{1}{8}$ grain is given. Chloroform is administered with a Vernon-Harcourt regulator. Less Chloroform is needed.—B.M.J. ii./08,809.

Atropine would not take the place of Scopolamine for the purpose.—B.M.J. ii./08,1525.

N.B.—Physicians are cautioned as to the doses in this method, as statements vary greatly.

It soothes and lessens amount of anæsthetic required.—L. i./09,913.

Ⓓ 'Scopomorphin.'—A proprietary article in Ampoules containing Scopolamine Hydrobromide, $\frac{1}{10}$ grain (0.0012 Gm.) and Morphine Hydrochloride $\frac{1}{2}$ grain (0.03 Gm.) in water 34 minims (2 Cc.).

Ⓓ Sterules, Hypodermic for Scopolamine - Morphine Anæsthesia contain Scopolamine Hydrobromide $\frac{1}{16}$ grain with Morphine Hydrochloride $\frac{1}{2}$ grain in 10 minims.

For use with these are Ⓓ Sterules of Atropine Sulphate $\frac{1}{16}$ grain with Strychnine Sulphate $\frac{1}{16}$ grain in 10 minims.

The Scopolamine and Morphine are given overnight, repeated early in the morning if necessary, and the Atropine and Strychnine an hour before operation, *vide* MacNaughton Jones above.

Ⓓ Lævo-Scopolamine with Morphine.

In labour 19 cases. The point is raised that as Hyoscine or Scopolamine exists in three stereo-isomeric forms (dextro, lævo and racemic) and the

lævo is said to be the most active on nerve endings, confusion may have arisen in consequence,—some writers use the word Scopolamine to denote the lævo, and Hyoscine to denote the other weaker forms in comparison of O.R. The operator in these cases used lævo-Scopolamine $\frac{1}{200}$ to $\frac{1}{100}$ grains, with Morphine $\frac{1}{8}$ to $\frac{1}{4}$ grain. The Scopolamine was sometimes increased, the Morphine never.—L. i./10,29.

Schmidt, on the other hand (vol. II., 2, p.1457), says distinctly that Commercial Scopolamine Hydrobromide from Scopol root—though often less lævo rotatory—physiologically hardly differs from the pure Lævo-Salt.

① Hyoscinae Hydrochloridum.

$C_{17}H_{21}NO_4 \cdot HCl \cdot 2H_2O = 372.88$ (375.678 I. Wts.).

In large crystals, similar to the hydrobromide.

Dose.— $\frac{1}{200}$ to $\frac{1}{100}$ (0.00032 to 0.00065 Gm.).

① Hyoscinae Hydriodidum.

$C_{17}H_{21}NO_4 \cdot HI = 427.83$ (431.106 I. Wts.).

Dose.— $\frac{1}{200}$ to $\frac{1}{100}$ grain (0.00032 to 0.00065 Gm.), increased. In crystals, with properties like above.

HYOSCYAMI FOLIA (Off.).

JUSQUIAME,—Fr. CX.

Henbane Leaves consist of the fresh leaves, flowers and branches, also the leaves and flowering tops separated from the branches and carefully dried. Collected from the flowering biennial plants.

Uses.—Similar to those of belladonna and stramonium.

Colocynth and other strong purgatives in pills are relieved in action by addition of Hyoscyamus Extract.

A therapeutic survival which pharmaceutical chemistry and pharmacology have done little to raise from the empirics,—MacEwan, Int. Cong.

U.S. directs leaves and flowering tops (second year's growth) yielding not less than 0.08% mydriatic alkaloids. P. Helv. required 0.1%.

① Extractum Hyoscyami Viride (Off.).

Dose.—2 to 8 grains (0.13 to 0.52 Gm.).

The juice of fresh henbane heated to 93° C. (200° F.) and the coagulated albuminous matter rejected.

Contains about 0.2% Alkaloids as a general rule. Volatile bases are contained in the drug, which may interfere with the estimation.—Am. Jl. Ph., Feb. '08, 71. We employ as standard 0.3%.

Microscopic identification.—P.J. ii./08, 835.

① Succus Hyoscyami (Off.).

Dose.— $\frac{1}{4}$ to 1 drachm (1.8 to 3.5 Cc.). The juice expressed from fresh Henbane 3 with Alcohol 90% 1.

The juice contains a very small proportion of alkaloid, indeed hardly sufficient to determine with accuracy.

① Tinctura Hyoscyami (Off.).

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.). Powdered Hyoscyamus leaves and tops 1 in Alcohol 45% to 10. Might be made with 30% Alcohol.—P.J. ii./09, 142.

Fr. CX.—1 in 10 Alcohol 70%. (F.I.). Maximum single dose 17 minims; maximum during 24 hours 1 drachm approximately.

Flavoring.—Syl Aurantii Amari, Syl Vanillæ; Syrupus Aurantii Floris.

② **Tinctura Hyoscyami Recentis.**—Fresh herb 4 lbs., Alcohol (90%) 50 oza., macerated for a week, then pressed. To the marc $1\frac{1}{2}$ pints of alcohol (45%) was added, and the mixture pressed again. The resultant tincture measured about $5\frac{1}{2}$ pints, had Sp. Gr. 0.956 and yielded 2.9% of extractive. Aroma and appearance superior to the Off. tincture.—C.D. ii./08, 383.

② **Oleum Hyoscyami, P.G. iv.** Macerate Hyoscyamus leaves 4, in Alcohol 90% 3, several hours, then mix with Olive Oil 40, and drive off the alcohol on a water bath.

Fr. Cx. has dried leaves 1, Alcohol 95% 1, Poppy Seed Oil 10.

For local action (not to be confused with the expressed oil from the seeds which, however, is little in use now).

② **Baume Tranquille (Fr. Cx.).**—An oily extractive of dry leaves of hyoscyamus, belladonna, poppy, stramonium, black nightshade, with a number of essential oils added.

① **Extractum Hyoscyami, U.S.** Contains 0.3% mydriatic alkaloids, is made by concentrating fluidextract. *Average dose.*—1 grain (0.065 Gm.).

① **Powdered Extract of Hyoscyamus of Commerce** contains 0.5% alkaloids.

② **Fluidextractum Hyoscyami, U.S.** *Average dose.*—3 minims (0.18 Cc.). Strength 1=1; hydroalcoholic percolate, standardised to 0.075% mydriatic alkaloids.

In the *U.S. Assay*, which is similar to that for Belladonna, Umney says better to use sand and extract with Chloroform, as in case of *Pilocarpus*.

② **Extractum Hyoscyami, Ph. Ned.,** is made with alcohol 60% from the leaves; that of *P. Belg.* and *P. Helv.* contains 0.3% alkaloids; that of *Fr. Cx.* is made with 70% Alcohol containing 10% moisture, as required by *F.I. (infra.)* *Maximum single dose* $1\frac{1}{2}$ grains; maximum in 24 hours 5 grains approximately. *Fr. Cx.* gives method of standardising but does not give a standard.

② *P. Hung.* has **Extractum Hyoscyami F.I.,** also ① **Extractum Hyoscyami cum Dextrino Exsiccatum,** $\frac{1}{4}$ strength so latter.

The dried leaves are said to contain as much as 0.25% of total alkaloid of which three-fourths may be Hyoscyamine. The average quantity is $\frac{1}{4}$ to $\frac{1}{2}$ of this percentage. The minute dark grey seeds of the plant contain 0.5% alkaloid, also a quantity of oil, *v. supra.* (*Hyoscyami Folia* should consist of leaf only—not the branches and flowers. The *tincture* should be 10% strength in alcohol 70%, the *extract* should be solid "containing about 10% of water," and should be prepared by alcohol 70%—*F.I.*)—confirmed by *C.R.*, excepting that for tincture the quantity of drug for each 100 Cc. would have to be altered. Other countries weigh the alcohol. For the extract it would be necessary to work out from alkaloidal content a dose suitable to account for the change in definition of the drug.

Fr. Cx. has leaves collected from the biennial plant at time of flowering; also the seeds for making ② *Pilules de Cynoglosse opiacées.*

Hyoscyamine is also contained in *Atropa Belladonna*, *Duboisia myoporoides*, *Datura Stramonium*, *Scopola Carniolica*, *S. Japonica*, and other atropaceous plants.

Egyptian Henbane contained 0.91% Alkaloids by titration.—*Southall's Lab. Rep.*, 1907. Is *Hyoscyamus muticus*. Costs less than $\frac{1}{10}$ of the medicinal drug. Has been imported in America and diluted with inferior henbane, as it contains 1 to 1.25% Hyoscyamine.—*L. i.*, 09, 52.

It grows wild all over Egypt, where it is known by the name of 'Sakran' the drunken. The alkaloid it contains is practically pure Hyoscyamine. In some respects

it is superior to *Hyoscyamus Niger*.—Am. Jl. Ph. May/08, 230. Histology *Ibid.* Aug./08, 361,

Lactucarium, U.S. *Average dose*.—15 grains (1 Gm.).

The concrete milk juice of *Lactuca virosa* (*Compositæ*), the strong scented lettuce. Hyoscyamine is said to be a constituent of the fresh plant. Brownish masses with opium-like odour and bitter taste, partly soluble in alcohol and in ether.

Tinctura Lactucarii, U.S. 1 in 2. *Average dose*.—30 minims.

Syrupus Lactucarii, U.S. (1 in 20). Tincture of Lactucarium, U.S., 100, Glycerin 200, Citric Acid 1, Orange Flower Water 50, Syrup to 1,000. *Average dose*.—2 drachms for insomnia.

Schmidt recently found in:—

Datura Metel.—Leaves 0.55%, and the seeds 0.5% of scopolamine.

Datura arborea.—All parts of this plant contain scopolamine principally, with some hyoscyamine.

Datura quercifolia.—Leaves contain 0.4% and the seeds 0.28% of alkaloid calculated as scopolamine; hyoscyamine is also present.

Ⓢ HYOSCYAMINA.

$C_{17}H_{23}NO_3 = 287.05$ (289.194 I. Wts.).

Dose.— $\frac{1}{120}$ to $\frac{1}{40}$ grain (0.00054 to 0.0016 Gm.), in cases of mania increased to $\frac{1}{16}$ or $\frac{1}{8}$ grain dissolved in water by means of diluted sulphuric acid, or in a pill. *Antidotes*. See Atropine.

An alkaloid obtained from *Hyoscyamus niger*, Henbane. (*vide* also p. 393).

An isomer of Atropine (which is inactive), into which it can be converted by heating or acting upon it with alkali. It is in light snow-white crystals. According to Schmidt O.R. of Solutions of Hyoscyamine is $[a]_D = -20.97^\circ$.

Soluble 1 in 120 of water, freely in alcohol, chloroform and ether. Is alkaline in reaction, and melts at 108° — 109° C.

It has been found in *Scopola Japonica*.—*q.v.*

Ⓢ **Hyoscyaminæ Hydrobromidum**, $C_{17}H_{23}NO_3HBr = 367.4$ (B.P. and U.S. Wts.); (370.122 I. Wts.).

Dose.— $\frac{1}{200}$ to $\frac{1}{100}$ grain (0.00032 to 0.00065 Gm.), increased.

In small white crystals, soluble about 2 in 1 of water.

Does not yield precipitate with platinic chloride (difference from most alkaloids) U.S. M.pt. 151.8° .

Ⓢ **Hyoscyaminæ Sulphas**. (*Off.*)

$(C_{17}H_{23}NO_3)_2H_2SO_4 \cdot 2H_2O = 707.2$ (712.506 I. Wts.). (U.S. without water = 671.43.)

Dose.— $\frac{1}{200}$ to $\frac{1}{100}$ grain (0.00032 to 0.00065 Gm.).

In small white granular deliquescent crystals, soluble in water 2 in 1 and about 1 in 4 of alcohol 90%.

Ⓢ **Injectio Hyoscyaminæ Hypodermica**.

Hyoscyamine Sulphate 1 grain, Distilled Water 2 drachms. *Dose*.—1 to 2 minims.

Ⓢ Hypodermic Tablets of Hyoscyamine Sulphate contain $\frac{1}{100}$ and $\frac{1}{50}$ grain. Ⓢ Ophthalmic Discs contain $\frac{1}{5000}$ grain.

Ⓢ **Granules of Hyoscyamine** $\frac{1}{100}$ grain (or 0.00065 Gm.) are used for sea-sickness. *Dose*, occasionally a day or so beforehand, and for the first few days on board; hourly if required.

Uses.—As a mydriatic it acts like atropine, but with greater intensity, while the duration of effect is about equal.

It removes the pain of neuralgia, has cured mercurial tremor, paralysis agitans, and relieves puerperal mania and delirium tremens.

When used hypodermically, is most valuable in calming the violence of a furious maniac, or a noisy general paralytic. $\frac{1}{10}$ grain has been given three times a day, increased to $\frac{1}{4}$ or $\frac{1}{2}$ grain as single doses; requires care.

① Duboisine from the leaves of *Duboisia myoporoides* is identical chemically with, and physiologically similar to Hyoscyamine. It is in amorphous granules very hygroscopic.

Experiments with Tropine and ψ Tropine have been conducted by fractionally crystallising their salts with certain optically active Acids. Both have been shown to be internally compensated confirming the view held by Willstatter that Tropine and ψ Tropine differ in the relative positions in space of the OH and CH_3 groups. Dicumphorsulphonates were used for fractional crystallisation, and Salts of the Stereoisomeric Hyoscyamines were obtained.

L-Hyoscyamine is 100 times as mydriatic as the corresponding D-Hyoscyamine. —Tutín, C.D. li./09,826.

*ICHTHYOL (F. Ital.)

Syn. AMMONIUM SULPHO-ICHTHYOLATE (P. Belg. P. Jap.).

Dose.—10 to 30 grains (0.65 to 2 Gm.) per diem.

A viscous, brownish, substance, with a disagreeable tarry odour, containing about 15% of sulphur, is obtained by treating the products of distillation of a bituminous quartz of fish origin (hence its name), found in the Tyrol, with sulphuric acid and neutralizing with ammonia. The ammonia combination is distinctively known as **Ichthyol**.

Soluble in water, glycerin, ether, fats, oils, and partially in alcohol 90%. **Uses.**—Internally has been given for rheumatism and skin affections, and as an intestinal antiseptic in constipation and dyspepsia. Reduces expectoration and cough in phthisis; also stated to be useful in whooping cough. It forms a valuable application for chronic skin diseases, as eczema, psoriasis, acne, and favus; as an embrocation, it relieves the pains of chronic rheumatism. The odour may be disguised with Oil of Citronella, which is itself used in Ceylon for rheumatism. Applied on wool as vaginal tampon, and as pessaries and suppositories, and as injections 2 to 5% (Lock Hosp.) in gonorrhœa, cystitis and vaginal discharges. Also applied to cracked nipples, and erysipelas. For prurigo senilis a 30% solution in water is recommended; for pruritus, and ulcers a 10% solution; may be combined with preparations of lead and mercury without the formation of sulphides.

For burns it has been used diluted with zinc oxide or bismuth (the powder being spread evenly over the surface), or in ointment (10 to 50%).

Pruritus vulvæ treated by 5 grains with 10 grains Potassium Bicarbonate thrice daily. —B.M.J.ii./08,632.

Ichthyol is not a definite chemical compound. Ether separates neutral oils insoluble in water. Alcohol removes saline bodies soluble in water. The sulphidic sulphur *i.e.*, that in the non-oxidised state (originally combined in the hydrocarbon oil before sulphonating) is of importance. Passa-

more finds 12·51% in Ichthyol—other preparations of the same nature since placed on the market showing considerably less.—C.D.ii./09,935.

For further notes on chemical composition *v.* P.J. i./08,9.

Lithium and Sodium Sulpho-ichthyolate, each.

Dose.—10 to 30 grains (0·65 to 2 Gm.) per diem.

Zinci Sulpho-ichthyolas: For external use.

Capsules of Ammonium-Ichthyol and of Lithium-Ichthyol, 4 grains (0·25 Gm.) each (or combined 2 grains of each). *Dose.*—1 or 2.

Collodion 7 parts, with Ichthyol 1 part, is used for eczema, erysipelas, and other skin diseases.

Mistura Ichthyol.

Dose.—1 to 3 drachms in water.

Ichthyol 6, Simple Elixir 20, Water 10. Another form is Ichthyol 2, Peppermint Water 7½, Syrup 2½.

Pilula Ichthyol Ammoniati.

Ichthyol 2½, Compound Tragacanth Powder ¼, Licorice Powder 1½ grains. Make a pill, on hot plate if necessary.

Pilula Ichthyol Lithii, also **Pilula Ichthyol Sodii** may be made also as above, but less Licorice. As the Ichthyol preparations are harder than the Ammonia body usually less Licorice will suffice.

For **Pilula Ichthyol Ammoniati** above the following is an alternative:—

Mix Ammonium-Ichthyol 120, Magnesium Oxide 15, Water 120, and evaporate to dryness with stirring, may be massed again with water, 2 grains = 3 grains Ichthyol.—C.D. i./04,444.

Tablets, 2½ grains (0·165 Gm.). *Dose.*—1 or more.

Pessaries of Ichthyol, 10% strength, with either Gelatin or Cacao butter basis are used for leucorrhœa, and 2 to 5% in gonorrhœa of the female.—L. ii./04,1223; also made with Resorcin 3% preferably with Cacao Butter basis. See also **Ovules**.

Suppositories of Ichthyol may contain 3 grains (0·2 Gm.) with a basis of beeswax 1 and oil of theobroma 2, or may be made, if for immediate use, with Glyco-gelatin basis. They may also be prepared with starch jelly with a little Formalin added as preservative.

Much discussion occurs in Pharmacy from time to time as to the best basis for Ichthyol Pessaries and Suppositories. If made with glycogelatin they may become insoluble. Do not overheat the mass.

Disp. p. 202, says "used with best results." (Gelatin basis).

The slow solubility of pessaries thus made is by some gynecologists thought of value.—P.J. ii./07,837.

They may harden on keeping; a little Ammonium Carbonate is said to prevent this.

[Physicians should specify which basis they prefer.]

Unguentum Ichthyol may be made to contain from 20 to 50% with lanolin or with olive oil and lard. For psoriasis.

Unguentum Ichthyol Rosatum.—20% with lanolin basis and otto of rose *q.s.* or as directed.

Ichthyol Resorcin. Ichthyol mixed with 10% of Resorcin for external application.

Ichthyol Paste, recommended by Unna for acne rosacea. Starch 40, moisten with Water 20, and rub in Ichthyol 40, and lastly strong solution of Albumen, 1 or $1\frac{1}{2}$. This is painted on the skin, quickly dries, and is easily washed off. Another formula:—Ammonium Ichthyol 25, Carbolic Acid, $2\frac{1}{2}$. Dissolve in warm water $22\frac{1}{2}$, and mix with starch 50.—L. i./91,622; B.M.J.E. i./91,102.

Pasta Ichthyol et Olei Terebinthinæ.

Ichthyol 1, Oil of Turpentine 1, mix. Of value in chilblains.

***Ichthalbin.** *Dose.*— $\frac{3}{4}$ to 15 grains (0.05 to 1 Gm.).

A combination of ichthyol and albumen, is an odourless and tasteless brown powder. Used internally for eczema, nervous intestinal affections and during convalescence from fevers.

Ichthyol-Salicyl is a powder made with either 25, $33\frac{1}{3}$ or 50% of sodium salicylate; recommended for psoriasis, acne rosacea and for rheumatic pains, and has been given internally in pills for tuberculosis.

***Ichthoform.** A compound of Ichthyol and Formaldehyde. Insoluble in water. *Dose.*— $1\frac{1}{2}$ to 5 grains (0.1 to 0.3 Gm.).

Used as antiseptic in the intestinal disorders occurring in tubercular diseases.—L. i./04,717. Combined with Salacetol in a cachet this substance acts as a useful intestinal antiseptic in catarrhal conditions.

***Thigenol** is similar but a sodium salt; a 5% ointment relieves eczema.—B. M. J. E. II./03,15.

***Sphagnol.**

A native tar product said to be produced by the decomposition of peaty deposits in the earth. With success in blepharitis, eczema, piles, sores and burns. Is detergent and relieves insect bites in tropical countries.

Sphagnol Ointment (10%). Medical Soap (15%) Toilet Soap (5%) and **Shaving Soap 5%** are prepared.

Sphagnol Suppositories, 3 grains for piles.—L. i./09,1465.

***Thiol.** *Dose* (of dry) 2 to 10 grains (0.13 to 0.65 Gm.)

A mixture of sulphonated hydrocarbons, prepared by heating gas oil, obtained in the distillation of coal, with sulphur. Occurs in two forms, (1) in dry black laminae or powder; and (2) **Thiol Liquidum**, a syrupy liquid containing about 40% of the latter. Is miscible with most ointment bases. Soluble in water. In skin affections and for uterine inflammation and ulcerations of the cervix.

Pigment, Thiol Liquid 4, Glycerin 2, to be painted on the part with a brush.

Ointment, containing Thiol Liquid 1, Vaseline 3, Lanolin 6.

Collodion, containing Thiol Powder 1, Collodion 19.

Pills, Thiol Liquid 1 drachm, Althæa Powder *q.s.* For 40 pills. Two thrice daily.

Pasta Thiol et Zinci contains 10% Thiol and 20 Zinc Oxide. In pruritus of the female genitals.

Isarol is a preparation similar to Ichthyol.

Ferriethol. *Dose.*—1 to 3 tablets thrice daily.

A preparation of Iron and Ichthyol in tablet form.

INFUSA CONCENTRATA.

These preparations are made of such strength that one volume diluted with 7 of water approximately represent the official Infusions. Recently Farr and Wright have recommended dilute Chloroform Water (Chloroform 1 in Water 1,000)—either (a) by **Macero-Expression** in which the amount of drug required per pint is macerated in 15 ounces of the menstruum in a

closed vessel for 24 hours, strained, pressed and the alcohol or tincture necessary then added and maceration repeated two or three times. The two latter liquors are evaporated and added to the first and made up to one pint. The third maceration may be omitted when dilute alcohol is used as menstruum, and for the second maceration only *q.s.* need be used to make the expressed liquids when mixed measure 1 pint. The dilute chloroform water is to be used to prepare diluted alcohol when this is employed as menstruum. (b) By **Repercolation** consisting in moistening half the drug with the menstruum and percolating. The other half is then moistened and percolated with the first percolate—percolation being continued in a second percolator until 13 ounces (reckoned on pint formula) are obtained. Add the alcohol and any tincture, etc., in the formula and reserve. Complete the exhaustion. The weak liquors are evaporated and added to the reserved portion. The bulk is then made up to volume (1 pint).

When using diluted alcohol as menstruum simply percolate until 1 pint of percolate has been collected from the second percolator. This is the easier procedure. By whichever process they are made concentrated infusions must, to keep, *contain at least 20% (for export 25%) alcohol.*—W.H.M.

Broom, by (b), but not very satisfactory. **Buchu**, by (a) using dilute alcohol and add tincture 1 ounce to each pint. Diluted, however, not equal to the fresh article. **Calumba**, by (a) heating finally to 85° C. for 5 minutes. **Cascarilla**, by (a) adding 6 dr. (B.P.C. 12 dr.) tincture to a pint. Diluted as good as infusion. **Chamomile** (b), dilute with alcohol, adding 1 drop of oil for each ounce of flowers used. **Chiretta** (b), satisfactory. **Clove**, not satisfactory. **Cusparia** (a), good. **Digitalis** (a), will not keep more than one month.—B.P.C. **Gentian Compound** (a), adding 2 drachms of orange and lemon tinctures to the pint. **Hops** (a), with alcohol. Use old hops. **Orange** (b), adding tincture 1 ounce. **Orange Compound** (a), adding 1 ounce orange and lemon tinctures. **Quassia** (b). **Rhatany** (a), if with alcohol more body, but not like official article. **Rhubarb** (b). **Roses** (b), with acidulated alcohol. **Senega** (b), with alcohol and a little ammonia. A little wintergreen oil to be added to finished product. Deposits in time. **Senna** (a), with alcohol and add essence of ginger $\frac{1}{2}$ ounce to pint. Diluted is as good as the fresh infusion. **Serpentary** (b). **Valerian** (b), with addition of ammonia (B.P.C. uses 0.3% strong solution). Diluted, is superior to the fresh infusion.—P.J. 1./06,163; C.D. 1./06,252. Yields of extractive.—P.J. 1./05,435. **Infusum Cinchonæ Acidum** (Off.) Cannot be produced in a concentrated form.

Tisanes.—Infusions or Teas (usual strength 1 in 10) of herbs are largely used by the laity in France, Italy, &c. Those mostly in use are:—*Tilleul* from flowers of *Tilia Europea*—Linné. German—*Lindenblüthen* (anti-spasmodic, diaphoretic); *Senna* and *Manna* (largely used); *Queues de Cerise*, cherry-stalks (diaphoretic); *Peppermint*; *Tamarinds*; *Bourrache*, Borage-leaf tea; *Chamomile*; *Mauve*:—*Malva Sylvestris*, Marshmallow-flowers (demulcent); *Chiendent*: couch-grass (kidney-tonic); *Aniseed* (both varieties), Linseed; *Orge* (pearl-barley). A large number of other tisanes are prepared.—Ph. Notes, France and Riviera. A large number are contained in the new Fr. Cx.

iodoformum.

Iodoform (Off.) **Tri-iodomethane.**

CHI_3 = 390.61 (B.P. and U.S. Wts.) (393.768 I. Wts.).

Dose.— $\frac{1}{2}$ to 3 grains (0.032 to 0.2 Gm.)

Iodoform is *manufactured* by acting upon Alcohol with Iodine in

the presence of Caustic Potash solution at a temperature of about 70° C. :—



It is also produced by the electrolysis of an aqueous solution of Potassium Carbonate, Potassium Iodide and Alcohol.

In yellow hexagonal crystals, with disagreeable odour, containing 96·7% iodine.

Antidotes.—Opiates, bromides, diuretics with 5 to 10% of Sodium Bicarbonate locally.—L.i./09,562.

Soluble 1 in 8 of absolute ether, 1 in 10 of ether (Sp. Gr. 0·735), 1 in 12 of chloroform, 1 in 95 of 90% alcohol, 1 in 14 of oil of eucalyptus, 1 in 10 of collodion, 1 in 60 of vaseline and oil of almonds, and about 1 in 30 of olive oil. It is almost insoluble in water, but dissolves 1 in 10 of Rubini's solution of Camphor, which disguises its odour.

Iodoformi Pulvis (strictly minute crystals), can be used in a dredger.

Iodoformum Præcipitatum (agglomerates) for dusting on sores, and for making ointments.

Iodoformum Aromaticum is scented with Coumarin, 1 in 50.

To cover its characteristic odour it may be mixed with balsam of Peru, oil of geranium or eucalyptus, phenol, oil of anise, Sanitas oil, otto of rose, tannic acid, oil of sassafras, creolin, thymol, menthol or coumarin.

Other suggestions for covering the odour of iodoform:—Carbolic Acid 1% and Peppermint Oil 2%, Cyllin $\frac{1}{2}$ % ; Rosemary Oil 1% ; Thymol 1%.

To remove the smell from the hands, utensils, &c., rub with a little crushed linseed and wash afterwards.—P.J. ii./08,181.

Uses.—Antiseptic, anæsthetic and sedative. Useful in gonorrhœa and syphilis (non-irritant). To sores as dusting powder or ethereal solution. Insufflations (*q.v.*) are used in throat affections. The (10%) ointment is a useful dressing to wounds.

Taken internally, Iodoform decomposes, and iodine is soon found in the urine; being non-irritant has given good results in intestinal hæmorrhage, tertiary syphilis and cirrhosis of the liver, also to kill tapeworm.

Tuberculous peritonitis, a case of, rapidly recovered under Mercury and Chalk $\frac{1}{2}$ grain with Iodoform $\frac{1}{4}$ grain thrice daily.—L. ii./95,291.

Phthisis treated by intravenous injection of Iodoform $\frac{1}{4}$ grain dissolved in Ether 10 minims containing 40% Liquid Paraffin.—B.M.J. ii./05,65.

Incompatible with calomel, silver and other nitrates, potassium chlorate, and nitrites.

Glutoid Capsules of Iodoform (Sahli).

Capsules (to show absence of pancreatic secretion), containing iodoforms surrounded by glutoid *q.v.*, are prepared. If the pancreatic secretion is active, the capsule is dissolved and the iodoform set free. Iodine in the form of iodides and iodates can then be demonstrated in the saliva by testing with chloroform and a little dilute nitric acid. The test is a useful means of demonstrating, firstly the length of time that food (in this instance the capsule) remains in the stomach, and secondly whether the pancreatic secretion is active or not. If no iodine reaction is obtainable in the saliva after the administration of the capsule it may be concluded either that the capsule has not passed from the stomach, or that the pancreatic secretion is in abeyance.

An individual suffering from pancreatic infantilism took a capsule. No iodine could be detected in the saliva, but the capsule had passed the stomach, for it was found undigested in the stools. A healthy person was tested in a similar

manner and the iodine demonstrated in the saliva. The patient before mentioned took, as a second experiment, a capsule of Iodoform, and one hour afterwards a dose of Pancreatic Extract was given—in two hours the iodine could be demonstrated in the saliva.—Byrom Bramwell, *Clinical Studies*, vol. II., 1904, p. 350; *vide also* M.P. i./07,383, 394. *See also* **Formagules**.

Another test is the administration of 2 to 3 ounces of Sugar before breakfast. The urine is tested in a couple of hours, when sugar is present disease of the pancreas is suspected.

Pancreatic Infantilism is improved by administration of Pancreatic Extract $\frac{3}{4}$ and 2 grains—0.05 and 0.15 Gm. respectively.

Ceratum Iodoformi, R.D.H. Iodoform 1, Hard Paraffin 1.

Collodium cum Iodoformo.

Iodoform 1, Flexible Collodion 12. P. Jap. and Fr. Cx. 1 in 10.

Dissolve. Used as a pigment to venereal sores.

May also (Am. Jl. Ph., 1906,472) be made 5% with Acetone Collodion *q.v.*, and 5% with Acetic Ether Collodion *q.v.* (10% will not dissolve).

Emulsio Iodoformi, U.C.H., G.H.

Iodoform, in fine powder, 1 (Alcohol 90% *q.s.* to moisten, St. Bart's., G.N.C., G.H.), Glycerin 7, Boiled Distilled Water 2. Mix well in above order. *For injection into sinuses.*

L. H. has Iodoform 1 shaken in Formaldehyde solution 10% 2; allow to stand, decant the liquid and add sterilised Glycerin to 10.

In tuberculous abscess in connection with caries of the cervical spine,—injected; benefit doubtful.—Pr. Oct. '07,829.

Lister used simply 1 in 10 of glycerin. In **Glycerinum Iodoformi, K.C.H.**, the Iodoform is washed with 1 in 20 Phenol Solution. Sir W. Watson Cheyne has recommended the Iodoform to be sterilised by soaking it three days in 5% Phenol Solution containing Perchloride 1 in 2,000.

Tuberculous joints, abscesses in, treated by.—B.M.J. i./08,2.

Most effective before caseation has occurred. The Iodoform crystals should be large,—toxic effects in this way avoided. For filling a cavity in the bone, after removing caseating tissue, Iodoform 1 and Boric Acid 4 is useful.—B.M.J. ii./09,331, 387, 950. *See also* L. ii./08,1605.

Injectio Iodoformi, U.C.H.

Iodoform, in fine powder, 1, Mucilage of Tragacanth 2, Water 7, *for Bladder Injection* this is less irritating than the Glycerin Emulsion (should be diluted 20—40 times with warm water). C. L. T. E. has Saturated Solution of Iodoform in Ether 1, Olive Oil 2. For injecting in gaitre.

A case of lupus of 13 years' standing completely cured after every treatment had been tried, including Finsen lamp, by, firstly, films of cotton wool soaked in Hydrogen Peroxide 10 volume, and every second day intravenous injection of 15 minims of an ethereal solution of Iodoform plus Liquid Paraffin.—B.M.J. i./07,744.

Hip-joint disease—Iodoform 10, Creosote 2, Olive Oil 90, Ether 40. Doses of 4, 6, 10 and 15 Gm. injected every 8 or 10 days. The Iodoform weakens virulence of the bacilli.—B.M.J. i./08,50.

Tuberculous abscess injected with 10% Iodoform in Glycerin—the Glycerin may be too dehydrating causing a pouring-in of serum into the cavity and preventing adhesion of the cut surfaces of the wound (by some said to be absorbed again leaving a coating of Iodoform).—B.M.J. ii./06,924.

Iodoform Gauze, 5, 10 and 20% strength, 6 yard pieces; also 5% in 1 and 2 yards in cartons; soothes the pain of burns. Iodoform Lint is prepared 10°/o. Iodoform Gauze Bandages, 4 inches wide.

Iodoform Gauze soaked in adrenalin solution, packed into apex of vagina, has been employed to arrest hæmorrhage.—B.M.J. ii./04, 1054.

Insufflatio Iodoformi.

Iodoform 2, Starch (carefully dried) 1. In specific affections of the throat, antiseptic and mildly caustic.

Ⓔ Insufflatio Iodoformi Composita.

(W. H. has under the name of *Insufflatio Iodoformi et Morphinæ*) Iodoform 1 grain, Boric Acid 1 grain, Morphine Acetate, $\frac{1}{8}$ grain (Vict. Park has Bismuth Oxychloride 1 grain *vice* Morphine).

Iodoform and Eucalyptus Bougies. Cereoli Iodoformi et Eucalypti.

Iodoform, precipitated 5 grains. Eucalyptus Oil 10 minims. Theobroma Oil 35 grains.

To make a bougie 4 inches long. Used for acute gonorrhœa. For further details *see* earlier Editions.

When the symptoms have subsided, any remaining discharge may be treated by injections of tannin or sulphate or acetate of zinc.

Injectio Iodoformi Ætherea.

Phthisis treated by intravenous injection of Iodoform $\frac{1}{4}$ to $\frac{1}{2}$ grain doses in 40% Liquid Paraffin in Anæsthetic Ether. Strength 10 minims to contain $\frac{1}{2}$ grain of Iodoform. Cases received $\frac{1}{2}$ grain every second day on an average—it is desirable to begin with $\frac{1}{4}$ grain to see how patient will stand it. Some cough dreadfully at first and in these cases prognosis is unfavourable. Several cases received 70–90 injections with benefit.—Glasg. Med. Jl. May/09, 345.

Treatment of Tuberculous Abscesses by means of 5–10°/o Ethereal Solution of Iodoform with or without Olive Oil and with or without Guaiacol and Creosote 2°/o of each.—L. i./10, 637.

Iodoform Varnish (after Whitehead).

Benzoin 4, Storax 3, Balsam of Tolu 1, Purified Ether 40; dissolve, grain, and add Iodoform 4. Some formulæ give 2°/o Socotrine Aloes in addition. For surgical application.

Ophthalmic Discs (Gelatin) contain $\gamma\delta\delta$ grain of Iodoform.

Pasta Iodoformi R.D.H.

Iodoform 60 grains, Tannic Acid 10 grains, Liquefied Carbolic Acid *q.s.* Cinnamon Paste and Iodoform Paste are also used by Dentists and are understood to mean Iodoform Powder mixed into a paste with Cinnamon Oil. Used for treating septic root canals.

Pencils of Iodoform, the thickness of a No. 9 catheter, for uterine medication, are prepared with iodoform 15% in glycerin and gum acacia. **Pigmentum Iodoformi.** *See* Collodium cum Iodoformo p. 400.

Suppositoria Iodoformi (Off.) contain 3 grains (also 1 and 5 grains) in each with Oil of Theobroma *q.s.* For Essure of the anus and irritated hæmorrhoids. May also be used as a **Pessary**.

Unguentum Iodoformi (Off.).

Iodoform 1, Paraffin Ointment, yellow, 9.

R.O.H. has 1 in 7. U.S. has 1 in Lard 10.

Iodoform Vaseline (10%). A useful surgical dressing to wounds.

Collapsubes (with Catheter attachment) of Iodoform and Eucalyptus Ointment of each 5%, and of Iodoform 5% and **Ⓢ** Cocaine 2% Ointment are useful for the treatment of gonorrhœal diseases.

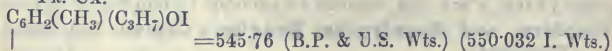
Wool Absorbent, Iodoform.

A dressing for wounds and sores.

To prepare this impregnate the absorbent wool under pressure with volume to weight of Ether 0.720, containing sufficient Iodoform to produce the desired 4, 10 or 50% article and expose to dry.

Succedanea or Substitutes for Iodoform.

* **Aristol.** *Syn.* DI-THYMOL-IODIDE. Thymolis Iodidum, U.S.
Fr. Cx.



Obtained by mixing a solution of iodine in potassium iodide with an alkaline thymol solution.

A reddish brown powder, containing about 45% Iodine; must not be heated above 100° F. **Soluble** in Alcohol and Oils, insoluble in Water.

Incompatible with alkalis, Mercuric Chloride, Metallic Oxides or anything decomposing Iodides.

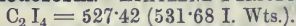
Used for psoriasis, lupus, eczema, and for ozæna; as dusting powder alone or diluted 5 to 50%. Ointments 2 to 10% and Pastes also employed. For blepharitis and conjunctivitis 10% in sterile Sesame Oil Solution is suggested, also for burns and ulcerations.

For chronic skin ulcers equal parts of Thymol Iodide and dried Ferrous Sulphate. Applied after washing.—L. i./09,1224. P.J. ii./09,190.

Suppositoria Aristol contain 1 grain each and weigh 15 grains (Theobroma basis), for hæmorrhoids.

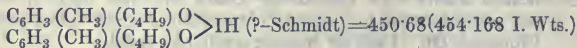
'Collapsubes' of Aristol Ointment 10% for venereal diseases of the urethra.

Di-iodoform.—ETHYLENE PERIODIDE. Fr. Cx.



In yellow crystals, 90% iodine, almost inodorous, soluble in chloroform and slightly in alcohol and ether, insoluble in water; partly decomposed by light.

* **Europen.**—ISO-BUTYL-ORTHO-CRESYL-IODIDE.



A yellow powder, containing 27.9% of iodine, insoluble in water and glycerin, soluble in alcohol; must not be heated. **Incompatible** with starch in presence of fats, metallic oxides, mercury salts. Decomposed by heat. Powder or ointment (1 to 10%) in simple and venereal ulcers, use otherwise as Iodoform.

Employed as Iodoform substitute, useful mixed with Boric Acid equal parts.—B.M.J.E. i./09,36.

Formidin. (Capsules contain 5 grains).

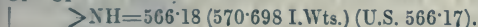
Stated to be METHYLENE-DI-SALICYLIC IODIDE $\text{C}_{15}\text{H}_{10}\text{O}_6\text{I}_2$. *Dose.*—1 to 5 grains (0.065 to 0.32 Gm.).

A white powder insoluble in water, alcohol, and dilute acids.

It decomposes in the presence of alkali, hence used as intestinal antiseptic. In general an odorless iodoform substitute. Applied locally in skin affections, non-irritating.

Its action is stated to be due to the splitting off of salicylic acid, formalin and iodine but the iodine content is somewhat less than theory demands—the theoretical amount being about 46%.—B.M.J. i./o8, 1124.

* **Iodol.**—*Syn.* TETRA-IODO-PYRROL. U.S.



Dose.—1 to 3 grains (0.065 to 0.2 Gm.).

An almost odourless crystalline, brownish powder, containing 89% iodine, obtained by acting on pyrrol with iodine in presence of alcohol. It explodes if rubbed with mercuric oxide. Decomposes at 140° C.

Soluble 1 in 145 of glycerin, 1 in 6 of absolute alcohol, 1 in 21 of 90% alcohol, freely in ether; also in chloroform and oils. Insoluble in water.

Uses.—Wounds are dressed with it, its application is painless; useful in buboes, indolent and corneal ulcers, and ear discharges.

An ointment, 1 to 5 of vaseline, and a solution, 3 parts to 35 of alcohol and 62 of glycerin, have been used for granular and chronic conjunctivitis with good results; and a solution of iodol 1, alcohol 3, glycerin 21, as a pigment in diphtheria. Also iodol 2, menthol 1, almond oil 96, for throat spray or pigment.

1% of menthol covers odour of iodol, and is said to render it more active.

'Collapsubes' with catheter attachment of iodol ointment 5, with eucalyptus oil 10% with soft petroleum basis are useful for urethral medication in the treatment of gonorrhoea.

* **Griserin. Novum.**

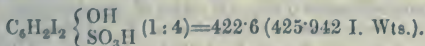
Dose.—5 to 8 grains (0.32 to 0.52 Gm.). To be taken in the morning fasting and two hours or so before bedtime.

Griserin consists of a mixture of Iodo-oxy-chinolin-Sulphonic Acid with 20% Sodium Bicarbonate. The mixture is soluble about 1 in 20 in cold water. Internal bactericide used in tuberculosis, lupus, psoriasis, eczema.

* **Vioform (Iodochloroxy-quinoline, P. Helv).**

Yellowish powder melting at 170° C. Insoluble in water. Emulsion: Vioform 1, Glycerin 4, Sterilised Water 4, Alcohol 2. Antiseptic and hæmostatic.

* **Sozoidol. Di-Iodo-para-Phenolsulphonic Acid.**



Contains 59% of Iodine and 7.5% of Sulphur. Has been combined with Sodium $\text{C}_6\text{H}_2\text{I}_2(\text{OH})\text{SO}_3\text{Na} \cdot 2\text{H}_2\text{O} = 480.24$ (483.966 I. Wts.), Potassium $\text{C}_6\text{H}_2\text{I}_2(\text{OH})\text{SO}_3\text{K} = 460.43$ (464.034 I. Wts.), Mercury $[\text{C}_6\text{H}_2\text{I}_2(\text{OH})\text{SO}_3]_2\text{Hg} = 1240.8$ (1249.868 I. Wts.), and Zinc $[\text{C}_6\text{H}_2\text{I}_2(\text{OH})\text{SO}_3]_2\text{Zn} \cdot 6\text{H}_2\text{O} = 1015.39$ (1023.334 I. Wts.) to form salts which are used as odourless substitutes for iodoform.

The first mentioned is **soluble** 1 in 14 of water. It has been given internally in doses of 15 grains for diabetes. This and the Potassium Salt in 2 to 10 ointments and powders are used externally to wounds, abrasions and skin affections. Lotion 2 to 10% for gonorrhoea, conjunctivitis, and as mouth-washes.

Sozoidol-Mercury in yellow powder, injected in syphilis v.p. 361. It is applied to venereal sores, cracked nipples and parasitic skin diseases.

* **Traumatol**, an Iodo-Creosol compound.

A greyish amorphous powder, used as a non-toxic antiseptic. A Liquid preparation is also made.

IODUM. (*Off.*)

I = 125.9 B.P. and U.S. Wts. (126.92 I. Wts.).

The following medicinal inorganic iodides contain the halogen in these proportions:—Ammonium Iodide (NH_4I = 143.84) 87.5%, Lithium Iodide (Anhydrous) (LiI = 132.87) 94.75%, Potassium Iodide (KI = 164.73) 76.43%, Rubidium Iodide (RbI = 212.42 I. Wts.) 59.75%, Sodium Iodide (NaI = 148.78) 84.62%, Strontium Iodide ($\text{SrI}_2 + 6\text{H}_2\text{O}$ = 446.02 U.S. Wts.), 56.45%.

Solubilities.—In Water 1 in 5,000, readily in Alcohol 90%, Ether 1 in 4, Chloroform 1 in 30 about, slightly in Glycerin. Very soluble in Potassium Iodide Solution.

Antidotes.—Stomach pump, Emetics, (Apomorphine Injection), Starch, Saccharated Solution of Lime, Demulcents and Stimulants; finally, Opium.

Sodium Hyposulphite would be the most rational antidote chemically speaking. By the combination of the two substances Sodium Tetrathionate is produced which is stated to be non-toxic.

A 10% solution will combine (decolorise) $\frac{1}{2}$ its weight of Tincture of Iodine.

N.B.—This on a rough calculation will be seen to refer to the F.I. Tincture of Iodine. In the case of the B.P. Tincture read *nearly twice its weight* of Tincture of Iodine.

In accidental poisoning the patient should sip the solution during intervals of vomiting.—M.P., Aug. 11./09, 148.

Uses.—Rarely employed internally in free state, *see* Tinctura Iodii. Has, however, been given in epilepsy, and to reduce obesity.

Externally.—Irritates the skin, if too strong will blister and cause scars. Used as counter-irritant painted on chilblains, over inflamed joints, spots of pleurisy, sore gums and scrofulous glands, to abort boils, and is injected in form of tincture to cure hydrocele, *c.f.* also Morton's Fluid for spina bifida. For ringworm (*c.f.* Coster's Paste). Is inhaled to check profuse expectoration in chronic bronchitis.

Iodine is a powerful germicide. A 1% solution has been stated to be equal to Mercuric Chloride 0.5% .*c.f.* List of Disinfectants.

Catgut (*q.v.*) is sterilised by immersion in 1% solution.

It has been seriously discussed whether a tolerance of Iodine is not a proof of the existence of syphilis.

Skin rash due to Iodine may resemble variola.

Poisoning by 4 ounces of liniment.—L. i./05, 793.

It is stated that absorption may be effected by painting the skin with liniment in the presence of red light only (excluding actinic rays subsequently) without either blistering or staining.

Tuberculous testes well treated by (Durant's) injections of 1% aqueous solution (made with potassium iodide) into the epididymis. At first only few drops are given. 30 injections alternate days. Also if satisfactory in other parts of the body.—B.M.J.E. ii./08, 12. See also DURANT'S INJECTION.

Uterine cavity is swabbed out with 'Iodine' to prevent puerperal sepsis.—L. ii./09, 339. In puerperal sepsis the uterus to be washed out thoroughly

and promptly with 5 or 6 pints of 'Iodine Solution'—strength not stated,—a reliable antiseptic.—B.M.J. ii./09,1038. *c.f.* *Injectio Iodi*.—C.H.W.

Incompatible with alkalis, alkaloids, starch, soluble lead and mercury salts, carbolic acid, chloral hydrate and sodium thiosulphate.

Calcii Iodidum, $\text{CaI}_2 = 291.51$ (293.93 I.Wts.).

Dose.—2 to 4 grains (0.13 to 0.26 Gm.). Given in *dilute* aqueous solution. Deliquescent crystalline powder. On exposure to light or air will give off Iodine: best preserved in amber bottles. Excellent results in foul ulcers and chilblains.—B.M.J.ii./06,138,1718; i./07,991.

Eczematous patch on tibia measuring 7 × 3 inches cured by 4 grain doses thrice daily. Also diabetic ulcer on foot (with Codeine in addition); also seat of recurrent mammary carcinoma (previously removed) were treated with.—B.M.J. ii./07,909.

Elixir Calcii Iodidi.—*Dose*.—1 drachm (3.5 Cc.), Calcium Iodide 3 grains, Aromatic Elixir 1 drachm. Has been employed in tuberculosis.

Chloroformum Iodi, 1 in 30.

Stains less and does not promote desquamation, itching or dermatitis like alcoholic solution.—*c.f.* L. i./06,1190.

Glycerinum Iodi.

Iodine 1, Glycerin 50. Heat carefully till dissolved—is not a mere solution, some decomposition of glycerin takes place. A useful pigment, the skin does not harden by repeated application, nor peel off. Water helps solution, *c.f.* Morton's Fluid.

Glycerinum Iodi, G.H., and C.X., is Morton's Fluid, *sine Aqua*.

Injectio Iodi Hypodermica Fortissima.

Iodine 360 grains, Potassium Iodide 360 grains, Distilled Water $1\frac{1}{2}$ drachms. Should measure exactly 1 ounce and contain $\frac{3}{4}$ grain free Iodine in each minim. *Dose*.—3 to 5 minims for fibrous bronchocele.

A grain of Iodine may be held in solution in a minim of fluid, by employing sodium Iodide in the proportion of Iodine 3, Sodium Iodide 2, and Water *p.s.* to 3 volumes.

Iodo-Glycerin Solution. *Injectio Iodi*, C.L.T.E. *Morton's Fluid*.

Iodine 10 grains, Potassium Iodide 30 grains, Water 25 minims, dissolve and add Glycerin to 1 ounce.

In *spina bifida* about 30 minims have been injected into the tumour, also injected into solid goitre.

Injectio Iodi, C.H.W. **IODINE DOUCHE**.—Tincture of Iodine 2 drachms, Water 1 quart.

Gangrene of the vulva, vagina and cervix treated by a douche of normal saline, cutting away the gangrenous parts, then giving a weak iodine douche, followed by packing with Balsam of Peru gauze.—B.M.J.F. ii./09,43.

Iodipin. * Jodipin 25% and 10%. *Syn.* **Iodinol**.—Analogous to Brominol, *q.v.*

Dose.—30 to 45 grains of the 25% = about 10 to 15 grains of Potassium Iodide. Hypodermically 30 to 90 minims (1.8 to 5.3 Cc.) of the 25% preparation.

Slightly warmed or for treatment of tertiary syphilis large doses (15 Cc.) are given on alternate days hypodermically—(15 to 20 Cc. doses hypodermically on 10 consecutive days.—L.ii./o6,1205.)

Soluble in ether, both the 10% and 25% iodinol and chloroform in all proportions, insoluble in alcohol.

An additive compound of Iodine and Sesame Oil, easily assimilated, prepared by repeated iodising of Sesame Oil by means of Iodine-Monochloride. The preparation is a thick yellow oil. The 25% has Sp. Gr. 1.23, and the 10% 1.025. The preparation is stated to be non-harmful, and to permit of lengthy and continuous administration of Iodine. Iodine can be detected in the urine within 10 minutes after a dose.

Either the 10% or 25% preparation may be used by inunction.

Capsules contain 2 grammes of the 25% = about 10 grains of potassium iodide.

A similar compound with 40% of Iodine has been made with Poppy Seed Oil.—P. J.ii./o1,65.

Iodine may be given in beer, wine, milk, shaken with syrup or emulsified as **Emulsio Iodinol**:—Iodinol 25% 2 ounces, Gum Acacia 1 ounce, Chloroform 12 minims, rub together and add quickly with vigorous agitation Water *q.s.* to 6 ounces. Dose of 2 drachms = about 12 grains potassium iodide.

Experiments with a 7.6% Iodine in Olive Oil.—B.M.J.E. i./o7,68.

Iodipin Tablets contain 3 grains of the 25% Iodipin, *i.e.*, $\frac{3}{4}$ grain Iodine = 1 grain Potassium Iodide. *Dose*.—Up to 90 grains (30 tablets) per diem.

Prepared with **Roborat** and administered in bronchial asthma, bronchitis arteriosclerosis, syphilis.

M./o8, devotes several pages to the results obtained with Iodipin in gout, arteriosclerosis, syphilis, tuberculous infections, bronchial troubles.

Iodinol cum Extracto Malti.

Dose.—1 ounce (30 Cc.).

Iodinol 25% 1, Malt Extract (thick) to 4. A palatable method of administration.

Uses of Iodipin and References.—Scrofulosis, convulsions of children, tuberculous induration of the larynx, pleuritic induration, facial paralysis, and syphilis have been treated by internal and local use. In actinomycosis markedly good results have been produced by Iodinol, and it has been found useful instilled for eye affections.

Uterine fibroids treated with Iodipin injections.—L. i./o3,958; B.M.J. ii./o4,1085.

Syphilitic disease of the nervous system—treatment by Potassium Iodide or Iodinol and Mercury. The two former can be administered in almost any quantity. Mercury can only be gradually introduced. They are equally useful, but mercury (in the form of oleate *q.v.*) is more powerful where there is inflammation. Potassium Iodide in 40 grain doses, thrice daily, was given as far back as 1847. Iodide or Iodinol should be given after the mercury treatment for 3 or 4 weeks, every 4 or 6 months; for 3 or 4 years.—Gowers; B.M.J. i./o3,773.

Found useful for inunction, also employed hypodermically in 15 minim doses.—Pr. July, 1904; gonorrhœal rheumatism 10 Gm. doses injected in affected region B.M.J.E. ii./o4,75.

Injected under the skin in arterio-sclerosis, aneurism, and syphilitic affections.

Large doses in angina. In locomotor ataxy 120 grains daily with best results.—*L. i.*/o6,1250.

Various cases treated with Iodipin hypodermically. The Iodine is slowly eliminated; aneurism, arteriosclerosis, angina pectoris, asthma, tertiary syphilis; good results in nearly all cases. It has, however, no effect on blood pressure.—*L.ii.*/o6,646.

So called virulent syphilis treated with Iodipin 15 to 20 Cc. hypodermically—painless and non-toxic.—*L.ii.*/o6,1205.

Iodipin taken by the mouth is passed practically unchanged through the stomach into the duodenum,—here it is acted on by the bile and pancreatic secretions and is emulsified. The absorption is the same as for all fats. The greater part of the iodised fat is ultimately stored up in the tissues, *e.g.*, bone marrow, liver, etc. Use in syphilis. Injections of 200 to 300 Gm. for a course. 20 Gm. may be injected daily, or every other day. Advantages and disadvantages of Iodipin detailed. Of little use where rapid action is desired. In case of threatened perforation of palate, cerebral gumma, etc., Potassium Iodine should be given.—*B.M.J. i.*/o9,1228.

If 300 Gm. of dry yolk of egg be extracted with Chloroform and the solution evaporated to 1 litre, the solution will absorb 2.5 Gm. Iodine (or 0.2 Gm. of Bromine). Warmed with 10 kilos of nut oil until the Chloroform is driven off, an oil is obtained which, shaken with an equal volume of water, forms a permanent emulsion. Stated to be suitable as a Cod Liver Oil substitute, and for external or subcutaneous use as a vehicle for medicaments.—Patent 1719, of 1906.—*P.J. ii.*/o6,723,723.

Iodipin with Phosphorus (Phosphor-Iodipin). An oily preparation containing Iodipin 10% with Phosphorus 0.0033%.

Dose.—1 drachm twice or three times daily. In rachitis and scrofulosis, especially in children.

Iodum Oleatum.

An Iodine-Oleic Acid compound containing 10% of Iodine. When thoroughly rubbed into any part does not stain the skin, but is rapidly absorbed, and its specific effect is soon apparent. Suitable for inflamed joints, enlarged scrofulous glands; should prove of value in tinnitus aurium.

Pigmentum Iodi Oleatum, C.L.T.E. Iodine 50 grains, Oleic Acid to 1 ounce. Stated to be non-staining and non-vesicant.

Liquor Iodi Oleicus, St. M.'s H. Iodine 1, Potassium Iodide 1, Oleic Acid to 20. A pale yellow liquid which stains the skin slightly on effunction.

Oleum Iodi (Iodised Oil) is a special preparation void of colour and non-staining—containing 10 grains of Iodine per ounce.

An elegant preparation (and stable) can be made by rubbing together Iodine 1 Gm., Sodium Iodide 0.25 Gm., and 1 or 2 drops of Glycerin, then adding prescribed amount of Cod Liver or other oil.—*P.J.ii.*/o9,64.

Liquor Iodi (B.P. 1885).—Syn. LUGOL'S SOLUTION.

Iodine 2, Potassium Iodide 3, Water 40.

Liquor Iodi Compositus, U.S. Iodine 5, Potassium Iodide 10 Water to 100. **Liquor Iodi Dilutus, U.C.H.** Iodine 5, Potassium Iodide 7.5, Water to 100.

Liquor Iodi Fortis, Strong Solution of Iodine (Off.).—Syn. LINIMENTUM IODI (B.P. 1885).

Iodine 5, Potassium Iodide 3, Distilled Water 5. Dissolve and add alcohol (90%) 36.

Sterilization of the skin of operation areas. An operator use Iodine Liniment to paint the line of proposed incision in a hernia case. It acted as useful antiseptic, the wound healing by first intention—also

used in a mastoid operation and in an appendicitis case with surprising results. Produced no irritation on the Spanish American Indian patients.—B.M.J.ii./09,504.

10% Spirituous Solution—‘practically the Liniment’—freely painted on the skin for use prior to operation.—B.M.J.i./09,332.

Tuberculous disease. After surgical operation sinuses swabbed out with this liniment—especially efficacious and permanent in tuberculous infections.—B.M.J.i./09,391, L.i./09,997.

Sterilizing of the skin of operation area by painting with the tincture: Liquor Iodi Fortis 1, ‘Spirit’ 3 (the Spirit being equal parts Methylated Spirit and water).—B.M.J.ii./09,368.

Mistura Iodi Composita E.L.—Tincture of Iodine 1 minim, Glycerin of Carbolic Acid 1 minim, Caraway Water to 1 drachm.

Pigmentum Iodi, U.C.H., Mid.H.

Tincture of Iodine 1, Strong Solution of Iodine 1.

Pigmentum Iodi, St. Th. H., has Iodine 100 grains, Potassium Iodide 100 grains, to water 1 ounce.

① **Pigmentum Iodi et Aconiti, K.C.H.** Tincture of Iodine 1 Tincture of Aconite (Fleming’s) 1. R.D.H. has the same, using official Tincture; also ‘Forte,’ using Liniment of Aconite.

Periodontitis is relieved by Iodine or Iodine and Aconite Pigment.

Pigmentum Iodi Æthereale.

Iodine $\frac{1}{2}$, Alcohol 90% 3, Methylated Ether $2\frac{1}{2}$. Has the advantage of drying rapidly.

Pigmentum Iodi et Olei Picis, Mid. H. *Syn.* (as Pasta Iodi et Picis COSTER’S PASTE.

Iodine 1, Light Oil of Wood Tar 4.

Mix carefully, applying heat if necessary. Ebullition generally takes place by the chemical action between the two ingredients, a part of the oil is oxidised and forms a resinous deposit.

Similar, but more irritating, applications are made by combining Iodine with creosote or *huile de Cade* in the same proportions as above.

Uses.—For ringworm of the scalp; after well shaking the bottle, it should be well brushed in with a stiff brush; a scab will be produced which should be removed in a few days, the part cleansed by soaking with oil, and then soap and warm water; after drying, more paste should be applied. It seldom causes pain.

Iodine, Chloral Hydrate, and Carbolic Acid, equal parts, have also been recommended for ringworm.

Pigmentum Mandl, T.H.

Iodine 6 grains, Potassium Iodide 20 grains, Oil of Peppermint 5 minims, Glycerin to 1 ounce. Use as a throat stimulant.

Iodised Absorbent Wool 6% rolls. To prepare, saturate cotton wool with ether containing sufficient iodine for above strength, as also sufficient glycerin to produce 5% in the finished article and expose to dry. Is said to have saved life in a case of double pneumonia.

Syrupus Iodo-Tannicus (Martindale).

Dose.— $\frac{1}{2}$ to 2 drachms (1·8 to 7·0 Cc.), containing $\frac{3}{5}$ to $2\frac{1}{2}$ grains of Iodine, in water or wine.

Iodine 2, Tannic Acid 2, Glycerin 20, Water 30, Syrup (with flavourings and carminatives) *q.s.* to 100.

Combine the Iodine and the Tannin in presence of the water, glycerin and syrup *q.s.* until no indication of free Iodine with starch, cool and add the other ingredients. This contains the Iodine to a great extent in the form of Hydriodic Acid.

Uses.—Of great value for enlarged glands in children and also as a tonic after removal of tonsils and adenoids. And is suggested in lymphæmia, anæmia, dysmenorrhœa and pulmonary affections.

Specially useful in cases of chronic lymphadenitis associated with or independent of adenoids. In atrophic rhinitis has given good results especially when combined with arsenic, and in simple bronchocele supplemented by the external use of Iodine Oleate or Unguentum Iodi Intinctum (*q.v.*)—B.M.J.i./04,724; L.i./04,994.

In arterio-sclerosis often more valuable than Iodides or Thyroid preparations.—B.M.J. i./06,126.

Ph. Ned. has—Mix Iodine Tincture (1 to 9) 10, Rhatany Extract 4, and add to Warm Water 80. Set aside in closed vessel 24 hours, or warm to 50° for 1 hour or until no iodine reaction is observed. Add Water 100, and dissolve Sugar 310.

Fr. Cx. has—add Iodine finely powdered 2, and Tannin 4 to Distilled Water 300, and keep at temperature of about 66° C., shaking from time to time. When Iodine is dissolved, and the liquid no longer turns starch paper blue, add Sugar 640. Contains 0.2% Iodine.

A formula for SOLUTO IODO TANNICO PHOSPHATADO containing 0.2% Iodine as a substitute for Cod Liver Oil in tuberculosis is also given in the Formulário dos Medicamentos of the Instituto of the Assistencia Nacional aos Tuberculosos at Lisbon, *c.f.*—C.D.ii/09, 194.

Syrupus Tann-Iodo-Phosphoratum.

Dose.— $\frac{1}{2}$ to 2 drachms. Contains 5 grains Monobasic Calcium Phosphate in 2 drachms of the Syrupus Iodo-Tannicus.—*Martindale.*

Vinum Tann-Iodo-Phosphoratum.

Dose.— $\frac{1}{2}$ to 2 ounces (containing 1 to 4 grains of Iodine). Is eight times weaker than the syrup above; is made with Malaga. These two preparations are elaborations of the Syrupus Iodo-Tannicus above, and are suitable as tonics for children and invalids.

Nourry's Iodinated Wine.

Dose.—Children 1 to 2 drachms, Adults $\frac{1}{2}$ ounce, with meals twice daily. Contains $\frac{1}{2}$ grain (0.05 Gm.) approx. Iodine and $1\frac{1}{2}$ grains (0.1 Gm.) approx. Tannin in $\frac{1}{2}$ ounce.

As a substitute for Cod Liver Oil and Iodides in lymphæmia, dysmenorrhœa, anæmia and phthisis.

B.M.J. i./09, 1308, found Alcohol 11.5%, Glucose 21.4%, Glycerin 6.6%, Iodine 0.33%. 1 ounce contains about $1\frac{1}{2}$ grains Iodine in combination.

Tinctura Iodi (*Off.*). **Dose** (for vomiting).—2 to 5 minims (0.12 to 0.3 Cc.).

Iodine 1, Potassium Iodide 1, Distilled Water 1; dissolve, add Alcohol (90%) *q.s.* to 40. U.S. Iodine 7, Potassium Iodide 5, Alcohol 94.9% vol. to 100.

Flavoring.—Syl Lavandulæ, Syl Vanille; Syrupus Aurantii.

Antidotes.—See under Iodum, p. 404.

F.I. agreed 10% strength by weight with Alcohol 95%. Fr. Cx. and P. Hung. have this with maximum single dose $3\frac{1}{2}$ minims, maximum during 24 hours 14 minims approximately.

C.R. points out *by weight* and Alcohol 95%, not official with us, the present tincture is 10 in 333·6 weight. The F.I. would necessitate reduction of dose to about $\frac{1}{3}$, and much inconvenience would be caused by altering this widely used preparation.

Tincture of Iodine is given as a tonic before meals in tuberculosis, also in the commencement of "la grippe" and ordinary colds, largely used on the Continent with excellent results. In vomiting of pregnancy invaluable, and small doses in sea-sickness.—B.M.J. ii./06, 1718.

Anthrax, in severe cases with œdema and erysipelas, injections of 1 to 2 drops of tincture at different points on the border of the erysipelas, about 5 to 10 Cm. apart using 8-17 minims in all. Repeated if necessary on following days. Also excellent in ordinary erysipelas, especially of the wandering type.—B.M.J.E. i./09, 40.

Endometritis, Curetting merely one factor in treatment. For Churchill's Iodine Tincture dissolve Potassium Iodide $\frac{1}{2}$ ounce in water 4 ounces, and Iodine 1,200 grains, then add Alcohol 90% to 16 ounces; applied subsequently twice a month for three months to the endometrium apparently diminishes the number of relapses following curetting.—B.M.J. ii./09, 1030.

This tincture cures chronic endometritis—dilatation, blunt curetting, swabbing, and subsequent drainage necessary.—B.M.J. ii./09, 1204.

Tinctura Iodi Ætherea.

Iodine 1, Pure Ether 40. For skin diseases.

Tinctura Iodi Decolorata B.P.C.

Iodine 2·5 (B.P.C. 1901 was 2·85), Alcohol 90% 27·5. Dissolve with a gentle heat, and add when cold Strong Solution of Ammonia 6·25. Keep the mixture in a warm place until decolorised, after which dilute it with Alcohol 90% *q.s.* to 100.

B.P.C. Supp. says use ammonia 5·5 instead of 6·25. Personally we experience considerable difficulty in combining the Iodine and Ammonia even with the 6·25.

It forms a useful application for chilblains and for painting on exposed affected parts. Some iodoform is formed in solution.

Tinctura Iodi Oleosa.

Iodine 1, Alcohol (90%) 9; heat to dissolve, and add Castor Oil 2. Repeatedly applied as a pigment, it does not crack the skin, as the tincture does.

Unguentum Iodi (Off.).

Iodine 1, Potassium Iodide 1, Glycerin (by weight) 3; dissolve, and add Lard 20. (U.S. Benzoated Lard 80.)

Ph. Ned. has Iodine 2, Potassium Iodide 3, Water 5. Simple Ointment 90 Unguentum Simplex Ph. Ned., is Yellow Wax 30, Sesame Oil 70.

Unguentum Iodi Intinctum, Stainless Iodine Ointment, Martindale.

Iodine 1, Oleic Acid 4, Soft Paraffin 14, Hard Paraffin 1.

Possesses iodising properties (*cf.* Iodum Oleatum, the liquid equivalent).

* Kelpion and Iodosol are stainless Iodine preparations.

Pasta Iodi et Amyli, U.C.H.

Starch, in powder, 1, Glycerin 2, Water 6; boil, and when nearly cold add Dilute Solution of Iodine U.C.H. 1.

Mix well. Useful to cleanse and heal foul sores, especially such as are syphilitic.—Tilbury Fox. It rapidly heals syphilitic ulcers, especially

those of the face; if applied on lint during the night, the sores may be hidden with calamine lotion during the day.

Iodalbacid. *Dose.*—15 grains (1 Gm.).

A brown powder, tasteless and odourless albuminous compound; said to contain 10% of Iodine. Has been given for epilepsy and syphilis; is suitable for prolonged administration.

***Iodomenin.** An insoluble Iodine—Bismuth-Albumin preparation. Insoluble in the stomach.

Tablets contain $7\frac{1}{2}$ grains (0.5 Gm.) Iodomenin, equivalent to 1 grain approx. (0.065 Gm.) Iodine. Usual dose 1 to 2 thrice daily. As Alkaline Iodide substitute.—M. '08, 249

Iodival *Syn.* ***JODIVAL.** MONO-iodo-iso-VALERIANYL-UREA.

Dose.—5 grains (0.32 Gm.) thrice daily in tablets.

A crystalline compound containing 47% of Iodine, as a substitute for Alkaline Iodides. Stated to pass the stomach unchanged and to be absorbed in the intestines. It is thought to enter the blood as the Sodium Salt $(CH_3)_2CH.CHI.CO.Na.N.CONH_2$, being slowly absorbed.

Glycogen Iodi. *Syn.* IODOLOSE.

Dose.—15 to 30 drops in red wine or tea. This preparation is a dark brown solution stated to contain $\frac{3}{8}$ grain Iodine in 20 minims.

It is described as a readily assimilable non-irritant organic Iodine compound—superior to the alkaline Iodides in action, and does not produce iodism, *e.g.*, iodic acne. Syphilitic glossitis has been treated.

* **Tiodine, Thiosinamin-ethyl-Iodide.**

$C_6SN_4H_{13}I$. *i.e.*, $S = C \begin{smallmatrix} NH.C_3H_5 \\ NH_2.C_2H_5I \end{smallmatrix} = 270.06$ (272.114 I. Wts.).

An organic Iodine compound for injection, painless and well tolerated—no iodism produced.

Prepared by heating Ethyl Iodide and Thiosinamin under a reflex condenser. Forms white crystals melting at $68^\circ C$. **Soluble** readily in water, sparingly in Alcohol.—P.J. ii./08, 166.

Ampoules are prepared containing 3 grains (0.2 Gm.) of Tiodine.

Dose.—The contents of one ampoule every other day.

***Iodolysin.**—A similar preparation, soluble, unirritating, stated to contain 43% Thiosinamin and 47% Iodine. **Iodolysin Solution** for oral use, 30 minims, containing 1 grain Thiosinamin and 1 grain Iodine, also **Injection** (hypodermic), 15 minims, containing $1\frac{1}{2}$ grains of each, and **Pigment** (local) are prepared. To soften cicatrices and promote absorption of fibrous tissue,—œsophageal and urethral strictures, in chronic arthritis, arteriosclerosis, deafness and paralysis.

Osteo-arthropathy, a case of, seemed to have improved under.—L. i/10, 28.

Iodalbin. *Dose.*—5 to 10 grains up to as much as 60 grains per diem.

A rust-coloured powder. An insoluble Iodine proteid Compound,—Iodine content $21\frac{1}{2}\%$. Readily soluble, however, in alkaline intestinal juice. Therapeutic effect of Alkaline Iodides without gastric irritation, employed in syphilis, rheumatism, and other conditions requiring a powerful alterative. Rarely causes gastric disturbances. **Capsules** contain 5 grains.—L. i./07, 1169.

***Iodoglidine.** *Dose.*—2 to 6 Tablets daily.

An organic compound of Iodine with vegetable albumen (wheat gluten). Non-depressant. Stated to be split up almost wholly in the intestine. The Iodine is thus gradually absorbed and the preparation is, therefore, non-toxic.

Uses.—In arteriosclerosis, gout, rheumatism, syphilis and tabes.

Acidum Hydriodicum. *Syn.* Acidum Hydriodicum Dilutum,

U.S. *Dose.*—5 to 10 minims (0.3 to 0.6 Cc.) in syrup.

May be made by interaction of potassium iodide, potassium hypophosphite and tartaric acid in hydroalcoholic solution.

A colourless, sour liquid, which becomes dark in colour on exposure to light. If this happens on keeping shake with a little dilute Hypophosphorous Acid. Sp. Gr. 1.085 = about 12% of Hydrogen Iodide. (U.S. contains 10%.) $HI=126.9$ (*Off.* and U.S. Wts.) (127.928 I. Wts.).

Flavoring.—Syl Rosæ, Syl Origani; Syrupus Tolutanus, Syrupus Zingiberis.

Syrupus Acidi Hydriodici, U.S., B.P.C.

Average dose.—60 minims (well diluted).

Diluted Hydriodic Acid 1, Water 3, Syrup 6. Contains 1% HI.

Glycerinum Acid Hydriodici.

Dose.—20 to 60 minims (1.2 to 3.5 Cc.).

Experiments which we have conducted show that Dilute Hydriodic Acid, U.S., 1, Glycerin $4\frac{1}{2}$ and Water $4\frac{1}{2}$, produce a glycerole with good keeping qualities. Contains 1% hydriodic acid. (The Hydriodic Acid, U.S., already contains a proportion of hypophosphorous acid.)

*Gardner's Syrup "Hyodin," contains about $1\frac{1}{4}$ % of Hydrogen Iodide.

Dose.—1 to 3 drachms in water.

Vapor Iodi Ætherealis.

Iodine 3 grains, Ether 2 drachms, Carbolic Acid 2 drachms, Creosote 1 drachm, Alcohol 90% 3 drachms. Ten minims to be used in an inhaler, *e.g.*, the 'Ozonie.' Thymol may be substituted for creosote.

*Jothion. Di-iodo-isopropylalcohol. Glycerin Di-iodo-hydrin.

$CH_2I \cdot CHOH \cdot CH_2I=309.41$ (311.888 I. Wts.).

Dose.—By inunction $\frac{1}{4}$ to 1 drachm weight suitably diluted in 25% or less Ointment. *Caution.*—Is not given internally.

A yellowish oily liquid (Sp. Gr. 2.5) prepared by heating α -dichlorhydrin with potassium iodide solution. Contains about 80% iodine.

Incompatible with water.

Soluble 1 in 75 of water. Being readily absorbed by the skin is employed for inunction of iodine in inflammatory conditions, scrofula, pulmonary tuberculosis, bronchial asthma, &c. Also for chronic metritis and in after-treatment of contusions.

*Iothionol. 25% Solution in Olive Oil.

Iohydrin is a similar product identical chemically being also Di-iodo-iso-propylalcohol and used for the same affections.

Unguentum Iohydrin 25% or less as ordered in Lanolin basis is most suitable strength. It should not be applied to any delicate portion of the body—pure Iohydrin alone is caustic.

*Sajodin. *Dose.*—5 to 15 grains (0.3 to 1 Gm.). up to 90 grains per diem after meals.

The name given to the Calcium Salt of mono-Iodobehenic Acid (Iodo-Sebacic Acid) $(C_{22}H_{42}O_2I)_2Ca=963.07$ (970.602 I.Wts.). A tasteless powder containing about 26% Iodine and 4% Calcium, **insoluble** in

water. In syphilis, bronchial asthma, arterio-sclerosis, &c., given as Potassium Iodide.—L. i./06,1254, *c.f.* also B.M.J.E. ii./06,48 for treatment of similar complaints with, and B.M.J. i./07,940. Successful in gummata of the skin and bone.—B.M.J.E. i./07,210.

***Sabromin.** *Syn.* Calcium Dibromobehenate ($C_{22}H_{41}Br_2O_2$)₂Ca = 1026·67 (1034·426 I. Wts.)

Dose.—15 to 45 grains (1 to 3 Gm.) in powder or tablets (7½ grains). Contains 29·0. approx. Bromine. White powder insoluble in water and alcohol. An alkaline Bromide substitute stated to have less tendency to produce bromism, the absorption being slow.—C.D. ii./08,822; B.M.J.E. i./09,3236.

TO ESTIMATE THE 'IODINE NUMBER' OF A FAT OR OIL.

The Iodine Number indicates the percentage of iodine capable of absorption. Hübl's Iodine Solution is prepared: Dissolve Iodine 25 Gm. in Absolute Alcohol 500 Cc.; dissolve Mercuric Chloride 30 Gm. in a further 500 Cc. of Absolute Alcohol, filter and add to the first solution. Allow to stand 12 hours or so, and ascertain the strength of iodine by a standard sodium thiosulphate solution in the customary manner.

0·8 Gm. of the fat, or 0·3 Gm. of a drying oil, or 0·4 Gm. of a non-drying oil, is accurately weighed out and dissolved in 10 Cc. of chloroform. To the solution in a stoppered vessel 20 Cc. of the Hübl's Solution are added, and if the mixture becomes decolourised on standing a short time a further 10 Cc. of Hübl's Solution are added. Then add 10 to 15 Cc. of Solution of Potassium Iodide B.P. and dilute the whole with 150 Cc. of water. Determine the free iodine with thiosulphate and starch, shaking thoroughly. Conduct a blank experiment with the same quantities of chloroform, iodine, &c., deduct the quantity required in the original experiment from the volume of the thiosulphate solution used in this blank experiment and calculate into the equivalent of iodine—this again is to be calculated into units per cent. of the oil.

Example.—0·8 Gm. of a fat required 36·7 Cc. of Thiosulphate Solution = 29 Cc. = 0·3651 Gm. Iodine, therefore 100 of the fat combines with $\frac{0·3651 \times 100}{0·8}$

Iodine = 45·6 the Iodine Number of the fat.

IODINE NUMBERS (*Allen*).

Almond Oil 97·5–98·9	Lard 59·0
Apricot-kernel Oil 99–102	Linseed (boiled) Oil 148
Cacao-butter 34·0	Linseed (raw) Oil 156–160
Castor Oil 81·0–84·7	Neatsfoot Oil 66·0
Cod-liver Oil 140–150 (4 hours)	Olive Oil 81·6–84·5
Cottonseed Oil 105–108	Sesame Oil 105–108
Human Fat 61·5.—L. ii./07,691.	Sperm Oil 84·3
Japan Wax 4·2	Stearic Acid 21·7 (<i>c.f.</i> p. 78)

Some authentic oils extracted with full data.—Y.B.P., 1907, 112.

Fats dissolve more than 5 times as much nitrogen as an equal volume of water or blood plasma. Caisson disease depends on this.—L. ii./07,691.

Comparative examination of the Halogen absorption of oils by Hübl's and other methods; the bromine method of McIlheney is better than the iodine ones.—P.J. ii./09,146,201

IONTOPHORESIS.

Syn. KATAPHORESIS, MEDICAL IONISATION.

In the dissociation of a molecule of a substance—inorganic or organic in solution—the nascent particles of the elements are called 'ions.' They are charged with electricity and are in rapid motion, The + charged

are called 'Kathions' and those — charged 'Anions.' Various agencies in addition to electricity are capable of causing the splitting up of compounds with the formatton of ions, *e.g.*, heat, light, and Rontgen Rays. Dilute solutions of substances contain free ions of the substances. Dilute Hydrochloric Acid can be electrolysed (split up) into its constituents Hydrogen and Chlorine which in their ionised condition appear at the poles of a battery, the Hydrogen at the **Kathode** (negative pole) and the Chlorine at the **Anode** (positive pole). On reaching their respective poles they lose their existence as ions. Arrhenius views that all solutions capable of conducting electricity contain molecules *already* dissociated.—*C.f.* Newth 96 *et seq.*

When zinc and copper plates are in contact, *e.g.* by a wire, in dilute sulphuric acid, electricity passes across the junction from copper to zinc and then from zinc through the exciting liquid to the copper again.

Non-Electrolytes are substances not capable of conducting electricity, *e.g.*, pure water, aqueous solutions of Alcohol or Sugar, Benzene, and a large number of Organic Compounds which do not fall under the head of salts, acids or bases. Nitrobenzene, Ethyl Nitrate, Chloral, are not electrolysed. Furthermore, Glycerin, Chloroform, Vaseline do not dissociate electrolytes (*c.f.* the relative non-toxicity of Glycerin of Carbolic Acid). Leduc points out in particular that a 5% Aqueous Solution of Phenol applied to an ulcer of the leg as a permanent dressing may prove most serious, whilst an Ointment of the same strength will make an excellent dressing. Carbolic Acid and Glycerin, equal parts, can be injected into purulent foci providing water be avoided. In aqueous electrolytic solutions the + and — ions are equally diffused, the + electricity of the one (metals) exactly neutralising the — of the other.

The *Electrolytical Solution pressure i.e.*, tendency of different metals to become ionised when in contact with a liquid varies with different metals, *e.g.*, in the case of:—

Zinc, Iron, Lead, *Hydrogen*, Copper, Silver.

The metals on the left have electrolytic solution pressure greater than H and those on the right. The former deprive H ions of their positive charges and thus displace H in an electrolytic cell. They dissolve in acids with evolution of hydrogen. In the voltaic cell of Zn, Cu and H_2SO_4 , the Zn by its high Electrolytical Solution pressure tends to form + charged Zn ions, and in doing so becomes — charged, the Cu has almost no tendency to become ionised and acquires a positive charge.—Lewis Jones. In addition to these two classes Newth mentions a class midway termed half-electrolytes. The terms strictly apply to the actual liquids or solutions—it is, *e.g.*, the *aqueous solution* of sodium chloride which is the electrolyte, but for brevity he explains it is customary to understand that *an aqueous solution is intended* and to speak of Sodium Chloride as an electrolyte, sugar as non-electrolyte etc.

Paul and Krönig in 1896 found that solutions containing a toxic ion in the same proportion are equally antiseptic. One gram-molecule in 64 litres of either Mercuric Chloride or Bromide is more powerful than Mercuric Cyanide solution four times the strength, as Mercuric Cyanide undergoes less dissociation.—*L. i./07,523.*

In **Kataphoresis**—introduction into the tissues of medicaments by ionisation—a movement of the electrolyte, comparable with Osmosis, takes place under the current generally in the direction of its flow, *i.e.* from + to - pole. Fluid can in this way be made to pass through porous diaphragms, *e.g.*, the skin, but the migration of the ions is a more important consideration.

The **Kathions** (+ charged) travelling to the Cathode include H, Na, K, Li, Pb, Cu, Fe and Bi.

The ions of alkaloidal bases in solutions of their Salts are also set free at the positive pole and are therefore applied medically at the Anode. (Positive Pole.)

The **Anions** (- charged) carry this electricity to the Anode. They include most of the metalloids and non-metals, also the following groupings—OH, NO_3 , ClO_3 , $\text{C}_2\text{H}_3\text{O}_2$, SO_3 , C_2O_4 , PO_4 .

These must, therefore, be introduced for medical purposes under the Kathode. (Negative Pole.)

The name 'ion' (a traveller) was given to these by Faraday. The Anions travel *against* the current, the Kathions *with* the current.

The electrical capacity of the ions varies with the valency of the element. The ions of 1 gramme-molecule of hydrogen and all monovalent elements carry electricity equivalent to 96,550 Coulombs. Divalent ions carry twice the quantity and so on.

Kathions. MONOVALENT OR UNIPOLAR KATHIONS:—

H, NH_4 , K, Na, Li, Ag, also Hg(ous) and Cu(ous).

DIVALENT:—

Mg, Ca, Fe(ous), Ba, Sr, S, Zn, Pb, also Hg(ic) and Cu(ic).

TRIVALENT.—Fe(ic), Al, Bi and Sb.

Anions.—MONOVALENT.—OH, F, Cl, Br, I, NO_3 , ClO_3 , $\text{C}_2\text{H}_3\text{O}_2$ and the Anions of all Monobasic Acids.

DIVALENT.— SO_4 , SO_3 , S_2O_3 , CO_3 , S (Sulphide), C_2O_4 and all anions of dibasic acids.

TRIVALENT.— PO_4 and other anions of tribasic acids.

The neutralising power is dependent on the valency, *e.g.*, a trivalent Nitrogen Anion requires three monovalent Hydrogen Kathions for neutralisation. The halogens, as also Carbon, Sulphur, and Phosphorus show a variable valency.

The more a solution is diluted—up to a point—so much greater is the ionisation and rate of molecular conductivity.

Osmotic pressure is influenced by ionisation. It is in proportion in the case of electrolytes to the molecules plus ions in the solution. In the case of non-electrolytes the osmotic pressure is only proportional to the number of molecules.

Ionisation of atoms giving them energy of various kinds appears according to an interesting standpoint taken up by Tibbles, to indicate to some degree an intermediate stage between living and non-living matter. Living organic matter from (Organic) Carbon, Hydrogen, Oxygen, Nitrogen, &c., is the outcome of (ionic) biological changes. Ionisation, in his opinion, brings about the 'continuous adjustment of the internal relations of materials to the external relations,' the transformation of energy' and other forms of change."

The rate of absorption of Salts through animal membranes has been found to differ according to the proportion of contained ions. K, Na, and I were absorbed about equally. NH_4 and Urea were absorbed more rapidly, Ca more slowly, and Mg slowest of all.

Of the Anions Cl is absorbed most rapidly, then Br, I, NO_3 , SO_4 in this order. The taste of substances has by some been thought to be due to dissociation, *i.e.*, to the action of Ions on the tongue or nerve endings—*e.g.* the H ions in the case of

Acids. Richards (Amer. Jl. Chem./1898, xx., 121—126) points to the fact that a Hydrochloric Acid Solution of distinct acidity to the tongue is tasteless when neutralised by Potash.

A small amount of Sodium Acetate added to a dilute solution of Hydrochloric Acid diminishes its acid taste. This view is debated however (v. Tibbles, p. 22).

Ions in many cases are toxic to low forms of life. Cl, Br and I increase in this respect slightly with their atomic weights. The anions of Mineral Acids have slight toxicity for fungi. Those of HCl, HNO₃ and H₂SO₄ being less than $\frac{1}{3}$ of that of H Ions. From some experiments by Osbourne (Proc. Phys. Soc. 1905) it was thought that Sodium Ions are toxic and Calcium Ions antitoxic.

Ions are assumed by Tibbles and others to play an important role in the biology of the plant cell and thence to the animal world. In all biological processes heat is developed by transforming the energy possessed by ions in excess of that retained by the combined molecules.

Crystalloid substances are either electrolytes or non-electrolytes,—the former constitute the Salts, Acids and Bases,—the latter consisting mostly of organic substances such as Sugar or Urea. They readily pass through animal membranes, and have a strong affinity for water. Their ions play an active part in the well-being of the organism.

The Mineral Constituents of the human body in the concentration in which they are present are almost completely dissociated—the remaining molecules (undissociated) are neutral electrically.

Colloid substances exist in two forms designated by Graham 'Sols' for the liquid and 'Gels' for the jelly form. Colloids do not pass through animal membrane and their osmotic pressure is so low that they diffuse with utmost difficulty. They do not conduct electricity. A colloid solution consists of matter in suspension in very fine particles. The particles are electrically charged. Tibbles gives the name *Meres* to these particles (*Merus*, Latin=real, pure, that with which nothing is united). They possess energy, part of which is potential and part kinetic, by reason of their electrical charge, their chemical combinations, etc. In colloidal bodies such combinations appear to be always between ions and meres—to such are due many physiological processes.

Change from colloid to crystalloid in the organism and *vice versa* is continuously proceeding.

All crystalloids have the power of modifying the gelation of colloids but only the electrolytes have the power of precipitating them. The precipitating power of the electrolytes varies. Mg, NH₄, K, Na and Li increase in power of precipitation in this order, but the anions, — Sulphate, Phosphate, Citrate, Tartrate, Chloride, Bromide, Iodide, and Sulphocyanate inhibit the action of the metallic ions, and the power to prevent the precipitation of Proteins also increases in this order. Thus the Sulphate increase in precipitating power from Mg to Li, and on the other hand Sodium Salts decrease in precipitating power from Sulphate to Sulphocyanate in the order given.

In the living organism it is well known that the salts are held fast with great force, and this is an analogue of the affinity exhibited between the salts and the Proteins. According to Pauli all the Protein constituents of the protoplasm enter into the composition of this substance only in combination with ions.

Leduc is of the opinion that there is no sharp limit between solutions of crystalloids and colloids—all properties of the one are found in the other—the difference is only in degree. Colloids have enormous molecules, *e.g.*, those of Albuminoids, and hence their solutions have a feeble molecular concentration and feeble osmotic pressure.

The importance of acquiring knowledge of the osmotic pressure of the fluids of the body is evidenced in every day treatment, *e.g.*, in the use of 'Normal Saline Solution.' Application of pure water causing osmosis in mucous membranes is painful and the use of a too concentrated Saline Solution will cause blood corpuscles to part with their water and break up completely.

The readily diffusible substances Urea, Sugar, etc., are produced by decomposition of Protein or Carbohydrate during metabolism—these are fortunately non-electrolytes, they are ionised only very slightly or not at all—this is of the utmost importance to the organism.

All *Kathions* precipitate protein. They increase more or less irritability of muscle and nerve,—they excite intestinal activity and increase blood pressure.

Anions dissolve protein (inhibiting the action of Kathions in general). The Sulphates, Citrates and Tartrates precipitate protein because the anions are associated with the over-balancing properties of the metallic ions. They are therefore cathartics. But in the case of Nitrates, Bromides, Iodides, the anion predominates in effecting sedative action and decrease of blood pressure.

The cathartic and precipitating power run parallel in the previous type of substances.

Application of Ionisation, Medically,—

It should be noted that the introduction of medicamenta by ionisation brings about a substitution of the fresh ions for the ions of the organism. This may obviously be a more drastic procedure than introducing chemical substances by the stomach or subcutaneously, hence considerable caution is necessary both as to the purity of the substances, the strength of current used, and method of procedure.

Leduc lays special stress on the futility of our present day ointments and pomades,—the active ingredients of which, in many cases, cannot possibly reach the diseased part to be treated—they act only superficially,—this is not the case when employing electrolytic methods, by these one may introduce ions of many kinds to the 'very spot.'

Ionic medication has many advantages, which may be summarised as follows:—

Easy application.

Localisation of treatment.

Use of nascent particles of elements and atom-complexes.

Painlessness—relatively.

Many other points will be gleaned by reading the Summary of References, p. 418.

The effects of ionised drugs last much longer than those with oral administration.—L. i./09,756.

Antecedent soaking of the part is necessary and regard to the relative area of contact of the respective electrodes must be taken. Ionisation is only a part of the process of kataphoric medication. (See also JI. Inst. Elect. Engineers, Vol. XIX. No. 86 and JI. Soc. Arts. No. 1999, Vol. XXXIV., pp. 316—325). Electrical Medication was originated by Fabre Palaprat, in 1833—who wrote on the introduction of Iodine into the tissues.—L. ii./08,1553.

The kathions 'go down' the electric current, as Leduc says, and the anions 'up,' therefore under the anode the kathions penetrate the skin, while the anions will penetrate under the kathode. Fresh Absorbent Lint in several thicknesses is to be used under the pad and fresh solutions for each sitting.

The quantity of drug caused to penetrate is strictly proportional to the magnitude of current and the duration of its flow.

The Solution made of the strength desired (e.g., with a "Solube" or 'Sterile' for Ionic Medication, v. p. 425) is applied by means of a disc covered with a pad of a number of thicknesses of Lint or Absorbent Cotton Wool, or by a glass cup electrode. This, the *active* electrode, is covered with a piece of pig's bladder, which is capable of allowing the ions to pass. The *indifferent* electrode being applied in any convenient situation.

The Unit of Electromotive Force is the *volt*. Resistance of a conductor is stated in *ohms*. Strength of Current is expressed in *ampères*. The *ampère*

is the Current which an E.M.F. of 1 volt produces in a circuit where the resistance is 1 ohm,—for medical use the 1/1000 part, the *milliampère* is the Unit or Standard. It is measured by D'Arsonval's Milliampère-meter.

The *Coulomb* is the unit of quantity of current—it is delivered by a current of 1 *ampère* in 1 second.

The density of the current used $\frac{I}{S}$ (intensity divided by surface of the conductor) is of great importance in medical use. 100 milliampères introduced into a patient by a surface of 1 sq. cm. will produce a different effect from the same current traversing 100 sq. cm.—as could easily be imagined, each sq. cm. in the last case being traversed by 1 milliampère in place of 100.

One requires for ionising about 40—50 volts, which with a total resistance of 400—500 *ohms* will produce a current of 100 milliampères.

$$I = \frac{E}{R} = \frac{50}{500} = 0.100.$$

(Ohm's Law: Intensity of Current is equal to E.M.F. divided by the Resistance or $C = \frac{E}{R}$).

This may well be provided by 30 cells having an E.M.F. of about 1.5 volts joined up in series.

Resistance of the body may be calculated by Ohm's Law from the galvanometer reading and the electromotive force of the cells—*e.g.*, with 6 Leclanché cells the E.M.F. being 9 volts, if the current through the patient be 4 milliampères, the resistance may be found thus:—

$$R = \frac{E}{C} = \frac{9}{0.004} = 2.25 \text{ Ohms.}$$

In employing the continuous current from the electric mains in place of batteries or accumulators secondary circuits of high resistance are required by which the potential gradually changes.

Summary of Various Chemicals Employed by Ionisation, with References to their Uses.

The following is a short *résumé* of the Chemicals used and the results obtained by Kataphoresis. The medicament is carried through the tissues of the patient who is situate between the two poles. The list is not intended to be exhaustive; other substances suggest themselves for trial.

Leduc pointed out that using simple weak acid solutions the effect on the skin at the anode by the H ion is the same for all ordinary acids. Using dilute alkaline solutions one introduces OH ions at the kathode. In each case the sore produced by a long or strong application, has its own characteristics. The K or Na or Mg ions produce definite effects only when given in large amounts. The alkaline earth metals, however, produce characteristic destruction of the tissues. He instances effects obtained when using Calcium Chloride solutions—the surface at the anode seemed white as though impregnated with Calcium Carbonate or Sulphate. Oedema occurred and an indurating ulcer was formed.

Of all ions the most painful was that of Carbonic Acid.

Sulphuric Acid produces a smooth, hard, dry skin surface.

As already outlined, the + ions (basic radicles) in a solution undergoing electrolysis travel from the positive pole towards the negative, and the - ions (Acid radicles) move away from the - pole. If a patient separates the solution into two parts with 1 pole of the battery in each the - ions will pass into the patient to make for the + pole, and the + ions will be passing from the other side of the patient. These new ions displace those already in him (of the same electricity), these in turn displace more, and at his opposite side some of his own ions pass out into solution. The solutions can be different at the poles; one may at one time have Potassium Iodide on the - pole driving in Iodine and Sodium Chloride on the + pole introducing Sodium.—L. i./09,756.

Oily applications must be removed before treatment, as they are non-conductors of electricity.

Copper chain-mail electrodes are useful,—gold or platinum would be better. The latter should in particular be used with organic substances.

Details as to technique, for large electrodes, of about 50 square inches. Copper Gauze is used, having a covering of moist sculptors' clay and liut.—L. i./10,353.

Solutions for electrolysis must be made with utmost care with fresh distilled water. Materials should be washed in the same. Steriles and Ionic Solubes are prepared for the purpose. Whenever possible the metal of the anode should be the same as that of the electrolytic solution:—

Acids, whether for introducing the positive (Hydrogen) or the Hydroxyl (negative) ions should be used in 1 in 1,000 solution.—Leduc.

Centersiation of the glands of the skin can be shown under the anode by the penetration of the H ion.

Acid Salicylic. See Sodium Salicylate.

Adrenalin.—Introduced under the anode produces anæmic lines. These and 'an ivory whiteness' indicate the vascular absorption.

Alkaline Earth Metals, readily produce mortification of tissues. *vide antea*.

Ammonium Ions, no therapeutic effect, but used where no effect is required from the positive ions.—L. i./09,757.

Anilin as Hydrochloride has been used in lupus.—B.M.J. ii./08,1180.

Antiseptics, Powerful, can be introduced to whatever depth may be required.—Leduc.

Bases applied under the Kathode show the canterisation of glands by the penetration of the OH ion.

Bromine Ions have well marked sedative action.

Chlorine *vide* Sodium Chloride.

Cocaine (from the positive electrode) using a solution of the Hydrochloride 5 to 10% strength—the skin sensibility is abolished in 10 minutes; has given speedy relief of pain in tabes dorsalis (Gowers).—B.M.J. i/05,5. Suitable for minor surgery.

The following solution has also been advised.—Cocaine Hydrochloride 1½ drachms, Solution of Adrenalin (1 in 1,000) 2 drachms, Water *q.s.* to 2 ounces.—L. i./07,900. For further details on the method for producing

local anæsthesia *vide* Leduc, Appendix *p.* 62. No toxic effects have been observed. Useful for hæmorrhoids.

Cocaine administered in this way, the Cocaine Solution at the + pole and Sodium Chloride solution at the - pole gives a different effect to that by hypodermic injection. The anæsthesia is not diffused—it remains limited to the surface covered by the electrode. The ion appears to be introduced into the cell plasma, not into the circulation. There is at first a blanching followed by vasomotor paralysis, which gradually disappears, giving in a few weeks a pigmented spot persisting several months with a marked atrophy of the skin of the part.

In removing moles by epilation Cocaine solution 5% electrolytically for 5 minutes is useful.—Lewis Jones.

Finzi states that Cocaine Anæsthesia produced in this way is useless as the duration is short and there is marked painful hyperæsthesia afterwards. —L. i./09,756.

Copper Ions employing Copper Sulphate solution have proved effectual in ringworm. A copper electrode connected with the positive terminal has been employed in hæmorrhoids.

Treatment of cases of pelvic disease in women.—L. ii./09,68,97. Excellent results obtained with Copper and Iodine. Each micro-organism may have its own particular potent ion; Copper for one, Zinc for another, and so on.—*ibid.*

Copper Ionisation (Cupric Chloride Solution 1%) in obstinate discharge. Introduce the cervical and intra-uterine electrode through the speculum—this ensures asepsis and allows fluid to pass. The current must be reversed for about $\frac{1}{2}$ of the time to obviate pain. In some instances it is well to begin with Iodine, *e.g.*, a solution containing Potassium Iodide 2% and 0.2% Liquor Iodi.—L. ii./09,71.

Local chronic diphtheria of the ear well treated by Cupric Ionisation. Four applications spread over two months.—B.M.J. ii./09,519.

Trachoma has been treated with Copper Sulphate 0.5% with two to three milliampères for two to three minutes every few days. In four acute cases, conjunctiva nearly normal and four chronic cases discharged as cured.—B.M.J. ii./09,976.

For chronic endometritis confidently recommended.—B.M.J. i./09,89.

Copper from Copper Electrode demonstrated to have passed through 13 layers of thick paper.—L. ii./08,391.

Lupus erythematosus benefited.—L. ii./08,391.

Alopecia areata treated by 2% Copper sulphate ionisation.—Lewis Jones.

Gold Chloride applied to the skin at the anode causes coloration, Gold being +.

Iodine Ions lower blood pressure, influence metabolism of the thyroid and reduce inflammation.—Tibbles.

As a sclerolytic agent, especially for ankylosis following septic arthritis, but *N. B.* short 'seances' desirable as it is likely to be caustic—produces cauterization and pigmentation of the glands.

Iodine may be driven into the thorax using Sodium or Potassium Iodide on the lint and applied with the *cathode* to the part, using a current of 60

to 100 milliamperes—in arthralgias, neuralgias, etc. Administer with care to prevent burning.

Arthritis deformans well treated by kataphoresis of Iodine in form of Iodine liniment.—L. ii./o8, 1869.

Lithium Ions have been used for gout.

In rheumatoid arthritis (*e.g.* in wrists) radiant heat applied (for twenty minutes as a rule and as hot as can be tolerated) followed immediately by 20 minute kataphoresis of Lithium Iodide Solution 2% strength. Drug treatment *per os* in addition extremely important.—B.M.J. i./o9, 14.

For gout and rheumatoid arthritis Finzi finds a Lithium Salt on the positive with Iodine on the negative side of value. Oedema rapidly disappeared.—L. i./o9, 757, 1457.

Local Anaesthetic *vide* Cocaine.

Magnesium.—Magnesium ions (from the positive pole) using a Magnesium Sulphate Solution 20 grains to the ounce, have given good effects in multiple warts on the hands. Current 5 to 8 milliamperes—duration 15 minutes if possible.—Lewis Jones.

Ozæna benefitted.—B.M.J. ii./o9, 1301.

Mercury.—Preparations of Mercury or Potassium Iodide Preparations taken internally have little action on locomotor ataxy. Mercuric Chloride intramuscularly is of benefit however, and will cure. Cases of syphilis treated insufficiently at the beginning—possibly not recognised—produce locomotor ataxy. Mercurial Salts of Organic Acids are not dissociated and again Compounds where the Mercury is part of an atom-complex, give no mercurial effect. They may be painless, but at the same time devoid of action as they lack the Mercury (+) ion. Sodium Chloride added retards dissociation and reduces concentration of the Mercury ions, but here by diffusion in the blood and regulating action of economy the dissociation returns to what it would have been without the added Sodium Chloride.

It is much better to use dilute solutions so as to act in very feeble concentration at the point of injection. In place of a 1% Sublimate employ a 1 in 500 or 1 in 1,000 solution, *e.g.*, 5 to 10 Cc. doses of the following:—

Mercuric Chloride 0.2 Gm.

Sodium Chloride 1 Gm.

Distilled Water 100 Gm.

The injection to be given twice weekly.—Leduc.)

Metals, Heavy.—Ions of these are all more or less caustic (probably by coagulating albumin).

Morphine.—Toxic effects can be produced.

Potassium.—Ions like Ammonium. *q.v.*

Potassium Permanganate.—Applied to the skin at the kathode causes brown pigmentation in the tissues,—the Permanganate ion is immediately reduced, producing an Oxide of Manganese. The current passes into the skin only by the glands.

Pyrogallol.—Lupus said to have been cured.—L. i./o9, 757.

Quinine Acid Hydrochloride.—Leduc records a case of trigeminal neuralgia, with frequent attacks of Pain (convulsive tic), which after all forms

of treatment, including the removal of every tooth, although sound, on the side affected, was cured by 1% Quinine Hydrochloric Solution electrically applied.—Lewis Jones, p. 426.

Salts, Neutral.—With feeble degree of dissociation, which has no direct action on the skin, are used 1 to 5 % strength.—Leduc.

Silver.—Ions have been used for infective cystitis.

In ulcerative colitis benefit has been derived from electric enemata of 0.1% Silver Nitrate Solution. After lavage $1\frac{1}{2}$ pints of this solution are injected through a rectal tube in which is a copper wire connected with the + pole. Large clay electrodes are placed on the back and abdomen, and connected with the - pole. A current from 15–20 milliampères is passed for 15 minutes, and repeated from time to time. Zinc.—Ions also have been used. Both worthy of trial in mild cases.—D'Arcy Power, Pr. Aug. 09, 154.

Sodium Chloride.—Resolving influence on sclerotic and cicatricial formations by a kathodal stream (Cl. ions), using a slightly warm dilute solution (1 to 2 %) of this salt, applying the cathode to the affected region. The tissues receive the Cl. ions and part with the Na. ions—the exchange is said to benefit adhesions and cicatricial tissues. Ankylosis of joints recover their mobility without forcing or pain. The anode may consist of a bath for the feet or arms,—for further details see Leduc, p. 44. Up to 100 milliampères 'doses' in several sances is the usual treatment. Rheumatic scleritis and peri-scleritis yield remarkably.

Electrolytic use of Sodium Chloride.—A case of complete ankylosis of the fingers was treated by a bath of Sodium Chloride solution, taking the place of the cathode on two occasions $\frac{1}{2}$ hour each, with a current of 30 milliampères, with complete recovery of movement.—B.M.J. ii./08, 199.

Value not proved,—have also been used for corneal opacities.—L. i./09, 757.

Dupuytren's contractions treated by Chlorine ions.—B.M.J. i./09, 1301.

Sodium ions are like those of Ammonium, *q.v.*

Superfluous hairs, nævi, etc., are removed by electrolysis the saline solution of the body, *i.e.*, by producing Caustic Soda at the negative pole.

Bulbar paralysis treated by ionic introduction of Sodium, Lithium, Iodine or Salicylic radical, either by large pads applied over the occipital and cervical regions, or by means of Schnee local bath cells,—result *nil*. Further procedure was to use the same medicated electrodes with patient insulated and the pads connected with the + side of a static machine, the negative being earthed. Dischargers arranged to give powerful "Morton Wave" current. Result good, but patient died as the case was advanced. The Authors would advise for such cases intermittent electrical currents at high tension impregnated with drugs. Fletcher Little and Bokenham.—B.M.J. ii./08, 703.

Sodium Salicylate.—For painful pleuritis and intercostal neuralgia, 2 % solutions. Pain disappears under the influence of the Salicylic ion. Also good in tic douloureux of the face and sciatica. Infective cystitis has also been treated.

In neurasthenia Leduc has obtained good by using the solution for the frontal cathode, thus introducing the Salicylic ion into the cell plasma of

the affected part. Neuralgia following herpes has been effectually treated by Mackenna.

For psoriasis 1 % solution has been recommended.—Lewis Jones.

Corns yield to Salicylic ions.—P.J. ii./08 346.

Sciatica treated by Salicylic ionisation, the electrodes being of lead covered with absorbent material. The kathode is charged with 3 % Sodium Salicylate Solution as hot as possible—about 50°C. The patient lies upon the cathode, and the anode is applied to the abdomen, thigh and leg. Current generally reaches 200 milliampères. Remarkable results claimed.—B.M.J.E. ii./09,83.

1 % Solution of Sodium Salicylate on the negative pole applied over the eye in neuralgia gave in 12 séances complete and definite cure.—B.M.J. per C.D. i. 10,123.

Sodium Sulphide.—For psoriasis 0.5 % solution has been recommended.—Lewis Jones.

Strychnine.—Toxic effects can be produced. Note the ion in this case diffuses rapidly, sufficient to produce death in a few minutes.

Sulphuric Ions introduced by a current of 10 milliampères for forty-five minutes leaves a dry parched surface like varnish,—it becomes black and desquamates in three weeks.—Leduc.

Zinc Ions.—Antiseptic of the first rank. There is no wound which cannot be disinfected by its use.—Leduc.

Zinc Salts for use in an infected focus, *e.g.*, purulent otitis, should be dissolved in Glycerin or Oils, having a slight degree of dissociation,—and washing with water either before or after is to be avoided—so as to produce a slow dissociation of the remedial ions.

Zinc Ions in very feeble doses stimulate growth of the hair. Stronger doses may produce death of the tissue.

For coagulating effect—the best coagulating medium known to medicine. For menorrhagia 60—100 milliampères with the Zinc Anode for 20—30 minutes. The Zinc is not absorbed.

Endometritis well treated with a uterine Zinc Anode. Infective cystitis has also been treated, also old-standing ozæna.

For rodent ulcer the Zinc electrode is wrapped in lint soaked in 2 % Zinc Chloride Solution. It is attached to the + end of the battery and the negative electrode is soaked in Saturated Salt Solution—applied to nape of the neck—within limits it should be as large as possible. The current is to be applied gradually and cut off equally gradually to prevent shock—2 to 3 milliampères are used for each sq. cm. of surface. A reaction ensues and subsides and healing may be effected in 10 to 14 days. A second application is not desirable until fourteen days after the first. Cocaine may be ionised into the part beforehand if desired.

The zinc electrodes must be covered with two or three layers of lint wetted with a 4 % solution of zinc sulphate. A number of such zinc electrodes of different sizes may be kept ready in a solution of sulphate of zinc. These should not be touched with the fingers, as sodium chloride and other impurities may be introduced. The zinc disc is held over the rodent ulcer, the circuit is closed, and the current slowly turned on until a current of ten

milliampères is passing. The application is continued for ten, twelve, or fifteen minutes, according to the thickness of the individual ulcer. Patients can bear up to ten milliampères without complaining. The application gives a burning sensation like a mustard plaster. The Zinc Ions seem to remain in the cells of the part for some time. The rate of movement of the ions in such a case is probably less than 1 cm. in 1 hour, the amount of zinc set in movement in an ordinary application of 10 milliampères for 10 minutes is about 4 mgr.—Lewis Jones.

Chronic pharyngitis, ozæna, pustular eczema and hypertrophic rhinitis have been treated by Zinc ions.

Large inoperable malignant tumours have been treated by combined Zinc and Mercury ions. As strong currents are used—a general anæsthetic is first given. Amalgamated Zinc Mercury pencils are connected to the positive and thrust into the tumour. Current up to 900 milliampères or more. "X" rays in massive doses preferred.—L.i./09,758.

Diphtheritic infections of the skin, warts and lupus treated.—Lewis Jones. L.ii./08,391.

Ophthalmia neonatorum was rapidly cured by everting the lid and applying + electrode consisting of cotton wool saturated with 2% Solution of Zinc Sulphate. The - electrode was held in the child's hand. The battery was an ordinary Bichromate Battery giving 20 volts. $\frac{1}{2}$ milliampère current was passed for three minutes. Twelve hours after the application the inflammation was subsiding and another application made. Two days later cured. Many cases of corneal opacities should be cured by this method.—B.M.J.ii./08,1433.

Atrophic rhinitis treated with some success by Zinc ionisation—using 1 to 2% Zinc Sulphanilate or by use of Argyrol 10%.—L.ii./08,738.

Also lupus vulgaris, lupus erythematosus, rodent ulcer, epithelioma and pigmented flat senile warts (Zinc Sulphate Solution 2%/8, current 6 to 10 milliampères.—L.i./09,763.

Old chronic thickened eczematous patches,—Kathaphoresis of Zinc into the skin valuable. Contact for 5 to 10 minutes with 3 to 6 milliampères.—B.M.J.i./09,1342.

Fistula in ano, granular lids, neuralgia and diphtheritic ulcer of the external ear well treated by Zinc ions.—B.M.J.i./09,1301; L.i./09,1527.

In ulcerative colitis worthy of trial.—Pr. Aug. '09,154 *c.f.* Silver.

Chronic urethral catarrh treated by probe wrapped in lint soaked in Zinc Sulphate Solution 2%—passing into the urethra connected with positive pole and constant current 2 milliampères for 10 minutes—repeated as necessary, good result. Where the aperture is narrow the canal may be filled with Zinc Sulphate.—B.M.J.ii./08,373.

Vide also Lewis Jones.—Treatment of skin diseases by electrolytic medication.—B.M.J.ii./08,1179.

Ions may be equally well removed. Several black patches on the face due to Arsenic used many years previously. The patient's hand placed in water with + pole from a battery of six cells. Pad of wet lint over the patch connected with the negative and current passed fifteen minutes with desired result. Electrodes of Iron, Silver or Copper to be avoided in

general. Platinum is always safe and Aluminium is useful.—L.ii./o8,1314, P.J.ii./o8,346.

Electro-therapeutics in gynecology.—L.i./10,347.

'Solubes' for Ionic Medication are prepared of many of the above substances.

Strength.—Each represent 4.375 grains (0.28 Gm.) to produce, on dissolving in 1 ounce of water, a 1% Solution. Two 'Solubes' produce an ounce of 2% solution, and so on.

The following are made:—

'Solube' Ionic.

Cocaine Hydrochloride.	Quinine Acid Hydrochloride,
Copper Sulphate.	Sodium Chloride.
Magnesium Sulphate.	Sodium Salicylate.
Potassium Iodide.	Zinc Sulphate.

'Sterules,' Ionic, of the majority of the solutions are also prepared of correct strength.

In addition to the 'British Medical Journal' and the 'Lancet,' we have to acknowledge having made very considerable use of the treatises on this branch of medical science by Leduc (MacKenna's translation)—see also B.M.A. address, B.M.J., ii/o7, 631, Lewis Jones, Tibbles, and others.

IPECACUANHA (Off.) U.S. FR.CX.

Dose.—As an expectorant, $\frac{1}{4}$ to 2 grains (0.016 to 0.13 Gm.), as an emetic 15 to 30 grains (1 to 2 Gm.).

The dried root of *Psychotria Ipecacuanha* (Rubiaceæ)* from Rio De Janeiro. A second variety is the Minas Ipecacuanha from Brazil. A third is Indian from the same plant, grown in Straits Settlements; another variety is known in commerce as Carthagena Ipecacuanha. It is thicker, the annulations less marked (taking the form of narrow merging ridges) and its starch-grains are somewhat larger; this is less expensive, and is not strictly official.

Flavoring of Liquid Ipecacuanha Preparations.—Syl Vanilla, Syl Rose; Syrupus Aurantii.

Uses of Ipecacuanha.—Expectorant, emetic. Loosens phlegm, e.g., in bronchitis, whooping cough and croup. In small doses is stomachic and increases the flow of bile. When de-emeticised is used in dysentery. Frequent doses, 1 to 2 minims of the Wine of Ipecacuanha sometimes check sickness.

In acute amœbic dysentery 20 grain dose.—R.A.M.C. Jl. 1905,362. A specific for; vomiting preventable by chloral hydrate.—L. i./o7,1016.

In anthrax has been employed successfully. The powdered root is dusted on the sores and 5 grain doses given every four hours.

For tropical liver abscess Ipecacuanha is specific. It cures the active or latent dysentery which has caused the suppurative hepatitis and prevents

* F.I. uses name *Uragoga*; Ipecacuanha.—Baill.

further breaking down of the liver substance.—B.M.J. ii/o8,1246. Large doses better than several small ones. Vomiting to be prevented by Chloral Hydrate and Liquor Morphine.—L. ii/o8,484.

In ulcerative colitis not so useful as in dysentery.—Pr. Aug. '09,152.

Poisoning by. If taken in sufficiently large doses it is *not* its own antidote.—L. ii/o8,536.

Methods of assaying with results: Brazilian, alkaloidal content about 2·2%, Carthagena about 2·0%.—P.J. i./o3,426, ii/c4,455.

Emetine constitutes 72% of the total alkaloid in the Brazilian root, Cephaeline 26, and Psychotrine the remaining 2%.—Ph.

In the Carthagena the proportions are reversed, namely, an average of 57 cf Cephaeline and 40 of Emetine.

Assay and identification of the powdered root.—P.J. ii./o3,73,101.

Review of the current methods of estimation. Titration of the residue should be insisted upon.—P.J. ii./o5,124.

Cæsar & Lorentz's method.—C.D. i./o8,22.

Ipecacuanha Alkaloids are fairly uniform, generally from 2 to 2·5% soluble in Chloroform. Umney.—C.D. ii/o8,492; P.J. ii/o9,344.

Colour reactions of the alkaloids similar to those of morphine.—Y.B.P. 1903,96.

F.I. agreed the root bark only to be powdered, rejecting the woody portion. The powder should have an alkaloidal strength of 2%. The alkaloidal content does not vary greatly. C.R. Confirmed. Fr.Cx. also requires 2% alkaloids and directs it to be estimated for alkaloid on a sample powdered as directed under Poudre d'Ipecacuanha; powdering in a covered iron mortar and passing through a fine sieve to the extent of three-quarters of the weight of root taken—i.e., rejecting the woody portion.

U.S. allows both *Cephaelis Ipecacuanha* (Rio) and *C. acuminata* (Carthagena) if yielding 1·75% Ether soluble alkaloids. (Average doses $\frac{1}{2}$ the maximum B.P.)

P. Belg. and P. Hung require 2% alkaloids.

U.S. Assay Method.—Shake 15 Gm. of ipecacuanha in No. 80 powder with chloroform, ether and ammonia. A volume of the solution is treated with sulphuric acid, and this solution shaken out with ether in the presence of ammonia. The ether-soluble alkaloid thus obtained is dissolved in $\frac{N}{10}$ sulphuric acid, warming gently if necessary. The acid solution is then back-titrated with alkali, using Cochineal as indicator, and employing the factor 0·0233 to ascertain the percentage of alkaloids. (1 Cc. $\frac{N}{10}$ Acid = 0·02314 Gm. Cephaeline or 0·02453 Gm. Emetine—a mean of 0·0233)

The factor is an arbitrary one, based on assuming that emetine and cephaeline are in equal proportion. Cochineal (as above directed) is better than hæmatoxylin.—A. B. Lyons, Int. Cong. 1909.

Unworkable as the acid liquors difficult to filter.—Am. Jl. Ph. 1906,454.

Ⓟ Tablets of Ipecacuanha Powder contain $\frac{1}{10}$, $\frac{1}{20}$, $\frac{1}{4}$ and 5 grains.

Ⓟ Pills may be prepared salol-coated for dissolving in intestine only.—P.J. ii./o4,580.

Ⓟ* 'Membroids' (Animal Membrane Capsules for dissolving in the intestines) of Ipecacuanha, 5 and 10 grains are very useful in the treatment of dysentery.—L. ii./o7,1591.

Membroids are also made of Blaud Pill=1, 2, and 3 Pills, and Ⓟ with arsenic $\frac{1}{10}$ and $\frac{1}{20}$ grain, of creosote 1, 2, 3 and 5 minims, and of quinine sulphate 1, 2 and 3 grains, and of santol oil 5, and 10 minims, also santol oil 8 minims, salol 2 grains and methylene blue 1 grain.

Pulvis Ipecacuanhæ sine Emetina. Syn. PULVIS IPECACUANHÆ

DE-EMETINASATUS (Ipecacuanha from which the emetine and cephaeline have been extracted) acts equally well, it is said, for dysentery, without causing vomiting. A small quantity of opium may be added if desired.

Dose.—5 to 20 grains (0·32 to 1·3 Gm.).—Pr. l. 411; M.C.

Ang. 93,338.

In sprue the ulcers of the tongue, febrile condition, etc., disappear under treatment with this drug.—Cantlie, L. ii./07,708.

Not a Poison. It is not a preparation containing Ipecacuanha.—P.J. i/09,156.

Ⓐ Acetum Ipecacuanhæ (Off.).

Dose.—5 to 30 minims (0·3 to 1·8 Cc.).

Liquid Extract of Ipecacuanha 1, Alcohol (90%) 2, Diluted Acetic Acid s. to 20. Alkaloids about 0·1%.

Ethyl Acetate may be formed in this preparation, as it is an aceto-alcoholic solution of the active principles.

Fluid-Acet-extracts. Acetic-extracts of Ⓐ Ipecacuanha, Cinchona, Ⓐ Colchicum Seed and other drugs have been prepared, and have been suggested to replace alcoholic preparations.

The acidity of these preparations is, however, a slight disadvantage, as they would be frequently incompatible. The acidity is hardly noticeable on dilution in mixtures. For medicinal effect they are stated to be in some cases even more active than the alcoholic equivalents.—SQUIRE.

Ⓐ Acet-extracts (Solid) of Aconite, Belladonna and Ergot are prepared.

Ⓐ Extractum Ipecacuanhæ Liquidum (Off.).

Dose.—As an expectorant, $\frac{1}{2}$ to 2 minims (0·03 to 0·12 Cc.); emetic, 5 to 20 minims (0·9 to 1·2 Cc.).

Ipecacuanha in No. 20 powder is percolated with 90% alcohol, and the marc mixed with calcium hydroxide and further percolated; the percolate is finally adjusted in strength to 2 to 2·25% alkaloid. 1 = about 1 of root. Keeps indifferently. P. Helv. 'at least 2% Emetine and Cephaeline.'

Should be 70% alcohol strength.—P.J. ii./09,142.

The separation of the total alkaloid into emetine and cephaeline by Paterson's process would exclude the use of Carthagena Ipecacuanha. The cephaeline would not exceed 30% of the total.—B. & C.D. i./05,403.

Ⓐ Fluidextractum Ipecacuanhæ, U.S. 1=1 by hydro-alcoholic percolation. Standardised to 1·5 Gm. alkaloids in 100 Cc. *Average dose.*—Emetic, 15 minims; expectorant, 1 minim.

Naylor has examined the U.S. process of standardising and is of opinion that chloroform is a better solvent than ether of the alkaloids. The strength of acid used is too strong, and the wash water is not sufficient.—P.J. i./07,394. The late Harold Wilson's method.—P.J. ii./08,580.

Umney says the U.S. assay method is easier than that of the B.P., but gives worse results by weighing, and still lower by titration, since ether is the solvent, which, as shown by Bird, is unsuitable for Ipecacuanha alkaloids. The ether residue is paler in colour, and is more easily titrated, but chloroform undoubtedly takes out more alkaloid, the results being practically the same as the B.P. method, which is not the case even after three washings with ether.—D. ii. /08,493.

Ⓐ Extractum Ipecacuanhæ, Fr. Cx.—Extract the root with 70% alcohol, and evaporate to firm extract.

Ⓐ Powdered Extract of Ipecacuanha of commerce is stated to contain 10% emetine.

Ⓐ An Elixir has been made with Liquid Extract 1, Alcohol 90% 1, Glycerin 5, Water to 20; may be dispensed with alkalis; strength same as Ipecacuanhæ (Off.). *Dose.*—As expectorant, 10 to 30 minims.

Ⓐ Linctus Glycerini, St. M.'s H.

Ipecacuanha Wine 5 minims, Paregoric 15 minims, Glycerin $\frac{1}{2}$ drachm, Water to 1 drachm.

(P) Mistura Ipecacuanhæ Ammoniata, St. M.'s H.

Ipecacuanha Wine 10 minims; Ammonium Carbonate 5 grains, Peppermint Water to 1 ounce.

(P) Mistura Ipecacuanhæ Salina, St. M.'s H.

Ipecacuanha Wine 6, Spirit of Nitrous Ether 20, Paregoric 30, Solution of Ammonium Acetate 60, Water to 480.

(P) Pulvis Ipecacuanhæ Compositus.

Syn. DOVER'S POWDER. (*Off.*).

Dose.—5 to 15 grains (0.32 to 1 Gm.).

Ipecacuanha 1, Opium 1, Potassium Sulphate 8. Is diaphoretic and anodyne; 10 grains at bedtime for an acute catarrh or coryza, followed at once by a hot drink and 5 grains of quinine next morning.—Tilley.

Should contain 10% of Pulvis Opii.—F.I. The name '*Opii et Ipecacuanhæ Pulvis Compositus*' will have to replace or be given as *Syn.* of Pulvis Ipecacuanhæ Compositus.—C.R.

Poudre d'Ipecacuanha opiacée.—Fr. Cx. *Max. Single dose* 15 grains, *Max. during 24 hours* 60 grains. Is the same, but has Potassium Nitrate 4 in place of half the Potassium Sulphate.

(P) Tablets of Dover's Powder, 5 grains (0.32 Gm.).

(P) Tinctura Ipecacuanhæ et Opii, U.S.

Average dose.—8 minims (0.5 Cc.). Equal to Opium $\frac{1}{4}$ grain and Ipecacuanha $\frac{1}{4}$ grain.

Represents Dover's Powder in liquid form.

U.S. Tincture of Deodorised Opium 10 (evaporated to 8), Fluidextract of Ipecacuanha 1, Alcohol 48.9% by volume to 100.

(P) Pilula Ipecacuanhæ cum Scilla.

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Compound Powder of Ipecacuanha 3, Squill 1, Ammoniacum 1, Syrup of Glucose *q.s.*

(P) Syrupus Ipecacuanhæ, P.G. iv.

Ipecacuanha 1, Alcohol (90%) 5, Water 40. Macerate 48 hours, filter 40, add sugar 60, and dissolve to make 100 of syrup.

(P) U.S. orders Fluidextract 7, Acetic Acid 1, Glycerin 10, Sugar 70, Water to 100.

Fr. Cx. has '*Sirop*' 1% of Extract made by dissolving Extract 1 in Alcohol 70% 3, and mixing with Syrup to 100 intended as an emetic. That of F.I. is not emetic in usual doses.—Fr Cx.

(P) Tinctura Ipecacuanhæ.—Fr. Cx. P. Belg., P. Hung. 10% prepared by percolation with Alcohol 70%.—as required by F.I.

C.R. says:—A standardised Liquid Extract made, as it should be, without lime, might be used for making this, which would then have the advantage of being standardised.

(P) Vinum Ipecacuanhæ (*Off.*).

Dose.—As an expectorant, 10 to 30 minims (0.6 to 1.8 Cc.); as an emetic, 4 to 6 drachms (15 to 22 Cc.).

Liquid Extract of Ipecacuanha 1, Sherry 19. After 48 hours, filter.

Is better prepared with detannated wine. Is given in 2 to 3 minim doses to allay the vomiting in pregnancy. U.S. has Fluidextract 1, Alcohol 1, White Wine 8.

Flavoring—Syl Vanillæ, Syl Cinnamomi; Syrupus Tolutanus.

(P) Emetina or methyl-cephaeline $C_{13}H_{15}N(OCH_3)_2$ or $C_{15}H_{21}NO_2 = 245.35$ (247.178 I. Wts.) (Paul and Cowley), is a white powder darkening

* Though probably not intended. This remark applies also to other preparations of Ipecacuanha.

an exposure, sparingly soluble in water, soluble in ether, alcohol, and chloroform. **(E) Emetine Hydrochloride** $C_{15}H_{21}NO_2.HCl=281.54$ 283.246 I. Wts.). [Dose $\frac{1}{100}$ to $\frac{1}{35}$ grain (0.00065 to 0.0026 Gm.) as an expectorant] a crystalline salt freely soluble in water. As an emetic, give $\frac{1}{12}$ to $\frac{1}{4}$ grain (0.0054 to 0.01 Gm.).

Of the Hydrochloride 4 grains in 8 ounces of Sherry forms **(P) Vinum Emetinæ** equivalent to Ipecacuanha Wine. Dose.—5 to 40 minims (0.3 to 2.4 Cc.).

(E) Cephaëline (Paul & Cowley), $C_{14}H_{19}NO_2=231.44$ (233.162 I. Wts.) is a crystalline alkaloid less soluble in ether than emetine, but soluble in caustic alkaline solutions, and also darkens on exposure.

The expectorant and emetic properties of **Cephaëline** and **Emetina** only result when administered *per os*.

(E) Cephaëline Hydrochloride, $C_{14}H_{19}NO_2.HCl$ (Paul & Cowley) =267.63 (269.63 I. Wts.) is the more powerful emetic in doses of $\frac{1}{12}$ to $\frac{1}{4}$ gr. and emetine the best expectorant, but this is emetic in large doses.

Emetine and Cephaëline in phthisis, compared.—B.M.J.E. i./05,19.

(P) Emetin—Extractive.

Dose.—Expectorant $\frac{1}{15}$ to $\frac{1}{10}$ (0.0043 to 0.0065 Gm.), emetic $\frac{1}{4}$ grain (0.032 to 0.065 Gm.), in pill or solution. An extractive substance, soluble in water; must be distinguished from Emetine.

(P) Trochisci Ipecacuanhæ.— $\frac{1}{4}$ grain (0.016 Gm.) in each, with Fruit basis. (*Off.*).

(P) Trochisci Morphinæ et Emetin (Trochisci Tussis) contain Morphine $\frac{1}{10}$ grain with Emetin $\frac{1}{80}$ grain. Useful in bronchial asthma.

(P) Unguentum Ipecacuanhæ et Crotonis.—Sawyer.

Pulvis Ipecacuanhæ 4 drachms, Linimentum Crotonis 4 drachms, Adeps Benzoatus 1 ounce. A powerful counter-irritant, rubbed on the skin of epigastrium relieves gastralgia.

IRIDIN.

Syn. Extractum Iridis.

Dose.—1 to 3 grains in a pill alone or with extract of henbane.

The powdered extract of a dark brown colour obtained by means of Alcohol 60% from the root of the blue flag, *Iris versicolor* (North America), has a bitter, acrid taste, possesses cathartic, alterative, and diuretic properties, given in hepatic and intestinal disorders.

Pilula Iridin.—Iridin 2 grains, Extract of Henbane *q.s.*, or with one grain of Euonymin; for biliousness.

Cholelithiasis successfully treated by 9 grain doses of iridin with urotropin. —B.M.J. i./06,264.

Orris Root of perfumery, containing 'Butter of Orris' about 0.15% a sweet-scented fatty substance, is from *Iris Florentina*, *I. Germanica* &c. (Italy).

JABORANDI FOLIA (Off.). P. AUSTR.**Pilocarpus, U.S. FR.Cx.***Dose.*—5 to 60 grains (0.32 to 4 Gm.) of the powder.*Average dose.*—U.S. 30 grains.**FR.Cx.** Max. *Single dose* 45 grains, max. during 24 hours 45 grains.

The dried leaflets of a shrub, diagnosed by E. M. Holmes as *Pilocarpus Jaborandi* (*Rutaceæ*), imported from Brazil, principally from Pernambuco. Jaborandi was introduced into Britain by the late W. Martindale. Contains Pilocarpine up to 0.5%.

FR.Cx. also directs this species, but states that *P. Pennatifolius* is much used. Rio or Paraguay Jaborandi contains less alkaloid. It states further that *P. Microphyllus* Stapf. (Maranham Jaborandi) is esteemed by manufacturers on account of its high alkaloid content, but it is the most adulterated.

Assay.—U.S. method: Percolate 10 Gm. of the drug in No. 60 powder with ammoniated chloroform. Shake the chloroformic solution of the alkaloids with sulphuric acid twice, and finally with water. The combined acid liquor is evaporated and the residue dissolved in a volume of N/10 sulphuric acid, and excess of acid titrated with N/50 potash. The figure 0.2 is employed as representing the weight in grammes of the alkaloids (mainly pilocarpine) neutralising 1 Cc. of N/10 sulphuric acid.

Method of determination.—P.J. ii./05, 123, 580.

Cesar and Lorentz's method.—C.D. i./08, 21.

Holmes suggests that *P. Microphyllus* should be substituted for *P. Jaborandi* in the next B.P. It is largely employed in manufacture of pilocarpine and is official in U.S. if yielding not less than 0.5% alkaloids.

White Cross Congress recognise this plant, which the General Medical Council has sanctioned as substitute, though not official. It yields up to 0.6% alkaloid.—Umney C.D. ii./09, 580.

P. Pennatifolius, *P. Selloanus*, and *P. Trachylophus* are substitutes and differ from the leaf as officially described.

P. Pennatifolius (5 samples) ranged from 0.07 to 0.15% total Alkaloids.

P. Microphyllus (2 samples) 0.55 and 0.63%. *P. Jaborandi*, worthless. *P. Trachylophus* contained as much as 0.75%.—Southall's Lab. Rep.

Uses.—True Jaborandi is a powerful sudorific galactagogue and sialogogue; after a time a large dose acts as an emetic, contracts the pupil of the eye, and causes the approximation of vision. These properties are principally due to an alkaloid **Pilocarpine** contained in it. For other constituents, v.p. 432.

The sweating and salivation from a full dose of Jaborandi, *e.g.*, Tincture or Pilocarpine, persist from 2 to 4 or 5 hours, the symptoms come on in about 10 minutes after taking the dose if external conditions are favourable. Hypodermically the alkaloid acts in 3 to 5 minutes. A reduction of temperature on an average of 0.9° occurs under the drug.

Jaborandi has been used in a great variety of diseases, most successfully in asthma, diabetes, dropsy and uræmia and as an antidote to belladonna and opium poisoning. Children proportionately are not affected by the drug so much as adults. Externally promotes growth of the hair, *e.g.*, in alopecia.

Description and physiological action (on the writer).—P.J. 1874, 364.

Pilocarpine salts possess the properties of Jaborandi in a marked degree, applied topically, they contract the pupil of the eye. Large doses are powerfully diaphoretic, and valuable in Bright's disease; small ones ($\frac{1}{36}$ grain) check night sweating of phthisis, and do not over-dry the skin.

Puerperal convulsions have been treated by injection of Pilocarpine.

It has been found to relieve nerve deafness, also itching of jaundice and assists passage of gallstones.

Pneumonia is treated by hypodermic injections of $\frac{1}{10}$ grain and more.

As a sialogogue, but requires care in administering.—L.i./o6,903.

In alopecia $\frac{1}{2}$ grain of the nitrate increased to $\frac{3}{4}$ grain injected into the scalp made hair grow.—C.D. i./o8,150.

In tinnitus aurium (acute labyrinthine) Pilocarpine hypodermically is of value in suitable cases. B.M.J. ii./o9,1131.

Obstructive forms of laryngitis occurring any time during measles are well treated with 1 mgr. injections of Pilocarpine (salt) repeated as required.—B.M.J.E. ii./o8,84.

Antidotes to Jaborandi and its preparations:—

After evacuating the stomach, give Tannic or Gallic Acid, then Atropine Sulphate or Tincture of Belladonna; *vide* also List of Poisons.

Ⓐ **Extractum Jaborandi** (Hydro-Alcoholic). B.P.'85.

Dose.—2 to 10 grains (0.13 to 0.65 Gm.), in pills.

Ⓑ **Powdered Extract of Jaborandi** of commerce contains 3.75% pilocarpine.

Ⓒ **Extractum Jaborandi Liquidum** (*Off.*), **Liquor Jaborandi**. 1 = 1 of leaves; in 45% Alcohol.

Dose.—5 to 15 minims (0.3 to 0.9 Cc.).

Necessity for a standardised official preparation (from *P. Microphyllus*) C.D. ii./o8,493.

Ⓓ **Fluidextractum Pilocarpi**, U.S. 1 = 1 of leaves by diluted Alcohol. Standardised to 0.4% Alkaloids. *Average dose*.—30 minims.

Ⓔ **Tinctura Jaborandi** (*Off.*). 1 in 5 of 45% Alcohol.

Dose.—30 to 60 minims (1.8 to 3.5 Cc.).

Fr. Cx. 1 in 5 by weight, Alcohol 60%. *Max. Single Dose*.— $\frac{1}{2}$ ounce approximately. Maximum during 24 hours the same.

Ⓕ **Linimentum Jaborandi**.

Jaborandi Tincture 1, Cantharides Tincture 1, Soap Liniment 4.

For hair falling off, to apply with friction.—B.M.J.E. ii./o9,24.

Ⓖ **Pilocarpina**, $C_{11}H_{16}O_2N_2 = 206.65$ (208.148 I. Wts.). Fr. Cx. The pure alk-aloid is a colourless syrupy dextrorotary liquid.

Uses of Pilocarpine and its Salts. See Jaborandi.

Ⓖ **Pilocarpinae Hydrochloridum**, P.G.iv., U.S. Fr. Cx.

$C_{11}H_{16}O_2N_2HCl = 242.84$ (242.81 U.S. Wts.; 244.616 I. Wts.).

Dose.— $\frac{1}{10}$ to $\frac{1}{2}$ grain (0.0032 to 0.02 Gm.) by mouth or hypodermically. In minute granular snow-white crystals, slightly deliquescent and very soluble in water. Melts at 204–205°C.—J.C.S. 1900,477. That in U.S. melts at 195.9°C. Fr. Cx., 200°C. For an aqueous solution of 2 Gm. in 100 C c. $\alpha_D = +91^\circ$ @ 18°C.

In pneumonia 20 minims of 1% solution on sugar or in water have been given. In hiccough ten minims every three or four hours is said to be useful. Pilocarpine in syphilis.—Beddoes p. 134.

Ⓖ **Hypodermic Tablets** contain $\frac{1}{4}$ grain.

Ⓢ Pilocarpinæ Nitras, (Off.) U.S.

$C_{11}H_{16}O_2N_2.HNO_3 = 269.23$ (269.20 U.S. Wts.; 271.166 I. Wts.).

Dose.— $\frac{1}{20}$ to $\frac{1}{2}$ grain (0.0032 to 0.032 Gm.). *Fr. Cx.*: *Max. single dose* $\frac{1}{2}$ grain approx.

In minute white granular snow-like crystals, but may be obtained in large white prismatic crystals. *Soluble* 1 in 8.2 of water, but very slightly in cold alcohol. This salt, preferred in England, was the first pure preparation of Pilocarpine prepared, and obtained by the late W. Martindale from an alcoholic solution.

For an aqueous solution of 2 Gm. in 100 Cc. $\alpha_D = +82.2$ @ $18^\circ C$.—*Fr. Cx.*

Pure Pilocarpine Nitrate melts at $177-178^\circ C$.; Isopilocarpine Nitrate melts at $159^\circ C$.—*P.J.* 1./97, 466; i./04, 54. That in U.S. melts at $170.9^\circ C$. *Fr. Cx.* $177^\circ C$.

Ⓢ Isopilocarpine (a syrupy liquid) is an isomeride and conversion product of Pilocarpine. *J.C.S.T.*, 1900, 473. Pilocarpine with small quantities of Pilocarpidine, $C_{10}H_{14}O_2N_2 = 192.74$ (194.132 I. Wts.) (found in Pernambuco Jaborandi only) and Isopilocarpine constitute the 0.5 to 1% of amorphous alkaloid in the leaves. — *J.C.S.T.*, 1900, 77, 473; 1901, 79, 580, 1331; 1903, 83, 433; *Y.B.P.* 1899.

Ⓢ Tablets to be given *per os* contain $\frac{1}{20}$ and $\frac{1}{2}$ grain.

Ⓢ Guttæ Pilocarpinæ Nitratis, 0.5 in 100. *R.O.H.*

Used to contract the pupil of the eye. Ⓢ 'Sterules' of this strength are prepared.

Ⓢ Injectio Pilocarpinæ Nitratis Hypodermica *R.O.H.* and *T.H.*

Dose.—2 to 6 minims.

Pilocarpine Nitrate 1, Distill d water 20.

G.H. has 1 grain in 12 minims. 'Remove the patient's night-shirt, wrap closely in a warm blanket, and cover with two more blankets. Put hot water bottles to his feet, and give hot drinks freely. After the sweating has ceased, remove blankets gradually, dry the skin thoroughly, and leave him between warm dry blankets.'

Ⓢ Hypodermic Tablets, $\frac{1}{10}$, $\frac{1}{8}$, $\frac{1}{6}$, $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{1}{2}$ grain (0.0065, 0.008, 0.01, 0.016, 0.02 and 0.032 Gm.).

Ⓢ Sterules, Hypodermic $\frac{1}{10}$, $\frac{1}{8}$, $\frac{1}{2}$ grain.

Ⓢ Ophthalmic Discs $\frac{1}{500}$ grain, combined with gelatin.

Ⓢ Lotio Pilocarpinæ, for the hair.

Pilocarpine Nitrate 2 grains, Quinine Hydrochloride 8 grains, Glycerin 2 drachms, Rose Water 6 drachms. If so ordered, Cantharides Tincture 1 drachm may be usefully combined with above quantities. Applied locally, and used internally or hypodermically, Pilocarpine seems to have an action in promoting the growth of hair in alopecia. Used also in Ⓢ Ointment, 4 grains to the ounce of a mixture of wool fat and soft paraffin ointment.

Serviceable in cases where the hair in falling out through dandruff or neglect.—*C.D.* i./10, 202.

Ⓢ Pilocarpinæ Phenas.

$C_{11}H_{16}N_2O_2.C_6H_5OH = 299.99$ (302.196 I. Wts.).

A colourless oily liquid, soluble in water and alcohol. In tuberculosis and in malaria 4 Cc. of a 0.02% solution have been injected subcutaneously.

Ⓢ Pilocarpinæ Salicylas.

$C_{11}H_{16}N_2O_2.C_6H_4.OH.CO_2H = 343.66$ (346.196 I. Wts.). *Dose.*—

$\frac{1}{20}$ to $\frac{1}{2}$ grain (0.0032 to 0.032 Gm.).

In small colourless tabular crystals or white crystalline powder, with bitter taste, easily soluble in water.

Ⓟ **Bromocarpin.** *Syn.* SYRUPUS PILOCARPINÆ ET POTASSII BROMIDI.

Dose.—For children 3 to 7 years of age 1 to 3 drachms daily; 7 to 15 years 1 to 6 drachms daily; adults $\frac{1}{2}$ to 1 ounce daily, *all spread over the day.* To be taken before meals.

Potassium Bromide 10, Pilocarpine Hydrobromide 0.005, Orange Syrup and Glycerin *q.s.* to 100.

This preparation is employed as a sedative in epilepsy and nervous affections.

JALAPA (*Off.*). FR.CX.

Dose.—5 to 20 grains (0.32 to 1.3 Gm.). The dried tubercules of *Ipomœa Purga*, *U. S. Exogonium Purga*, (*Convolvulaceæ*).

Uses.—A powerful purgative producing watery stools, is apt to gripe; must be avoided if the bowels are inflamed. Used to reduce the dropsy of Bright's disease, and to relieve uræmia.

Extractum Jalapæ (*Off.*) Hydro-alcoholic.

Dose.—2 to 8 grains (0.13 to 0.52 Gm.).

Powdered Jalap Extract of commerce contains 40% resin.

Jalapæ Resina (*Off.*) P.G. and U.S.

Dose.—2 to 5 grains (0.13 to 0.32 Gm.).

Contains two glucosidal resins, about 90% Convolvulin (*Syn.* JALAPURGIN), $C_{21}H_{50}O_{16} = 673.29$ (678.4 I. Wts.), soluble in alcohol but insoluble in ether, [this should be termed Jalapin, as understood in England, (*dose* 1 to 5 grains)] together with about 10% Jalapin (Mayer), (*Syn.* ORIZABIN), $C_{34}H_{56}O_{16} = 715.02$ (720.448 I. Wts.), soluble in ether and in alcohol. The latter, the principal constituent of spurious Jalap (*Ipomœa similans* and *I. orizabensis*), is identical with Scammonin (*dose*, 1 to 5 grains) from scammony root, *Convolvulus Scammonia* (*Convolvulaceæ*), v.p. 621. It is cheaper and less active.

The average yield of resin from Jalap Root is 8%. FR.CX. requires 7%.

The B.P. requires 9 to 11—rather high.—P.J. i./04,5.

Power has made various Extractives of Jalap Resin—with petroleum, ether, chloroform, ethyl acetate, and alcohol—all of those excepting the first produced purgation of dogs. He concludes that none of the amorphous bodies obtained from Jalap should have chemical formulæ assigned to them.—P.J. ii./09,7.

U.S. requires at least 7% total Resin, of which not more than 15% should be soluble in Ether.

Assay (U.S.).—The evaporated ether percolate of the drug in No. 60 powder gives the ether-soluble portion. The marc is then again percolated with alcohol, and a volume of this percolate is shaken with an equal volume of chloroform and of water. The chloroform solution evaporated gives the percentage of resin insoluble in ether, which added to the first figure gives total resin.

The ether test for scammony was devised to detect the adulteration with jalap. Scammony resin of commerce is obtained from the roots and not from the gum resin. American scammony (*Ipomœa orizabensis*) is used as the source of the resin.—P.J. ii./05,683

A sample of this yielded 16 to 20% resin, tested by the Official Process.—C.D.I./o8,453.

Further examination of this Mexican Scammony Resin.—P.J.ii./o8,366,407.

The so-called Mexican is not equivalent to the product of the Levant.—L.i./o9,52.

Cowie's scheme for valuation of Jalap Resin.—

Should not contain more than 6% moisture and 1% ash. Pure white Jalap Resin of commerce is practically Jalapin, (almost free from Scammonin). Brown Jalap Resins contain varying amounts of Scammonin. *Saponification* equivalent is taken. Absence of *Colophony* is proved by dissolving 0.25 Gm. in Acetic Anhydride 5 Cc., and adding 2 drops of Sulphuric Acid (*Off.*)—no purple color should be produced. *Guaiacum* is tested for by adding a few drops of Ferric Chloride Solution to a little of the Resin moistened with Alcohol. Dry Ether is essential in extracting and the Resin must also be dry. Ethers of different Sp. Gr. extract different percentages of Resin.—P.J. ii./o8,363,405.

Pulvis Jalapæ Compositus (*Off.*).

Dose.—20 to 60 grains (1.3 to 4 Gm.).

Jalap 5, Acid Potassium Tartrate 9, Ginger 1.

Tinctura Jalapæ (*Off.*). *Dose.*— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.).

About 1 in 5 of Alcohol (70%). Standardised to 1.5% of Resin.

Tinctura Jalapæ Composita, I.C.Add., *q.v.*

Dose.—30 to 60 minims (1.8 to 3.5 Cc.).

Jalap 8, Scammony 2, Turpeth Root 1, percolate with Alcohol (60%) to 100.

KAOLINUM.

Kaolin (*Off.*) U.S. Bolus Alba, P.G., P. Jap.

Native white aluminium silicate, $\text{H}_2\text{Al}_2\text{Si}_2\text{O}_8 + \text{H}_2\text{O} = 258.832$ I. Wts., purified by elutriation from sandy matter; it is a pearly white powder. A useful absorbent powder for irritation of the skin. Cimolite is a special preparation, agreeably perfumed. Kaolin is unacted upon by most chemicals, hence used for making pills of Silver Nitrate, Gold Chloride, and Potassium Permanganate (*see* Unguentum Kaolini). It is useful for sprinkling on to the filter paper in clarifying liquids. According to U.S. it should leave not less than 85% non-volatile residue on ignition. Is also tested for iron.

To cleanse the vaginal folds of discharge, insufflation of this dusting powder from a 'siccator' affords great relief and is better than douching and wet applications generally.—checks discharge at once.—B. M. J. E. ii /o3,7.

The secretion with the powder is however removed by douching. The dry method is claimed to have a prophylactic value—by absorbing irritant discharge the production of fresh erosions is prevented, and those existing have an opportunity of healing.

*Emol Keleet and *Dimatos are similar. Fullers Earth (China Clay) contains traces of Iron and Magnesia.

Westcott has drawn attention to the frequent deaths of infants by tetanus when Fullers Earth has been applied to sores on navel and nates—there may be serious risk of infection of more than one kind from the use of this unsterilised earth. Warning should be given to the poor not to use this. Boric Acid with Zinc Oxide and Starch is safe in use.—B. M. J. i./o8,892.

Unguentum Kaolini.

Soft Paraffin 1, Hard Paraffin 1; melt, add Kaolin 1, and stir till cold. Spread on rag to apply on abraded skin, it allays irritation. Also as pill excipient, *v. ante.*

Glycerinum Kaolini Aceticum.—Unna.

Glycerin 3, Kaolin 4, Acetic Acid 2 (shake before use). For extracting comedones use night and morning—they are then easily squeezed out.

Talc, U.S., a native foliaceous magnesium silicate; that from the Tyrol—Venetian Talc—is soft and unctuous.

Talcum Purificatum, U.S., is the above purified by hydrochloric acid.

French Chalk, a harder silicate of magnesium.

Kieselguhr, a diatomaceous or infusorial earth, known as white peat; burnt produces a light absorbent powder. **Ceyssatite** is a calcined siliceous earth from Ceyssa (Auvergne).—F.N., 1908.

Zinc Oxide, various **Starches**, powdered **Orris Root**, and mixtures of these, perfumed, are employed for toilet purposes; also **Zinc and Starch**; **Boric Acid and Starch**; **Boric Acid, Zinc and Starch Powder**.

Calamina Præparata, B.P. 1885.

Syn. LAPIS CALAMINARIS PRÆPARATUS.

Impure zinc oxide prepared by calcining native Calamine (zinc carbonate) and reducing it to an impalpable powder. Genuine Calamine is useful as a dusting powder, and for making lotions, and may be mixed with Carmine Triturate to produce the desired tint.

Linimentum Calaminæ, G.H.

Rub prepared Calamine 20 grains, Zinc Oxide 15 grains (and other powders, if ordered) with Solution of Lime 2 drachms and Water 2 drachms, then incorporate Olive Oil to 1 ounce. U.C.H. has Levigated Calamine 40 grains, Zinc Oxide 22 grains, Zinc Oleate 13 grains, Wool Fat 13 grains, Soft Paraffin 1½ drachms, Liquid Paraffin to 1 ounce.

Lotio Calaminæ, U.C.H., E.L.

Levigated Calamine 40 grains, Zinc Oxide 20 grains, Glycerin 14½ minims, Water (or Rose Water) to 1 ounce. Elutriate the calamine and zinc oxide by triturating them in a mortar with successive portions of the water and decanting from the siliceous matter, and add the glycerin. Used in eczema, especially where the surface is red and tender, also to conceal acne spots on the face. One grain of mercuric chloride may be added to 6 ounces as antiseptic. *(P)* Lotio pro Acne, N.H.W. is similar.

Lotio Calaminæ Oleosa, St. M.'s H., E.L.

Calamine 40 grains, Zinc Oxide 20 grains, Lime Water 3 drachms, Olive Oil 1 ounce.

In chronic eczema, *e.g.*, to a freely weeping surface with redness and itching apply with brush or cotton wool swab or spread on thin washed butter muslin. Very important that the inflamed surface should not be treated with a hot thick dressing. Perchloride 1 in 2,000 to 1 in 3,000 may be desirable addition.—B.M.J.i./o9, 1341.

Unguentum Plumbi cum Calamina 'ERYSIPELAS DRESSING,' St. G. H. Lead Plaster 5, Calamine 1, Lard 4, Olive Oil 2.

LASIOSIPHON.*(Lasiosiphon Meisneri.)***Dose.**—2 to 5 grains (0·13 to 0·32 Gm.).

The root of this South African drug resembles Mezereon in some of its properties (there are several species of *Lasiosiphon*,—this is considered the most active). The bark of the root when chewed produces a scorching sensation in about fifteen minutes,—the effect lasting for some hours. The activity is due to a resin which imparts the acrid properties after a time to the saliva.

Tinctura Lasiosiphon. Root 1 in 10 Alcohol 90%. **Dose.**—10 to 60 minims (0·6 to 3·5 Cc.).

This preparation has been found to be remarkably efficacious in chronic skin affections, and long-standing eczema has been got rid of by its use. It has also been known to be very efficacious in the treatment of old sores from blood poisoning which have resisted other modes of treatment.

Extractum Lasiosiphon Liquidum, 1 = 1. **Dose.**—2 to 5 minims (0·12 to 0·3 Cc.).

In addition to the above, **Lasiosiphon Bassorin Paste** consisting of Liquid Extract of Lasiosiphon thickened with 3% Tragacanth may prove of service for local use in skin affections.

LECITHIN, OVO-LECITHIN.

$$\text{C}_{42}\text{H}_{84}\text{NPO}_9 (?) = 771\cdot88 \text{ (777}\cdot682 \text{ I. Wts.)}$$
Choline Di-Stearo-Glycerophosphate.

Dose.—Internally 3 to 5 grains (0·2 to 0·3 Gm.) preferably half an hour before meals, *vide* Emulsion.

Subcutaneously $\frac{1}{4}$ to 2 grains (0·05 to 0·13 Gm.) in sterile olive oil every second day.

Manufacture.—It should be prepared from egg yolks, *c.f.* Watts P.J. ii./08,272, gives the methods.

Alexander gives 3 methods.—Med. Times, July 3, '09.

Lecithin is a Mono-amino Phosphatide. Phosphatides are complex bodies of more or less fatty nature which can be extracted from tissues by Alcohol, Ether, etc., and which contain fatty acids, Nitrogen and Phosphorus. They are of unstable composition. Examination of Lecithins from various tissues showed considerable variation in the proportion of Nitrogen. According to the above composition (Choline di-stearo-Glycerophosphate) all the Nitrogen should be present in the form of Choline: This does not appear to be the case.—B.M.J. ii./09,677.

A yellowish wax-like mass, insoluble in water, soluble 1 in 5 of ether, twice its weight of chloroform, and 1 in 30 of alcohol 90%. It is a constituent of the brain 11%, and of yolk of egg 7% ; milks, human, cows', etc. contain varying amounts, *c.f.* p. 476.

Flavoring.—Prescribed as Elixir or Emulsion *q.v.*

Uses.—Where the phosphates excreted by the urine are high. Given in neurasthenia, various nervous diseases, diabetes, tuberculosis, tabes and general paralysis; also in all diseases producing a disturbance of nutrition.

It is said to cause a marked increase in patients' weight, and to improve the general well-being; augments the blood corpuscles. Rickets and marasmus have been successfully treated with lecithin, and intramuscular injections of Sterile Oil Solution have also given relief. Use suggested in incipient tuberculosis, osteomalacia, and the like.

Has given good results in myasthenia gravis (Gowers).

Lecithin should be entirely soluble in chloroform indicating absence of added mineral phosphates. The total phosphorus should be estimated.—Y.B.P. 1903.

Elixir Lecithin. *Dose.*—2 drachms containing 3 grains of Ovo-Lecithin, thrice daily after, or half an hour before meals, the latter in preference.

Emulsio Lecithin. *Dose.*—Half ounce, containing 5 grains of Ovo-Lecithin, thrice daily, as the Elixir.

Diabetes has been treated with marked results. Ovo-Lecithin should be taken in a fluid form half an hour before meals on an empty stomach. Absorption thus by the system takes place more readily. No very hot fluids should be drunk for some time afterwards, so that the composition of Lecithin may remain unaltered.

Nervous breakdown of various forms is well treated with Lecithin. The nerve centres depend on Lecithin for the highest performance of their functions and obtain it from the food eaten. Nerve and brain exhaustion is caused by undue expenditure of Lecithin. After a short course with above treatment sufferers put on flesh and experience a feeling of well being. Many nostrums contain Lecithin in one form or another.—Alexander, 'Med. Times,' July 3/09; B.M.J. ii./09, 1108.

In menorrhagia $1\frac{1}{2}$ to 3 grains thrice daily between the periods have converted a fortnightly menstruation to a normal one, or if period of usual length but too profuse, also useful. Must be given during the intermenstrual period, and continued some time.—B.M.J.E. ii./09, 51.

Pernicious anæmia may be due to a deficiency in the body of Lecithin or Cholesterol, and the administration of these (*e.g.*, the former as Red Bone Marrow) may be of some use as a remedy.—B.M.J. ii./08, 146.

Sterules for Intramuscular Injection. *Dose.*—1 Cc., equivalent to $\frac{3}{4}$ grain (0.05 Gm.) of Lecithin (prepared with oil). Also of \textcircled{P} Lecithin $\frac{3}{4}$ grain with Strychnine $\frac{1}{160}$, and \textcircled{D} $\frac{1}{160}$ grain and Lecithin $\frac{3}{4}$ grain, with Guaiacol (oil solution) $\frac{3}{4}$ grain.

Capsules, Pills and Tablets contain $1\frac{1}{2}$ grains (0.1 Gm.). **Granules** (so-called 'Confection' in France) containing $1\frac{1}{2}$ grains (0.1 Gm.) per teaspoonful are also made.

Is contained in *Pilula Potentin Composita*, *q.v.*

Lecitogen. *Dose.*—3 to 4 drachms. Cocoa containing 1% Lecithin 22% nitrogenous material, 25% fat, 8% starch.—B.M.J.E. ii./05, 100.

Effervescent Lecithin 3 grains in 1 drachm (a dose) is prepared. This preparation unavoidably froths up considerably.

Lecithin on hydrolysis yields Stearic Acid, Glycerophosphoric Acid Choline.

The **Marchi Reaction** is now generally in use for showing nerve degeneration. The reaction consists in the fact that the fatty acid (decomposition product of Lecithin) stains black with Osmic Acid even in the presence of Chromic Salts which Lecithin does not.

In degenerative nerve disease,—the products, notably Choline, can be detected in the blood and cerebro-spinal fluid. This fact might be used for diagnosing between functional and organic disease.—L. i./07,1303, v. also p. 866.

LIQUORES CONCENTRATI.

This class of preparations introduced into the British Pharmacopœia was intended to take the place of commercial concentrated decoctions and infusions. One volume diluted with nine of water give the corresponding infusions and decoctions. Commercially the strength is 1 to 7.

Those of **Chiretta**, **Cusparia**, **Krameria**, **Quassia**, **Rhubarb**, and **Serpentary** are prepared by percolation with 20% alcohol; that of **Senega** with slightly stronger alcohol. They are of the uniform strength of 1 in 2, except Quassia (1 in 10), and the *dose* of each is $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Liquor Calumbæ Concentratus (*Off.*), in 2 is prepared by double maceration with cold water, heating to 180° F., and adding Alcohol (90%) $4\frac{1}{2}$ parts in 20. *Dose.*— $\frac{1}{2}$ to 1 drachm.

Liquor Sarsæ Compositus Concentratus (*Off.*).

Sarsaparilla 20, Sassafras 2, Guaiacum 2, Liquorice 2, and Mezereon 1, are digested in three successive portions of water at 160° F., concentrated, and Alcohol (90%) $4\frac{1}{2}$ added, to produce 20. *Dose.*—2 to 8 drachms (7 to 30 Cc.). *Vide also* Sarsaparilla.

Sarsaparilla preparations combined with Iodides are sold as “Blood Purifiers.” **Liquor Sennæ Concentratus** (*Off.*) is prepared by repercolation, with water as a menstruum, heating the product to 180° F., and preserving with Alcohol and Tincture of Ginger, Strength 1 in 1. *Dose.*— $\frac{1}{2}$ to 1 drachm (7 to 30 Cc.).

LITHIUM.

Li = 6·97 (7·00 I. Wts.).

Lithium Salts have long had a reputation for assisting in the elimination of Uric Acid, but doubts are now felt on the subject. They should be given freely diluted.

Lithii Benzoas, U.S. $C_6H_5COO Li = 127·10$ (127·11 U.S.) (128·04 I. Wts.). *Dose.*—2 to 10 grains (0·13 to 0·65 Gm.) or more.

Usually a light white crystalline powder, soluble about 1 in 4 of water, about 1 in 12 Alcohol 90%; antilithic.

Lithii Bromidum, U.S. $Li Br. = 86·32$ (86·34 U.S.) (86·92 I. Wts.). *Dose.*—5 to 15 grains (0·32 to 1 Gm.).

White, deliquescent, slightly bitter granules, neutral reaction; very soluble in water and alcohol.

Contains 91% Bromine as against 67% in Potassium Bromide, hence effect greater, especially as a hypnotic, and in epilepsy. Of great use in Bright's disease.—L. ii./95,685.

Lithii Carbonas (*Off.*) $\text{Li}_2\text{CO}_3 = 73.49$ (73.51 U.S.) (74.00 I. Wts.).

Dose.—2 to 5 grains (0.13 to 0.32 Gm.). Slightly soluble in water (1 in 70). Diuretic and increases the alkalinity of the blood.

Tablets, 5 grains (0.32 Gm.).

Lithii Citras (*Off.*) $\text{C}_3\text{H}_4\text{OH}(\text{COO Li})_3 \cdot 4\text{H}_2\text{O} = 280.05$ (280.08 U.S. (282.104 I. Wts.).

Dose.—5 to 10 grains (0.32 to 0.65 Gm.).

White crystalline powder. Diuretic. **Soluble** 1 in 2 of water, and almost insoluble in 90% alcohol.

Dott finds 27% moisture in place of B.P. 19%. Suggests formula with $9\text{H}_2\text{O}$.—C.D. i./05,489. Should be $+5\text{H}_2\text{O}$ which loses 24% at 95 to 100° C.

Tablets, 5 grains (0.32 Gm.).

Effervescent Lithium Citrate (*Off.*) U.S.

Dose.—1 or 2 drachms (4 to 8 Gm.). Contains 1 in 20.

* 'Vescettes' of Lithia, contain 3 and 5 grains Lithium Citrate.

Lithii Citras Laxativus Effervescens, B.P.C.—30% Sodium Phosphate, 10% Lithium Citrate.

Dose. 60 to 120 grains. A saline, and diuretic purgative and antilithic, for use in gout.

Lithii Glycerophosphas, v.p. 61.

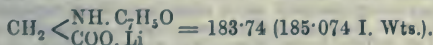
Lithii Guaiacas, Lithium Guaiacate.

Dose.—5 grains (0.32 Gm.) in pill twice a day.

Prepared by digesting guaiacum resin in solution of lithium oxide, decanting the clear solution, evaporating, and scaling it. Contains Lithium Oxide 1, Guaiacum Resin 3. Given for chronic gout and rheumatism.

Pilula Lithii Guaiacatis, 5 grains.

Lithii Hippuras, Lithium Hippurate.



Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

In light white minute crystals, soluble in water 1 in $2\frac{1}{2}$, is a powerful solvent of lithates; useful in gout and rheumatism. **Vescettes** contain 5 grains. **Effervescent Salt** 5 grains in 1 drachm.

Lithii Iodidum Li I = 132.87 (133.92 I. Wts.).

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

White crystalline deliquescent powder. A salt rich in iodine,—containing 94.7%. An antiarthritic and has been employed in syphilis, also in rheumatoid arthritis, by iontophoresis, *q.v.*

Lithii Salicylas, U.S., P.G. iv. $\text{C}_6\text{H}_4\text{OH} \cdot \text{COO Li} = 142.98$ (142.99 U.S. Wts.; 144.04 I. Wts.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.) for rheumatism and gout. A deliquescent white powder **soluble** 1 in 1 of water, forming a neutral or slightly acid solution.

Effervescent Lithium Salicylate contains 1 in 80.

Dose.—1 or 2 drachms.

Lithii Tartras Acidus.

CHOH. COOLi. CHOH. COOH, $1\frac{1}{2}$ H₂O = 181.71 (183.064 I. Wts.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

A finely crystalline white powder, of special use in gouty cases with gum affections.—L. i./94,1614.

Lithion is a granulated (non-effervescent) preparation composed of lithium citrate, magnesium sulphate, sodium sulphate, &c. *Dose.*—One-half to one teaspoonful taken in a little warm water.

★ **Thialion** is a laxative Lithia Compound.

Sodium Sulphate (anhydrous) 26%, Sodium Citrate 56%, Sodium Chloride 3%, Potassium Citrate 3%, Lithium Citrate 3%, Water 9%.—B.M.J. ii./08,779.

★ **Uricidin.** Tablets 15 grains (1.0 Gm.). A German speciality.

Dose.—1 to 2 drachms (4 to 8 Gm.).

In brownish-yellow granules, soluble in water, containing lithium and sodium citrates with sodium sulphate.

MAGNESIUM.

Mg = 24.18 (24.32 I. Wts.).

The metal magnesium is largely used for burning to produce a white light for photographic purposes.

Magnesii Carbonas Levis (*Off.*) 3 (MgCO₃), Mg (HO)₂, 4H₂O = 380.65 (383.36 I. Wts.). Is prepared by precipitation of Magnesium Sulphate Solution with Sodium Carbonate, **Magnesii Carbonas Ponderosus**, similarly in more concentrated solution and with evaporation to dryness. *Dose.*—5 to 30 grains repeated, or 30 to 60 grains as a single administration.

Liquor Magnesii Carbonatis (*Off.*) Fluid Magnesia.

Dose.—1 to 2 ounces (30 to 60 Cc.).

A colourless liquid, containing 10 grains of Magnesium Carbonate in 1 ounce of Carbonic Acid water.

Can be satisfactorily prepared on a small scale with 'Sparkiet' syphons. Freshly precipitated Magnesium Carbonate—the B.P. quantity according to directions is just sufficient—introduced into a pint of water, in a 'Sparklet' syphon—gas from one bulb is generated, and the mixture allowed to stand in the cool for 7 days, with occasional shaking. The liquor is removed and transferred to another syphon and charged again. A sample showed 0.17 Gm. MgO from 2 Cc. of the solution.—P.J. ii./08,255.

Magnesia Levis and Magnesia Ponderosa, Mg O = 40.06 (40.32 I. Wts.) are prepared from the respective carbonates by exposure to a dull red heat. *Doses* as for carbonates. Antacid, antilithic, diuretic, laxative.

To be tested for lead, and limit fixed—usual figure suggested is 20 per million.—C.D. ii./09,581.

Magnesii Citras Verus.

Dose.—30 to 120 grains (2 to 8 Gm.).

White crystalline powder or in scale form, soluble in water about 1 in 17. A mild purgative.

Liquor Magnesii Citratis, U.S. *Limonade Purgative au Citrate de Magnésie.* FR. Cx.

Average daily dose.—12 ounces.

Magnesium Carbonate 15, Citric Acid 33, Syrup of Citric Acid 60, Potassium Bicarbonate 2·5, Water *q.s.* to nearly 360.

The following is a modification of the *Fr.Cx.* formula (gaseous variety) as prepared on the Riviera:—

Sodium bicarbonate (about 3 or 4 Gm.) is first placed in the dry bottle (about 400 Cc. capacity); syrup (70 Gm.) is added on to this, *alcohol limone* (about 1 Gm.) added, then a solution (prepared in the cold) of magnesium carbonate (18 Gm.) and citric acid (crystal) (32 Gm.) in about 150 Cc. of water, is added. The citric acid is in decided excess. The syrup prevents the sodium bicarbonate and magnesium carbonate solution from touching each other. The bottle is then filled up to within half an inch of the shoulder with water. A good cork is used, which is tied down securely, the bottle then well shaken, and the purgative is ready. *Limonada Rogé* in S. America is similar to *Fr. Cx.*—*Ph. Notes.*

Syrupus Acidi Citrici, U.S.

Citric Acid 1, Water 1, Tincture of Fresh Lemon Peel 1, Syrup to 100.

Magnesii Chloridum, $MgCl_2$, $6H_2O$ = 201·80 (203·336 I. Wts.).

Dose — $\frac{1}{2}$ to 1 ounce (8 to 30 Gm.)

Deliquescent crystals, very soluble in water. Is a mild purgative, useful in constipation.

Magnesii Glycerophosphas, v.p. 61.

Magnesii Hydroxidum, $Mg(OH)_2$ = 57·94 (58·336 I. Wts.). *Syn.*

MAGNÉSIE HYDRATÉE. *Fr. Cx.*

Dose.—5 grains to 2 drachms (0·32 to 8 Gm.).

Prepared by double decomposition of Magnesium Sulphate $24\frac{1}{2}$ and Sodium Hydroxide 8 in solution, the precipitate washed free from sulphate and dried cautiously.

According to the *Fr.Cx.*, calcined magnesia is boiled with 20 to 30 times its weight of Distilled water 20 minutes. Dry as much as possible by collecting on calico and finally at $50^\circ C.$ until it no longer loses weight. Thus prepared, Magnesium Hydroxide contains 31% H_2O .

It dissolves more freely in dilute acids than calcined magnesia. It is a recognised antidote in arsenical poisoning.

Pulvis Magnesii Hydroxidi cum Carbone.

Dose.—1 to 2 drachms in a little water after meals.

Magnesium Hydroxide 1, Wood Charcoal 2.

Is suggested in dyspepsia. The Magnesium Hydroxide is antacid and the charcoal has the useful property of gas absorption. Furthermore, the charcoal would tend to preserve the hydroxide.

A little cinnamon powder (1 in 8) is occasionally added.

Cremor Magnesiae. MAGNESIA CREAM.

Dose.—1 to 4 drachms in a little water.

A palatable concentrated preparation. Each ounce represents 24 grains of suspended Magnesium Hydroxide. Antacid without evolving Carbon Dioxide—hence no distension is caused.

Uses.—In indigestion, dyspepsia, acidity, rheumatism, and as an alkaline mouth wash, forming a film of Magnesium Hydrate over the tooth surface. A useful antidote in case of poisoning by mineral acids.

Collection and washing of the precipitated Magnesium Hydroxide on chamois skin is recommended.—*P. J. i./09, 148.*

Magnesii Lactas.— $\left[C_2H_4 \left\{ \begin{smallmatrix} OH. \\ COO \end{smallmatrix} \right\} \right]_2 Mg. 3H_2O.$
= 254·56 (256·448 I. Wts.)

Dose.—15 to 60 grains (1 to 4 Gm.). White crystalline powder. *Soluble* 1 in 30 water. Superior to the Boro-citrate (*q.v.*) as a hæmostatic. Useful in some cases where Calcium Salts do not seem to act. A dose of 30 grains usually reduces time of coagulation of the blood 30% *e.g.*, from 2 to 1½ minutes. The salt can be made extemporaneously by the dispenser, if prescribed in a mixture, from Magnesia, with Lactic Acid *q.s.* The large dose of the bulky powder, if ordered in that form, is inconvenient to take. Note.—Magnesium Oxide 1 requires Lactic Acid (75°/o) about 5 to dissolve it.

Oozing of blood from the gums has been well treated by 40 to 60 grain doses.—L. ii./o6,436; i./o8,96.

For erosion of bone, due to scurvy, this and the Calcium Salt valuable.—Sir A. E. Wright.—L. ii./o8,725.

Magnesii Peroxidum, *v. p.* 388.

Magnesii Sulphas. (*Off.*) **U.S.**

$\text{MgSO}_4 \cdot 7\text{H}_2\text{O} = 244.68$ (246.502 I. Wts.) (244.69 U.S. Wts.).

Dose.—30 to 120 grains repeated, or ¼ to ½ ounce for a single administration.

Soluble 10 in 13 of water—measuring 18.

Incompatible with Soda Tartarata.

Flavoring.—Glyl *Menthæ Piperitæ*, Glyl *Cinnamomi*; Syrupus *Zingiberis*.

Dysentery in South Africa treated by the "Evacuant Method"—Magnesium and Sodium Sulphates, Castor Oil, Calomel, also with Ipecacuanha Powder.—L. ii./o3,7.

Solutions kept ready for dispensing should be well sterilised, this will effectually prevent the fungoid growth which occasionally occurs.

Intraspinal Anæsthesia has been induced by injecting Magnesium Sulphate in dilute solution. Intracerebral injection cured tetanus (desperate case in which 115 Cc. of Antitoxin had failed).

The highest dose employed was 0.2 Gm. per kilo, or 15 drops of a 25% solution for each twenty pounds of body weight.—L. i./o6,127.

Tetanus has been treated with success by three intra-spinal injections of 3—4 Cc. of 25°/o solution.—L. ii./o7,910.; L. ii./o8,504.

Tetanus, 13 cases treated with injections. In one case a boy of 7 years received 11 lumbar injections of 2.5 Cc. of 25% Solution at each puncture. Produces almost complete relaxation of muscles in all cases.—B.M.J.E. i./o9,91. See also L. i./10,367.

Spinal injections by eliminating the spasms will tide many a patient on to recovery who would die under Serum treatment alone.—B.M.J. i./10,552.

Chorea treated by 1 to 5 Cc. of 25 % Solution of the *pure* salt. Weaker Solution, *e.g.*, 7.3%, which is isotonic with the cerebro-spinal fluid is, however, advised—of this 3.4 Cc.=1 Cc. of the 25%.—B.M.J. ii./o8,1707.

In ulceration of rectum to promote lymph flow to intestinal walls.—Pr. Aug. '09,153.

In epilepsy 1 Cc. of 1 in 5 Solution or 1 Cc. of 1 in 2 Magnesium Chloride hypodermically beneficial.—B.M.J. i./o8,12.

For local pain, solution applied on gauze, renewed every ½ hour.—M.A. 1908,21.

Coagulability of the blood (*c.f.* lactate) not increased by.—L. i./08,97.

For warts one drachm doses internally stated to have given remarkable results.—Pres. 1910, p. 5.

Poisoning by Magnesium Sulphate:—

There have been very few cases of poisoning by Magnesium Sulphate recorded. Seven in all are reported since 1841. In the particular case reported here subcutaneous injections of Saline into tissues of axilla gave relief, also Calomel $\frac{1}{2}$ grain every hour until bowels opened and recovery.—L. i./09,1174.

Magnesii Sulphas Effervescens (*Off.*) U.S.

Dose.— $\frac{1}{2}$ to 1 ounce (15 to 30 Gm.), or 1 to 4 drachms (4 to 16 Gm.) repeated.

Magnesium Sulphate 50, Sodium Bicarbonate 36, Tartaric Acid 19, Citric Acid $12\frac{1}{2}$, Refined Sugar $10\frac{1}{2}$. U.S. has 50, 40·3, 21·1, 13·6 respectively and no sugar.

Enema Magnesii Sulphatis. $\frac{1}{2}$ to 2 ounces in $\frac{1}{2}$ to 1 pint of water.

Enema Magnesii Sulphatis Acida. *Syn.* HENRY'S SOLUTION.

Magnesium Sulphate 7 ounces, Dilute Sulphuric Acid 1 ounce. Distilled Water 7 ounces.

'Vescettes' of Magnesium Sulphate, each containing 30 grains.

To be crushed and dissolved in a small draught of warm water.

Mistura Alba. *Dose*— $\frac{1}{2}$ to 2 ounces.

This is a pleasant and efficient aperient.

St. Th. H. has Magnesium Sulphate 30 grains, Magnesium Carbonate 15 grains, and Peppermint Water 1 ounce.

Magnesia Mixture for analytical work.

Solution of Magnesium Ammonio-Sulphate (*Off.*). Dissolve Magnesium Sulphate 20, Ammonium Chloride 40, in water 160, add Ammonia Solution 84. Allow to deposit in stoppered bottle before use. Is employed for the gravimetric estimation of phosphates. Ammonium Magnesium Phosphate is precipitated and converted by incinerating into Magnesium Pyrophosphate $Mg_2P_2O_7 = 221·12$ (222·64 I.Wts.).

Magnesii Sulphis, *v.p.* 81.

MALTUM.

Maltum, U.S. Grain of barley partially germinated artificially and then dried. Yields 70% extract. The acidity calculated as lactic acid should not exceed 0·3%.

Malti Pulvis. *Dose.*—1 to 2 drachms (4 to 8 Gm.).

Malt flour or entire malt powdered, is added to baked wheaten flour in various proportions to form the popular infants' foods, and is given to assist digestion. When these are mixed with hot water or a mixture of hot milk and water, the starch contained in the wheaten flour becomes soluble and digested into dextrin and malt sugar. The diastatic property of malt is most acute in aqueous solution at 104° F.—a boiling heat destroys it. A small teaspoonful of malt flour may be sprinkled over or mixed with cooked farinaceous foods, coffee, beer, &c.

Diastase. Obtained by exhausting malt with tepid water, precipitating with alcohol, and drying at below 45° C. Is a yellowish white powder

or in translucent scales. According to CODEX diastase converts 100 times its weight of starch into sugar and dextrin. Its use is indicated by the presence of starch grains in the fæces, or urine.

Extractum Malti, U.S. B.P.C., G.H.—*Syn.* EXTRACTUM BYNES.

Dose.—1 to 4 drachms.

A syrupy, brownish liquid, about Sp. Gr. 1·375, with pleasant sweet taste, consisting principally of maltose (about 50%), with dextrin, dextrose, diastase, proteid, phosphates and aromatic principles. It is made by mixing malt with tepid water (55° C., *i.e.*, 131° F.), pressing, filtering, and evaporating below 55° C. Extract of Malt and its preparations are prescribed in cases of debility of all kinds, as a restorative, like cod liver oil, but particularly where digestion is weak. B.P.C. 1907 states its diastatic power in terms of amount of starch converted into sugar *vide infra*, or the time taken to do this.

It should digest twice its weight of arrowroot starch in 30 minutes at 40° C. (B.P.C., 1901).

Caspari recommends the titration of the resulting Dextrose with Fehling's Solution. 1 Cc. of this = 0·005 Gm. Dextrose = 0·0045 Gm. of starch converted therinto.

Determination of Solids, Proteid, Diastase, in Commercial Extracts.—P.J. July 28, 06. The Nitrogen content varies very much.—P.J. 1/07, 205.

A properly prepared Malt Extract contains Maltose as its principal ingredient. Glucose and Dextrin are sometimes added as sophistications, and the Protein content is consequently lowered—the latter should be about 6% of the whole, or 8% of the total solids.

The Malt Extracts of commerce are reported on (B.M.J. ii./09, 1477) the total reducing sugar found being calculated as Maltose; the Protein was arrived at from the total nitrogen found. The Diastatic Power was ascertained by a modification of the B.P.C. 1907 method (*vide above*) and was expressed as the percentage of Starch which was digested by the Extract in half an hour at 40° C., *i.e.*, a Diastatic Power of 500 means an Extract digesting five times its weight of starch. The percentage of Maltose in the same varied from 53·6 to 75·2, and the Diastatic values from 9 to 413.

For the results of the analyses, *vide* B.M.J. ii./09, 1477; 1/10, 30.

Some of the preparations are referred to in the Patent Medicine Chapter.

HARRISON'S method of determining diastatic value of Malt Extract: Glycerin is a frequent addition and might be approved of for an Official preparation to extent of 5% by volume. Proteids might be 5% at least. A lower figure for Proteid would point to added Glucose or other non-nitrogenous matter. Added Glucose to be entirely excluded and test for it provided.

After reviewing the various methods, and the pros and cons of the amount-of-Maltose-produced methods as against the time-taken-to-convert-a-given-weight method, the former is decided upon, employing Anhydrous Potato Starch 1 Gm. in water 100 Cc. with 1·2 Gm. Malt Extract. After half an hour at 40° C. the Maltose formed is titrated. If the Diastatic Power is over 500 repeat the test using less Malt Extract.—P.J. i./09, 390; ii./09, 148.

Adulterants.—The principal adulterants found were materials containing dextrose, *e.g.*, starch, syrup and molasses-syrup (from beet sugar). The dextrin formed in mashing of Malt is never much less than 10% of the Maltose formed. The amount of dry solids is determined, the amount of sugar reckoned as Maltose, and the proportion of Nitrogenous substances. If the two latter are added together and deducted from the total dry solids, the result is the amount of non-reducing Nitrogen free Extract, which is practically speaking dextrin, and the figure is called the dextrin figure, usually 9 to 14. If below the minimum one can conclude adulteration with glucose or starch syrup, because the dextrose of these has a much greater reducing power than Maltose. Maltose produces less acidity, *i.e.*, less irritation to the bowels. 70% of Maltose is absorbed in the first hour, whilst only 20–40% of other Sugars. Addition of glucose reduces protein content and the organic phosphorus. The

Food value of Malt Extract depends directly on its diastatic strength.—Max Lamburg.—P.J. ii./09,133.

*** Maltine** (a trade mark) is sold plain; with cod liver oil 30%; with iron pyrophosphate 8 grains to the ounce; with pepsin and pancreatin; with hypophosphites of lime 3 grains, of soda 3 grains, of iron 2 grains in the ounce; with phosphate of lime 4 grains, of soda 4 grains, and of iron 3 grains in the ounce (Malted chemical food); with \odot iron pyrophosphate 4 grains, quinine 1 grain and strychnine $\frac{1}{2}$ grain in each ounce; with cascara = 66 minims of liquid extract; and with creosote 4 minims in the ounce.

Maltine with Cod Liver Oil. Analysis of.—B.M.J. i./10,30.

Cream of Malt is a special preparation. It is supplied 'plain,' with Cascara, with Cod Liver Oil, with Cod Liver Oil and Hypophosphites, with Creosote, with Analysed Iron, \odot Easton's Syrup, &c.

Diamalt is stated to have diastatic power 1060—(1392 elsewhere)—higher than many of the Malt Extracts on the market. Contains 5.8% proteids.

Digested nearly seven times its weight, of starch at body temperature, at higher temperature 13 times.—L. i./09,551.

Made according to an Austrian patent. Description of the process.—B.M.J. ii./09,606.

Diamalt with Cod Liver Oil contains 16.6% 'Oil,' and the Extract present has diastatic power—592, much higher than any of the other commercial brands.—B.M.J. i./10,30.

Extractum Malti Liquidum. *** Bynin.**

Dose.—1 to 4 drachms (3.5 to 15 Cc.).

In place of evaporating malt infusion to the viscosity of the solid extract, it be concentrated *in vacuo* to prevent decomposition of the ferment diastase until it has Sp. Gr. 1.375, and about 7% of alcohol added, making the finished product of Sp. Gr. 1.250, a liquid extract is formed which is more convenient.

Glycerin is added; Alcohol only precipitates the diastase, also a small quantity of Formaldehyde as preservative.—P.J. ii./07,732.

\odot * Bynin Amara.

Dose.—2 to 4 drachms well diluted.

Contains Quinine Phosphate $1\frac{1}{2}$ grains, Iron Phosphate 2 grains, Strychnine Phosphate $\frac{1}{2}$ grain, in liquid malt extract (Bynin) 1 ounce. It is $\frac{1}{2}$ the strength of Easton's Syrup.

Extractum Malti cum Hypophosphitibus.

Dose.—1 to 4 drachms (3.5 to 15 Cc.). Dissolve Calcium Hypophosphite 5 in water 4, and Sodium Hypophosphite 0.5 in water 1, then add Liquid Extract of Malt *q.s.* to 100.

Extractum Malti cum Hypophosphitibus cum Oleo Morrhue.

Dose.—1 to 4 drachms (3.5 to 15 Cc.). Contains Calcium Hypophosphite and Sodium Hypophosphite of each 0.5, Cod Liver Oil 15 and Liquid Malt Extract *q.s.* to 100. Label the above 'Shake the bottle.'—Cf. J. i./07,452.

Extractum Malti cum Cascara.

Dose.—1 to 4 drachms (3.5 to 15 Cc.). Liquid Extract of Cascara 1, Liquid Extract of Malt 7. This is palatable. Mix and mark 'Shake.'

Extractum Malti Ferratum, G.H.E.

Iron Pyrophosphate 2, Water 3. Dissolve and add Extract of Malt 95.

Dose.—1 to 4 drachms (4 to 16 Gm.).

Extractum Malti cum Glycerophosphatibus, v.p. 62.

Extractum Malti cum Hæmoglobino.

Dose.—1 to 4 drachms (3.5 to 15 Cc.).—Hæmoglobin 1, Liquid Extract of Malt 7. Mix and mark 'Shake.'

Extractum Malti cum Syrupo Ferri Phosphatis. *Syn.*

MALTOFERROSE.

Dose—1 to 4 drachms.

Containing in each drachm: Phosphate of Iron $\frac{1}{4}$ grain, and $\frac{1}{2}$ grain Calcium Phosphate, with $\frac{1}{4}$ grain each of Sodium and Potassium Phosphates.

Extractum Malti cum Oleo Morrhuæ, G.H., B.P.C. *Dose*.—1 to 4 drachms (3·5 to 15 Cc.).

The amount of oil in this preparation is variable—it should be at least 15% (20 G.H.; 25 St. Th. H. and L.H.).—P.J. 1894, 162. A little salicylic acid is often added to preserve it.

Extractum Malti cum Pancreatina. *Dose*.—1 to 4 drachms (3·5 to 15 Cc.). Liquid Extract of Malt 2, Pancreatic Solution 1.

We find this produces a perfectly clear solution without any deposit; on the other hand, made with Pancreatin 2, Glycerin 10, and Liquid Extract of Malt to 100, the result was not satisfactory. Assists digestion of farinaceous food.

Extractum Malti Siccum.

Contains about 75% Maltose, 1·5% Phosphates, 5% Albuminoids. *Dose*.—1 to 2 drachms.

A somewhat hygroscopic yellowish coarse powder, easily soluble in water. Is desiccated carefully *in vacuo* and hence keeps well.

In some experiments we determined English Dried Malt Extract to be more active than foreign, but not quite so active as Extractum Malti.

Examination of commercial extracts.—P.J. ii./06, 94.

Extractum Malti cum Pepsina.*Dose*.—1 to 2 drachms (3·5 to 7 Cc.).

Pepsin 5, water *q.s.* to form a paste, and add Liquid Malt Extract to 100. The bulk of the pepsin dissolves. Use a small quantity of glycerin and hydrochloric acid as solvent of the pepsin.

Taka-Diastase. *Dose*.—1 to 5 grains (0·065 to 0·32 Gm.).

A whitish powder obtained by the cultivation of a fungus, *Eurotium Oryzae*, on bran; possesses amyolytic properties.

Useful for gouty dyspepsia and hyperacidity of the stomach.

MANGANESEIUM.

Mn=54·52 (54·93 I. Wts.) (54·6 U.S. Wts.).

Manganesii Oxidum Præcipitatum, U.S.

Dose.—3 to 10 grains (0·2 to 0·65 Gm.), or more, in pills with syrup. Tablets, 2 grains (0·13 Gm.).

Manufactured by removing the matter soluble in dilute hydrochloric acid from commercial manganese oxide, removing the acid and washing the residue, utilising the lighter portions only of the residue.

Consists principally of manganic oxide $\text{MnO}_2 = 86·28$ (86·93 I. Wts.; 86·36 U.S. Wts.) (U.S. contains not less than 80% MnO_2), a bulky blackish brown powder, free from grittiness and entirely soluble in cold hydrochloric acid.

Uses.—In gastrodynia, pyrosis, and in amenorrhœa taken 3 or 4 times a day before expected period. In chlorosis it assists the action of iron salts, and is less irritant than the permanganates.

Manganesii Citras, 'Soluble.' *Dose.* — 3 to 5 grains (0·2 to 0·3 Gm.).

This is a double salt with Sodium Citrate. **Ferro-Manganese Citrate.** *Dose.* — 3 to 10 grains (0·2 to 0·65 Gm.) [and combined with Quinine 15%. *Dose.* — 3 to 5 grains (0·2 to 0·3 Gm.) and P with Strychnine 1%. *Dose.* — 1 grain (0·065 Gm.)] and **Ferro-Manganese Phosphate**—*Dose.* — 3 to 10 grains (0·2 to 0·65 Gm.)—are also prepared.—P.J. ii./01, 136; Y.B.P. 1901, 458.

Manganesii Hypophosphis, U.S. $\text{MnP}_2\text{H}_4\text{O}_4 + \text{H}_2\text{O} = 201\cdot52$ 201·54 U.S. Wts.; 202·978 I. Wts.).

Dose. — 1 to 10 grains (0·065 to 0·65 Gm.).

A white or slightly rose-tinted powder, soluble 1 in 10 of water. A nerve stimulant.

Manganesii Phosphas $\text{Mn}_3\text{P}_2\text{O}_8 \cdot 7\text{H}_2\text{O} = 477\cdot36$ (480·902 I. Wts.). *Dose.* — 1 to 5 grains (0·065 to 0·32 Gm.).

A white powder, generally with a pinkish tint, insoluble in water. From $\frac{1}{2}$ to 1 grain is given in 1 drachm of syrup of ferrous phosphate.

Manganesii Sulphas, $\text{MnSO}_4 + 4\text{H}_2\text{O} = 221\cdot38$ (221·47 U.S. Wts.; 223·064 I. Wts.).

Dose, of powder. — 2 to 10 grains (0·13 to 0·65 Gm.).

A white powder with a faint pink tint, due to a little manganic sulphate or in pink crystals. **Soluble** about 1 in $1\frac{1}{2}$ water. For jaundice, 60 grains is a cholagogue purgative; not reliable, may cause sickness.

Potassii Permanganas (*Off.*). $\text{K}_2\text{Mn}_2\text{O}_8 = 313\cdot74$ (316·06 I. Wts.); U.S. $\text{KMnO}_4 = 156\cdot98$ U.S. Wts.

Dose. — 1 to 3 grains (0·065 to 0·2 Gm.) in well-diluted solution, or pill. Capsules contain 1 grain (0·065 Gm.).

Potassium Permanganate may be prepared by oxidising manganese oxide by the aid of potassium chlorate in the presence of potassium hydroxide.

Incompatible with all vegetable oxidisable matter, *e.g.*, glycerin, alcohol, sugar, fats and oils, with ammonia, ammonium salts and alkaloids.

Uses.—The **Saturated Solution** (1 in 20 of water) is strongly antiseptic; as a disinfectant its colour is an advantage. It is a good odouriser. The official Liquor is 1%.

A dilute solution will dye white hair to a chestnut brown.

In amenorrhœa, 1 or 2 grains, in a pill 3 or 4 times a day should be given for a few days before the time of the expected period.

For gonorrhœa, 1 in 1,000 is used as an injection. For acute gonorrhœa give with injections of 1 to 2 quarts of 1 in 10,000 to 1 in 20,000 at 40° 45° C.—L. ii/08, 1223. 1 in 5,000 (approx.) gives invariably good result.—B.M.J., i/09, 532.

For dysentery rectal injection 4 grains to the pint is used.

Cholera in India treated by the stomach with weak solution of Potassium permanganate.—*Proc.* 1910, p. 11.

In ozæna a spray of the Liquor 5 minims with Sodium Chloride 5 grains the ounce of water is useful.—Tilley.

Gargle, Mouth Wash, or Vaginal Injection, 1 of the official liquor in 50 of water is useful.

St M.'s H. and E.L. for gargle have official liquor 12 minims to water 1 ounce.

Useful for applying to foul ulcers and patches of gangrene and to carbuncles as mild caustic.

In bromidrosis, wash the feet first in benzene, then in 1% permanganate (at night). Powder (during the day) with Potassium Permanganate 13, Alum 1, Talc 50, Zinc Oxide 18, Zinc Chloride 18. Bath of borax and benzoïn also useful.—M.A. 1906,150.

As *disinfectant* some valuable data were obtained by Bousfield *re* Potassium Permanganate. Hitherto nothing exact was recorded (excepting perhaps our own statement in the Extra Pharm. xiii. p. 932 in which we stated that 1 in 1,000 rapidly killed all the organisms examined in 2 minutes.—W.H.M.) Sewage as control in these new experiments gave an average of 239 colonies, in 0.00001 Cc. against sewage with 1 in 5,000 permanganate 99, 1 in 2,500 23, and 1 in 1,000 one colony—the time of contact being 12 hours. Further work showed that the time element is of no importance whatever—results after 5 minutes contact were quite as good as after 4 hours. A source of error in the Rideal-Walker method was overcome in these tests by diluting the disinfectant after 12 hours' contact to 1 in 100,000 of the strength at which it had been allowed to act for the purposes of the experiment before making the cultures. The general conclusion was that 1 in 1,000 is efficient and that if such a mixture of permanganate and sewage is deodorised it is also sterilised.—L. ii./08, 1078.

Snake bite lancets are prepared containing the crystals.

Directions.—Squeeze the part so as to press out the venom, then cut with the lancet, making several incisions deeper than the bite, and rub in the dry crystals thoroughly, moistening with water if necessary. Tie a ligature or handkerchief between the bite and the heart as soon as possible to prevent the venom getting into the circulatory system. Equally good in all kinds of snake bite; results.—B.M.J. ii./05, 1290.

If a tube of ethyl chloride is at hand spray the part whilst making incisions.

Sir L. Branton has reprinted papers by Fayer and himself dealing with methods of preventing death from snake bite.—Review.—B.M.J. i./09, 541.

Cobra bite, treated with Potassium Permanganate crystals locally—injection of strychnine nitrate $\frac{1}{16}$ grain and digitalin $\frac{1}{160}$ grain—internally Potassium Permanganate 2 grains to the ounce every other half-hour with alternately a mixture of Aromatic Spirits of Ammonia, Ether, Sweet Spirits of Nitre, Strychnine, Digitalis and Camphor Water—man's life was despaired of—recovery.—L. i./10, 643.

Scorpion stings are best treated by ammonia or an evaporating lotion to the affected part, also Potassium Permanganate as in snake bite. *q.v.* Twenty out of 21 recovered under Potassium Permanganate treatment.—Brooke, 120.

Vomiting of pregnancy treated by 2 to 4 grains Potassium Permanganate in a cachet, giving immediately afterwards 3 to 4 ounces of water. Patient keeps this in the stomach 10 to 20 minutes—lying very still—then a pint or more of warm water. If necessary a further 1 grain of Permanganate per hour.—B.M.J. i./07, 684.

A saturated solution applied to ulcerating lupus of the face with good results.—B.M.J. ii./03, 194.

Isolated lupus nodules to be treated by boring holes with wooden skewer,

filling with permanganate and moistening the surface with water and repeating a few hours later, using novocain and adrenalin.—L.ii./o8,471.

Pilula Potassii Permanganatis.

1, 2, 3, 4 or 5 grains with Kaolin Ointment, q.s.

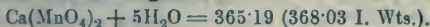
Caution! Avoid mixing any easily oxidised substance, like sugar, glycerin, &c. The pills may be coated with sandarach solution. A solution of Potassium Permanganate is very nauseous.

Tablets contain 1, 2 and 3 grains. To be dissolved.

'Solubes' 5 grains for preparing lotions and vaginal injections; to be dissolved in $\frac{1}{2}$ a pint or more of water.

Hartin's Crimson Salt, is said to contain Potassium Permanganate.

Calcium Permanganate.



Dose.— $\frac{1}{4}$ grain (0.016 Gm.), thrice daily one hour before meals.

Deliquescent crimson crystals preferred for making mouth lotions, as it has least taste. 1 in 100,000 sterilises water in 5 minutes; more powerful than the potash salt.

For rodent ulcer and also for gastritis has been recently advised. Effect ascribed partly to the oxidising power and partly to the nutrient effect of the calcium. Internal use in rodent ulcer has proved beneficial even on recurrence after X-ray treatment. Gastric ulcer with usual symptoms greatly improved. In gastritis excellent results with $\frac{1}{4}$ grain doses and plenty of water.—B.M.J.ii./o9,1674.

Sodium Permanganate,

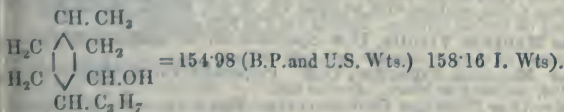
$\text{Na}_2\text{Mn}_2\text{O}_8 = 281.84$ (283.86 I. Wts.) in solution, red in colour, is used as a cheap disinfectant. *Condy's Red Fluid contains this salt. This manufacturer's green fluid has Sodium Manganate $\text{Na}_2\text{MnO}_4 = 163.8$ (164.93 I. Wts.) in solution. — L. ii./oo,1587; i./o3,971. See, however, chapter on Disinfectants.

Zinc Permanganate.

$\text{Zn}(\text{MnO}_4)_2 + 2\text{H}_2\text{O} = 336.75$ (339.262 I. Wts.). Deliquescent brown crystals; for lotions and injections, 1 grain in 8 ounces, where the astringent action of the zinc is indicated, v. p. 684.

MENTHOL (Off). FR.Cx.

METHYL-PROPYL-PHENOL HEXAHYDRIDE.



Dose.— $\frac{1}{4}$ to 2 grains (0.032 to 0.13 Gm.) or more in a pill with powdered soap, or in solution in olive oil.

A white crystalline substance deposited on cooling Oil of Pepper-

mint.* Obtained from *Mentha arvensis*, vars. *piperascens* et *glabrata*, and of *M. piperita*, *Labiata*, it melts at 107.6° F.

Soluble 5 in 1 of 90% Alcohol, also in Ether 2 in 1, Chloroform 4 in 1 approximately, 1 in 4 of Olive Oil, and in Petroleum Spirit 10 in 7; sparingly soluble in water, insoluble in glycerin. Soluble on warming in a strong solution of Sodium Salicylate, but throws out again.

Uses.—Given internally, it acts as a diffusible stimulant. It is stated to be of value in the vomiting of pregnancy. Its solutions, applied topically to the skin affect the nerves of the part somewhat like aconite, and form useful pigments for headache, rheumatic pains and neuralgia, having the advantage of being non-poisonous. It has antiseptic and anæsthetic properties, and gives great relief in prurigo, urticaria and pruritus ani. It is moulded into cones, sticks and pencils, for relieving neuralgia. It liquefies when gently rubbed on the painful part.

Pigment, 1 in 4 of oil, is used to relieve laryngeal tubercular ulceration. As an antineuralgic in toothache, 1 in 60 of Alcohol with a little Clove Oil, and for sciatica. The crystals also on cotton wool may be placed in the hollow of an aching tooth.

Menthol liquefies with an equal amount of either Carbolic Acid,† Chloral Hydrate or Thymol, also 3 parts of Menthol and 2 parts of Camphor, 2 parts of Menthol and 1 part of Butyl Chloral Hydrate, and 2 parts of Menthol, with 1 of each Phenol and Butyl Chloral Hydrate. The above will relieve toothache. Its Camphor and Phenol combinations are used to medicate oro-nasal 'Ozonic' and the Nasal 'Ozonic,' and other dry inhalers, and are most beneficial for arresting and curing colds, and relieving influenza and chest affections.

* U.S. requires not less than 6% ester calculated as Menthyl Acetate, and not less than 60% of total Menthol (free and as ester). Schimmel on the two varieties of U.S. oils, Authentic oils frequently as low as 4% Ester.—Am. J. Ph. June 1906, 259.

Glycerin Acetate, or Triacetin, was used as an adulterant of Peppermint Oil.—Umney, C.D., lxii, 591. *Ibid.*, ii, 09, 292.

Finest English white Mint Oils contain 12 to 15% esters, whilst the black variety rarely more than 8%.—P.J., ii, 08, 624.

Oleum Menthæ Piperitæ, *P. Off.*—Distilled from fresh flowering *Mentha Piperita*, rectified if necessary, by redistillation. Sp. Gr., 0.900 to 0.920 [*Off.* same]; O.R., -20° to -35°; Soluble 1 in 4 of 70% alcohol. Should contain at least 50% menthol, free and combined, determined by the acetylation process (*q.v.*), and not less than 6% of esters (calculated as menthyl acetate) by saponification with alcoholic potash.

Oleum Menthæ Viridis, U.S., is distilled from fresh flowering Spearmint, *Mentha Viridis* (*Labiata*).

Oleum Menthæ Viridis, *P. Off.*—Distilled from fresh flowering spearmint *Mentha viridis* or *Mentha crispa*. Sp. Gr. 0.925 to 0.940 (*Off.* 0.920 to 0.940); O.R., -30° to -50°. Forms a clear solution with an equal vol. of 80% alcohol, the solution becoming turbid on further dilution. Soluble 1 in 3 of 90% alcohol.

Spiritus Menthæ Viridis, U.S. Spearmint Oil 10, Spearmint 1, Alcohol to 100, macerate 24 hours. *Average dose.*—30 minims.

Spiritus Menthæ Piperitæ, U.S. Peppermint Oil 10, Peppermint 1, Alcohol to 100, macerate 24 hours. *Dose* as last.

Aqua Menthæ Piperitæ Concentrata. This in commerce is a solution of the Oil in Alcohol. Ph. Form. p. 555, gives Peppermint Oil 160 minims, Light Magnesium Carbonate 2 drachms, Alcohol 90% 3 ounces, Water 1 ounce. For dilution 1 to 39.

† **Ⓐ Menthophenol**. Menthol 3, Phenol 1. Useful as gargle; 15 drops to the tumbler of water.

For the inhalation of hot medicated moist air the 'Portable' and 'Poor Man's Inhaler' may be used *c.f.* Creosote and other vapors.

Menthol Camphor and other combinations, diluted with a heavy mineral oil, or preferably in spirituous solution, for spraying into the nares or inhaled as above, relieves swelling and irritability of nasal catarrh, contracts capillary blood-vessels of mucous membrane, reduces swelling, relieves pain and fulness of head, arrests sneezing, checks excessive discharge, and corrects perverted secretion.

For ringworm of the scalp, 1 part Menthol in 4 volumes of Chloroform and 12 volumes Olive Oil.

For threadworms injection of Menthol 1 grain in Olive Oil 1 ounce useful.

For dyspepsia, and vomiting of pregnancy.—M.A. 1908, 21.

In the intractable vomiting occurring in cholera, further in acute and chronic forms of asthma, of great service, though not so rapid as morphine. For dyspnoea of pulmonary origin *e.g.* in emphysema of lungs quiets the cough and relieves the dyspnoea. Allays colicky pains and checks painful evacuation. Undoubted service in hyperchlorhydria—in this a dose of 0.25 Gm. with 5 Gm. of Sodium Phosphate is given about 2 hours after each principal meal.—B.M.J.E. ii./08, 51.

Aqua Menthol. Menthol 8 grains, Alcohol (90%) 2 drachms, Distilled Water 20 ounces.

Emplastrum Menthol, Menthol Plaster (Off.). Menthol $1\frac{1}{2}$, dissolved in melted Yellow Wax 1, and Resin $7\frac{1}{2}$. Useful for rheumatism and intercostal neuralgia.

Injectio Menthol, C.L.T.E.

Menthol $2\frac{1}{2}$ gr., Liquid Paraffin 1 ounce. For use with an Eustachian catheter to the middle ear.

Sterules, Hypodermic of Menthol contain $\frac{1}{8}$ grain (0.013 Gm.) in 10 minims Liquid Paraffin.

Insufflatio Menthol. For nasal catarrh, consisting of Menthol 1, Ammonium Chloride 3, Boric Acid 2, and Lycopodium 6, gives great relief. C.L.T.E. has Menthol 2, Ammonium Chloride 3, Boric Acid Powder 3, also **Insufflatio Menthol Mitis** 1% approximately in Milk Sugar.

Insufflatio Menthol et Cocainæ. R.F.H. Cocaine Hydrochloride $\frac{1}{2}$ grain, Menthol 3 grains. Boric Acid Powder $\frac{1}{2}$ ounce, Bismuth carbonate $\frac{1}{2}$ ounce,

Insufflators.—Butlin's, for self use; Lucas's, rubber ball and vulcanite tube; Maw's, glass barrel and rubber ball; Kabierske's, glass chamber, rubber ball and vulcanite mount.

Linimentum Menthol. (Adopted by B.P.C.).

Menthol 3, Chloroform 4, Olive Oil *q.s.* to 16; is useful in lumbago, neuralgia, sciatica, and ringworm.

Linimentum Menthol Compositum.—S.H.

Menthol 3, Tincture of Aconite 4, Chloroform 4, Soap Liniment 5.

In pruritus Menthol 1, Camphorated Alcohol, Chloroform and Ether of each 3 "dabbed on" lessens irritation.—B.M.J.E. i./10, 5.

Menthol-Paraffin Capsules contain a saturated solution of menthol in liquid paraffin. These have elongated ends, which can be torn off, and the contents dropped into the ear to abort boils and to relieve earache.

Mentholeate. Menthol 200 grains, Oleic Acid $\frac{1}{2}$ ounce. Heat gently to dissolve. Useful in pruritus, etc., where absorption is desired.

Pastillus Menthol, T.H., contains $\frac{1}{8}$ grain.

Pigmentum Menthol, G.H.—1 to Olive Oil 4. Painted or injected into the larynx, or even the trachea, useful in phthisis and laryngeal disease. Also applied on wool for ear affections.—**Nebula Menthol**, a solution in liquid paraffin is used for spray or pigment for throat, 5 to 10 grains to ounce, T.H., or Olive Oil, C.L.T.E.

Pigmentum Menthol cum Guaiacol G.N.C. Menthol 1 grain, Guaiacol in crystals 1 grain, Oil of Almonds to 1 ounce.

Tabellæ Menthol. *Dose.*—1 or 2, *ad libitum*.

Contain $\frac{1}{4}$ grain menthol, combined with chocolate.

Ⓟ **Tinctura Menthol Ætherea**, for local application.

Menthol 1, Purified Ether 4 and Chloroform 4. In neuralgia, best applied with a glass brush.

Ⓟ **Menthol Spray.**—Menthol 1, Chloroform 10, Ether 16, produces temporary local anæsthesia.

Acute laryngitis may be relieved by inhaling from an atomiser a solution of menthol 10 grains in Liquid Paraffin 1 ounce.—Tilley.

Arthritic pharyngitis may be treated with Ointment of Menthol 6 grains, Boric Acid 15 grains, Soft Paraffin 1 ounce, introduced into the nostrils morning and evening.

Gossypium Menthol, B.P.C. 10%. Saturate Cotton Wool 85 with Menthol 10 and Liquid Paraffin 5 in Ether 250 and spread out to dry. Useful to plug the nose in nasal catarrh.

★ **Validol.** *Dose.*—10 to 15 minims (0·6 to 0·9 Cc.).

A specialty said to contain 30% of menthol in valerianic acid, is a colourless liquid with an agreeable odour and free from burning taste of menthol. Nerve sedative. Useful in sea-sickness.

On going on board, or at first sign of malaise 15 drops in a little wine. In severe cases 10 drops of **Validol Camphorate** (containing 10% of Camphor and repeat in half an hour if necessary. Also given in cardialgia and gastralgia. Stated to be useful in 'examination fright' and similar forms of fear. 5 to 8 drops rubbed on the forehead causes a sensation of cold and acts as a stimulant in faintness. The Camphorate inserted in a carious tooth stops toothache.

Bromo-Validol. Tablets contain Sodium Bromide 15 grains, Magnesia usta. $1\frac{1}{2}$ grains, Validol 5 drops. *Dose.*—1 to 2 tablets.

In nerve complaints, hysteria and insomnia.

★ **Coryfin.** MENTHYL-ETHYL-GLYCOLATE.

Dose.—2 to 5 minims (0·12 to 0·3 Cc.) Colorless liquid soluble in Alcohol and Oils, insoluble in water. Useful as a paint in nasal catarrh. Inhalation 10 minims to the pint, gargle 4 drops to the tumbler of lukewarm water. Applied locally relieves toothache and headache.

Estoral. A Boric Acid and Menthol preparation.

$B(O.C_{10}H_{19})_3 = 472\cdot79$ (476·456 I. Wts.).

White crystalline powder with slight Menthol odour.

Estoral Snuff is made.—A treatment for common colds.

Ⓜ MORPHINA. FR. Cx.

$C_{17}H_{17}NO(OH)_2H_2O=300.93$ (300.92 U.S. Wts.) (303.178 I. Wts.).

Dose.— $\frac{1}{10}$ to $\frac{1}{2}$ grain (0.0065 to 0.02 Gm.).

This, the principal alkaloid of opium, is in a white powder, or in white, shining crystals, insoluble in water and ether. **Soluble** in alcohol 90% slightly; glycerin 1 in 150, oleic acid 1 in 10; solutions of its salts are precipitated by ammonia and by potash (but re-dissolved in the latter). It loses about 6% of its weight on drying at 90° C., 3 parts of Morphine are reckoned approximately equal to 4 parts of any of the official salts.

Solubility in chloroform by heating at 105° C. is increased.—Dott.

Hydrated Morphine is soluble 1 in 5,200 water at 20° C.—C.D.i./07,457.

To the phenolic character (chemically) of Morphine is due the coloration produced by Ferric Salts, its reducing effect on iron and on iodates—distinction from Codeine, Dionin and Heroin in which the Phenolic OH. has been replaced.—Am. Jl. Ph. Feb. 08,73.

Estimation in presence of Glycerin by precipitating Morphine-di-iodo-hydriodide (not "Morphine hydriodide tri-iodide, as stated.—W.H.M.)—Am. Jl. Ph. 1906,465.

Isolation of morphine in toxicology.—P.J. ii./05,617.

Incompatibility.—Morphine salts are decomposed by alkalis, and solutions are precipitated by vegetable compounds containing tannin, also with iron, lead, manganese, silver, copper and zinc salts, Liquor Arsenicalis, and potassium permanganate.

Antidotes.—Emetics should first be given and the stomach tube used. Wash out the stomach with Potassium Permanganate Solution; give strong hot coffee, or Ammonia, or Ether, Amyl Nitrite inhalation. Physiological antidotes are Belladonna and Atropine. $\frac{1}{20}$ grain of the latter antagonises 1 grain Morphine (draw off the urine with catheter frequently). The following have also been given with good effect hypodermically:—Nitroglycerin, Picrotoxin, Pilocarpine, Strychnine, Oxygen inhalation, Saline Solution intravenously (for the latter *vide* L. i./02,1317) and Brandy *per rectum*.

Cure of Morphine poisoning by inhalations of Oxygen.—L. ii./98,545. By nitroglycerin.—B.M.J.E. ii./90,77.

$\frac{1}{10}$ grain Atropine, in doses of $\frac{1}{16}$ grain at intervals brought recovery where 4 grains of Morphine had been injected.—B.M.J. i./05,1040.

Calcium permanganate 5% solution is antagonistic (decomposes).—C.S.A. i./05,107.

Flavoring of liquid preparations of Morphine. Gyl Rosæ Syl amygdalæ Amare; Syrupus Aurantii.

Uses of Morphine Salts.—General and most useful sedative and anodyne for all purposes, but may cause indigestion and constipation. Must be given with care to children. Employed in diabetes, but Codeine generally preferred.

Opium and morphine may poison infants through the mother's milk; see case in B.M.J. ii./85,1159.

Puerperal eclampsia well treated by hypodermic injections.—B.M.J. ii./03,212.

Hæmoptysis treated by $\frac{1}{8}$ to $\frac{1}{3}$ grain hypodermically.—B.M.J. ii./04, 1635, 1783. Excellent.—W.W.W.

Wanted, a reliable hypodermic hypnotic to replace Morphine, owing to effect on heart or risk of possible paralysis of the intestines.—B.M.J. i./07, 1036.

Constipating effect of morphine discussed.—M.A. 1908, 24.

In toxæmia from various causes.—L. ii./08, 520.

May be given in renal cases. For restless painful nights with cardiac dyspnœa it is invaluable. Give a small dose at first.—L. ii./08, 520.

Mania treated by $\frac{1}{4}$ grain dose with chloroform in addition. The two together produce deep sleep lasting several hours. Either alone is comparatively of little avail.—B.M.J. ii./08, 197.

In **Morphine Habit**, Sparteine Sulphate is recommended to gradually replace the Morphine solution, commencing with $\frac{1}{4}$, increased to $\frac{3}{8}$ grain, four to six times a day. Sodium Bromide and Nitroglycerin Tablets are useful, *q.v.* Camphor has been given to relieve the craving; also Heroin and Dionin.

Gamgee on chronic morphinism and its treatment. For the insomnia of Veronal, for the circulatory and respiratory troubles give full doses of Digitalis Tincture, repeated hypodermic Strychnine ($\frac{1}{30}$ grain) injections and cupping glasses to the region of the heart. For the gastric catarrh Bismuth Carbonate (as much as 5 Gm.) first thing in the morning, with directions to change resting position as is done in treatment of gastric ulcer.—L. ii./08, 796.

Jennings' Therapeutic Triad.—(1) Turkish bath with hot and tepid douches, (2) Heart tonics (Digitalis and Sparteine). (3) Sodium Bicarbonate *e.g.*, as Vichy Water. In addition there is gradual reduction of amount of Morphine by the patient himself, using Normal Saline as the solution becomes weaker. Comparison with the late Professor Gamgee's methods.—L. ii./08, 1325; M.P. July 21/09, 64.

Chinese Opium 'Cures' were found to contain Morphine (to extent of 75% of those examined). Tests were Iodine in Potassium Iodide (pp.) Fröhde's Reagent (blue), Ferric Chloride (blue), Iodic Acid (Iodine liberated). One contained Strychnine and Quinine.—L. i./09, 56. With the exception of heart tonics and agents that neutralise acidity, drugs, and especially hypnotics, are to be used as little as possible. The habit can be "knocked out" in a relatively short time by Hyoscine and Atropine. The Australian drug Pituri has been suggested for use, but the plant seems to be practically unobtainable.—O. Jennings.—'The Morphine Habit.'

Ⓜ Oleatum Morphinæ.

Morphine 1, Oleic Acid 60. Dissolve.

Oleic acid will dissolve as much as one-tenth of its weight of pure morphine. Morphine is added to oleate of mercury to relieve pain.

Ⓜ Morphinæ Acetas, Morphine Acetate (*Off.*) U.S. $C_{17}H_{19}NO_3$, $C_2H_4O_2$, $3H_2O=396.27$ (396.26 U.S. Wts.; 399.242 I. Wts.).

Dose.— $\frac{1}{8}$ to $\frac{1}{2}$ grain (0.008 to 0.032 Gm.), which may be increased.

A white powder, *soluble* 1 in $2\frac{1}{2}$ of water (if recently made, or

add a little Acetic Acid), also about 1 in 100 in Alcohol 90%, Glycerin 1 in 5.

Ⓔ Injunctio Morphinae Acetatis Hypodermica, Martindale:

1 grain in 6 minims. *Dose*.—1 to 2 minims.

Dissolve the Morphine Acetate in freshly boiled distilled water in the above proportion. Two or three drops of Acetic Acid (P.B.) may be necessary if the morphine salt be not very fresh. Thus made a bottle of the injection has kept in good condition for a long time. Sulphurous Acid 1 minim to the ounce will prevent the slight darkening which will ultimately occur. A few drops of glycerin added, will prevent the salt incrustating on lip of the bottle.

On account of the small quantity of liquid, this injection (1 grain in 6 minims) is preferred. **Caution.**—Carefully distinguish this from the official injection, Morphine Tartrate (1 grain in 22 minims).

Ⓕ Injunctio Morphinae et Atropinae Hypodermica, Martindale.

Contains Atropine Sulphate 1 grain in 3 drachms of Injection of Morphine Acetate (1 grain in 6 minims).

Dose.—1 to 3 minims. 3 minims contain half a grain of morphine acetate and $\frac{1}{80}$ grain of atropine sulphate. Some practitioners prefer to use it *half* this strength. The atropine increases the sedative action and counteracts the disagreeable effects of the morphine on the head, stomach, and bowels.

Ⓖ Ophthalmic Discs are made containing $\frac{1}{800}$ grain Morphine and $\frac{1}{800}$ grain Morphine with $\frac{1}{8000}$ grain Atropine respectively.

Ⓖ* Liquor Morphinae Acetatis (Off.).

Dose.—10 to 60 minims (0·8 to 3·5 Cc.).

Morphine Acetate 1, Diluted Acetic Acid 2, Alcohol (90%) 25, Distilled Water to 100.

Ⓖ Pastillus Morphinae Acetatis ($\frac{1}{80}$ gr.), v. Pastilli.

Ⓖ Pastillus Cocainae ($\frac{1}{8}$ gr.) et Morphinae ($\frac{1}{80}$ gr.).

Ⓖ Morphinae Hydrobromidum.

$C_{17}H_{19}NO_3 \cdot HBr \cdot 2H_2O = 399 \cdot 16$ (402·122 I. Wts.).

Dose.— $\frac{1}{4}$ to $\frac{1}{2}$ grain (0·008 to 0·032 Gm.).

A white powder, soluble 1 in 22 of water and about 1 in 50 alcohol 90%. Given with hydrobromic acid as sedative, affects the head less.

Ⓖ Morphinae Hydrochloridum. (Off.). U.S. Fr. Cx.

$C_{17}H_{19}NO_3 \cdot HCl \cdot 3H_2O = 372 \cdot 88$ (372·86 U.S. Wts.). (375·678 I. Wts.).

Dose.— $\frac{1}{4}$ to $\frac{1}{2}$ grain (0·008 to 0·032 Gm.), which may be increased.

In silky white crystals or in powder soluble 1 in 24 of water, about 1 in 50 of alcohol 90%, and about 1 in 8 of Glycerin.

Ⓖ Insufflatio Morphinae.

Morphine Hydrochloride 1, Bismuth Oxychloride 4, Starch 2.

Ⓖ Linctus Morphinae, U.C.H.

Solution of Morphine Hydrochloride 3 minims, Chloroform Emulsion 3 minims, Treacle 60 grains, Water to 1 drachm. May be more agreeably flavoured with syrup of lemon.

Dose.—A teaspoonful 3 or 4 times a day; repeated frequently when cough is troublesome. Taken undiluted, swallowed very slowly. For children

* This may be debated but it would be safest to treat as Ⓖ.

of 8 to 14 years, dose 10 to 20 drops. Not suitable for very young children, or where there is difficulty of expectoration in brouchitis.

(P) **St. M.'s H.** has Morphine Hydrochloride Solution 5 minims, Honey $\frac{1}{2}$ drachm, Water to 1 drachm.

(P) **Linctus Morphinae Compositus, C.X.**

Solution of Morphine Hydrochloride 2 minims, Spirit of Chloroform 2 minims, Ipecacuanha Wine 2 minims, Mucilage of Acacia $\frac{1}{2}$ drachm, Water to 1 drachm.

(P) **Linctus Morphinae Hydrocyanicus** (Ogle's Drops) St. G. H.

Dilute Hydrocyanic Acid 1 minim, Solution of Morphine Acetate 3 minims, Oxy-mel of Squills to 1 drachm.

(P) **Guttæ Rosæ.**

Dose.—2 to 10 minims (0.12 to 0.6 Cc.).

Morphine 1, Citric Acid 0.5, Cochineal Tincture 8, Water to 50. For cough,—a useful name and method of giving the drug.—Ph. Notes (Denmark, modified.)

(P) **Mistura Morphinae et Phenazoni Composita, Martindale**

Dose.—1 ounce (30 Cc.).

Solution of Morphine Hydrochloride 10 minims, Phenazone 10 grains, Tincture of Castor 20 minims, Spirit of Chloroform 10 minims, Mucilage and Water to 1 ounce.

Flavoring.—Syl or Gyl Sassafras, Syl Lavandulae, Gyl Amygdalae Amaræ.

This forms what may be designated a specific for spasmodic dysmenorrhœa.—W.W.W.

(P) **Linctus Sedativus, Brompton H.** *Dose.*—1 drachm.

Solution of Morphine Acetate 8 minims, Chloric Ether 3 minims, Lemon Juice 15 minims, Mucilage of Acacia to 1 drachm, *i.e.*, $\frac{1}{12}$ grain Morphine Acetate in the drachm dose.

(P) **Mistura Tussi Rubra.** *Dose.*— $\frac{1}{2}$ to 2 drachms (1.8 to 7.0 Cc.) in a little water. Hydrobromic Acid 5 minims, Morphine Hydrobromide $\frac{1}{32}$ grain, Diluted Hydrocyanic Acid $\frac{1}{8}$ minim, Spirit of Ether 5 minims, Tincture of Cudbear 5 minims, Syrup to 1 drachm. This forms a popular winter-cough mixture.

(P) ***Liquor Morphinae Hydrochloridi (Off.).**

Dose.—10 to 60 minims (0.6 to 3.5 Cc.).

Morphine Hydrochloride 1, Diluted Hydrochloric Acid 2, Alcohol (90%) 25, Distilled Water to 100.

(P) **Soluté de Morphine (HCl.) pour injection hypodermique.**

FR. CX. 2%.

(P) **Mistura Anodyna, N.H.W.**

Solution of Morphine Hydrochloride 20 minims, Sal Volatile $\frac{1}{2}$ drachm, Water to $\frac{1}{2}$ ounce.

(P) **Pulvis Morphinae Effervescens.**

Dose.—1 or 2 of the following during the day. Morphine Hydrochloride $\frac{1}{2}$ grain, Potassium Bromide 10 grains, Antipyrin 10 grains, Citric Acid 40 grains, Tartaric Acid 40 grains, Sodium Bicarbonate 1 drachm, Lactose 1 drachm. For one Effervescent powder. Very serviceable in dental neuralgia.—M.P., July 21/09, 68.

* See note to Liquor Morphinae Acetatis. Same remark applies.

⑩ **Suppositoria Morphinae.**

Morphine Hydrochloride $\frac{1}{4}$ (*Off.*), also $\frac{1}{2}$, 1, $1\frac{1}{2}$, and 2 grains (taking weight of the suppository as 15 grains).

⑪ **Tablets, Hypodermic,** contain $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ and 1 grain.

⑫ **Trochisci Morphinae (*Off.*).**

Contain $\frac{1}{32}$ grain (0.0018 Gm.) of the hydrochloride in each lozenge, with a sugar basis flavoured with tolu.

Trochisci Morphinae et Emetin, v. Emetin.

⑬ **Trochisci Morphinae et Ipecacuanhae (*Off.*).**

Contain $\frac{1}{32}$ grain (0.0018 Gm.) of Morphine Hydrochloride, with $\frac{1}{16}$ grain (0.0054 Gm.) of Ipecacuanha in each. These lozenges are often given to allay cough.

⑭ **Morphinae Meconas.—Morphine Meconate.**

$(C_{17}H_{19}NO_3)_2C_7H_4O_7 + 5H_2O = 854.03 (860.436 \text{ I. Wts.})$

Dose.— $\frac{1}{4}$ to $\frac{1}{2}$ grain (0.008 to 0.032 Gm.).

This, one of the natural salts of morphine in opium, is in white minute acicular crystals, soluble 1 in 34 of water. It is said to disturb the head less, as well as to derange the stomach and bowels less, than the other salts.

⑮ **Liquor Morphinae Bimeconatis.**

Dose.—5 to 40 minims (0.3 to 2.4 Co.).

Morphine (pure Alkaloid) $14\frac{1}{2}$ grains, Meconic Acid 12 grains, Alcohol (90%) 1 ounce. Mix and add Distilled water to 4 ounces. Filter.

One ounce contains about 6 grains or 1.3% of morphine bimeconate, is about the same strength as tincture of opium. ⑯ **Pills** contain $\frac{1}{4}$ grain.

⑰ **Tablets, Hypodermic,** contain $\frac{1}{8}$ and $\frac{1}{4}$ grain.

⑱ **Morphinae Sulphas, U.S.** $(C_{17}H_{19}NO_3)_2H_2SO_4 + 5H_2O = 752.84$
(U.S. 752.83; 758.49 I. Wts.).

Dose.— $\frac{1}{4}$ to $\frac{1}{2}$ grain (0.008 to 0.032 Gm.).

In white silky acicular crystals. Soluble 1 in 23 of water, very slightly in alcohol 90%.

⑲ **Hypodermic Tablets** contain $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{2}$ and 1 grain; also combined with Atropine as follows:

{ Morphine Sulphate $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $2\frac{1}{4}$, $2\frac{3}{4}$ gr. }
{ Atropine Sulphate $\frac{1}{160}$, $\frac{1}{80}$, $\frac{1}{40}$, $\frac{1}{20}$, $\frac{1}{10}$, $\frac{1}{5}$, $\frac{1}{2}$, $\frac{1}{10}$ gr. }

Morphine $\frac{1}{4}$ grain and Atropine $\frac{1}{160}$ grain used with advantage, 20-30 minutes before the aæsthetic in operations, particularly in abdominal cases.—L. i./10,624.

Morphine and Atropine to be given before aæsthesia effected by gas and ether to lessen the amount required and to minimise the secretion from the mouth and lungs.—Annus Medicus, L. ii./09,1898.

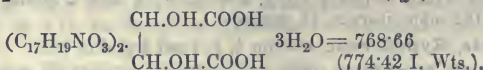
⑳ **Pills of Morphine Sulphate** contain $\frac{1}{4}$ grain.

㉑ **Pulvis Morphinae Compositus, U.S.**

Average dose.— $7\frac{1}{2}$ grains (0.5 Gm.).

Morphine Sulphate 15, Camphor 32, Glycyrrhiza 33, Precipitated Calcium Carbonate 33.5.

① **Morphinæ Tartras**, Morphine Tartrate. (*Off.*)



Dose.— $\frac{1}{8}$ to $\frac{1}{2}$ grain (0.008 to 0.032 Gm.).

In small white nodular tufts of acicular crystals, readily soluble 1 in 10 of water, slightly in alcohol 90%.

① **Injectio Morphinæ Hypodermica**. (*Off.*)

Dose.—2 to 5 minims (0.12 to 0.3 Cc.).

Contains 5% (1 grain in 22 minims). N.B.—Is slightly less than $\frac{1}{2}$ strength of that in B.P. 1885.

In making, a small quantity of crystalline Morphine Acid Tartrate may separate.—P.J.i./o3,134,178.

But Alkaloidal Acid Tartrates in general are soluble in excess of the tartaric acid.—Am.Jl.Ph., July '07, 304.

① **Injectio Morphinæ Hypodermica Diluta**, Gt. Orm. H.

Morphine Tartrate 1 grain, Distilled Water to 40 minims.

①* **Liquor Morphinæ Tartratis**. (*Off.*)

Dose.—10 to 60 minims (0.6 to 3.5 Cc.).

Morphine Tartrate 1, Alcohol (90%) 25, Distilled Water to 100.

①* **Dionin**, Ethyl-Morphine Hydrochloride. P. HUNG. P. SVEC.

$\text{C}_2\text{H}_5 \cdot \text{C}_{17}\text{H}_{18}\text{NO}_3 \cdot \text{HCl} \cdot \text{H}_2\text{O} = 364.94 (367.678 \text{ I. Wts.})$.

Dott, gave $2\text{H}_2\text{O}$. Morphine contains one alcoholic and one phenolic OH. In this body the H of the phenolic OH is replaced by C_2H_5 .

Dose.— $\frac{1}{4}$ to $\frac{1}{2}$ grain (0.016 to 0.032 Gm.).

A white crystalline powder *soluble* about 1 in 10 of water and 1 in 25 of alcohol 90%. Insoluble in ether. Recommended to replace codeine and morphine in bronchitis, pulmonary emphysema, and bronchial asthma, also for whooping cough and for morphine habit. May be used hypodermically in doses of $\frac{1}{10}$ grain in 5 minims of water.

Dott found the solubility of "Dionin" to be 1 in 14 of water, and 1 in 29 of alcohol (90%). Our experiments, however, showed it to be more soluble. He found melting point 124°C .

Stated to induce a habit even more dangerous than morphine.—Apoth. Zeit. 1907, 920.

May cause "ophthalmic fireworks," pain, chemosis, swelling, and sneezing. Corneal ulcers have been cured by it.—M.P. Aug. 1905; B.M.J. i./o6, 1098.

In interstitial keratitis with potassium iodide internally, and yellow precipitate ointment in the conjunctival sac.—B.M.J. ii./o4, 1303.

① 'Sterules' of Dionin are prepared for ophthalmic use of 5% strength; dionine is a useful anodyne in glaucoma, iritis, corneal ulcers, &c. Solutions may be from 1 to 5% strength or more.

① Sterules, Hypodermic of Dionin contain $\frac{1}{2}$ grain (0.01 Gm.).

① **Ethyl-Morphine Sulphate** has similar properties to the hydrochloride.

①* **Heroin Hydrochloride**. Diacetyl-Morphine Hydrochloride, P.Jap. $\text{C}_{17}\text{H}_{17}(\text{OCH}_3\text{CO})_2\text{NO} \cdot \text{HCl} = 402.64 (405.662$

* See Note to Liquor Morphinæ Acetatis. Same remark applies.

I. Wts.). The Hydrogen atoms of both the alcoholic and the phenolic OH groups are replaced by the CH_3CO groupings.

This body was first produced in London by Beckett and Wright.

Dose.— $\frac{1}{4}$ to $\frac{1}{2}$ grain (0.0028 to 0.0054 Gm.).

In white crystalline powder, *soluble* about 1 in $2\frac{1}{2}$ of water and about 1 in 13 of alcohol 90%. Useful cough sedative, *e.g.*, in phthisis and bronchitis, also in asthma. Possible Heroinomania on lengthy use must be guarded against.—Glas. Med. Jl., Dec. 1905, 465; M.A. 1908, 17.

Useful in acute coryza. In hay fever the following has been recommended: Heroin $\frac{1}{2}$ grain, Atropine Sulphate $\frac{1}{300}$ grain, Caffeine Citrate 1 grain, Salophen 5 grains. In cachet, one every four hours.

Incompatibles.—Both alkalis and acids, and others as morphine.

Flavoring.—*Vide* Morphine.

Recovery after 9 grains.—B. M. J. E. ii./02, 31.

In the treatment of hæmoptysis of phthisis pulmonalis—an appreciation.—Pres. May, 1907, p. 144.

In bronchitis, early stages of, and in laryngitis frequently occurring in influenza, will relieve cough and so induce sleep. May well be prescribed with a small dose of hydrocyanic acid.—Pr. 1907, p. 663.

Ⓟ Tablets, Hypodermic, $\frac{1}{4}$ and $\frac{1}{2}$ grain.

Ⓢ Morphinum Diacetylicum, P. Austr. *Syn.* ACETO-MORPHINE
The base of the above salt. Slightly soluble in water.

Ⓢ Morphine-Methyl Bromide. *Syn.* MORPHOSAN.

$\text{C}_{18}\text{H}_{22}\text{NO}_2\text{Br} \cdot \text{H}_2\text{O} = 395.19$ (398.122 I. Wts.)

Dose hypodermically, $\frac{1}{2}$ to $\frac{1}{4}$ grain (0.008 to 0.016 Gm.)

White needles soluble 1 in 20. Comparatively with Morphine it is non-poisonous, —it is thought to be 10 times less potent.

Uses.—In epilepsy, also for use with Scopolamine *q.v.* as anæsthetic.

Ⓢ Glycaphorm. *Syn.* GLYCEROLE OF DIACETYL-MORPHINE HYDROCHLORIDE, LINCTUS HEROIN, SYRUPUS HEROIN.

Contains $\frac{1}{4}$ grain Diacetyl-Morphine Hydrochloride in 1 drachm of a vehicle consisting of Glycerin 3, Syrup of Roses 4, Water 1.

Dose.—1 to 2 drachms (3.5 to 7 Cc.).

This preparation forms a useful linctus for coughs, and is employed in bronchitis, pertussis, laryngitis, asthma, and similar disorders.

Ⓢ Glyco-Heroin.

Dose.—1 drachm (3.5 Cc.) repeated; children 15 to 30 minims (0.9 to 1.8 Cc.) or less. A proprietary article. Is given for coughs.

Ⓢ Cryptopine.— $\text{C}_{21}\text{H}_{23}\text{NO}_5 = 366.45$ (369.191 I. Wts.) and

Ⓢ Gnoscopine $\text{C}_{22}\text{H}_{23}\text{NO}_7 = 410.12$ (413.191 I. Wts.) are other alkaloids.

Cryptopine is only present to the extent of about 1 in 10,000 in Opium. A hot solution of the Hydrochloride sets on cooling to a gelatinous mass.

Gnoscopine is isomeric with Narcotine, but M.pt 228°C .; Narcotine 178°C .

Meconin.—A neutral body in Opium. Colourless, slightly soluble prisms.

Ⓢ Papaverine.— $\text{C}_{20}\text{H}_{21}\text{NO}_4 = 336.66$ (339.178 I. Wts.)

White crystalline needles melting at 147°C . Insoluble in water. Said to be irritative and strongly narcotic. With Sulphuric Acid the crystals give a dark blue.

Ⓢ Xanthaline.— $\text{C}_{37}\text{H}_{36}\text{N}_2\text{O}_9 = 647.47$ (652.308 I. Wts.)

White crystalline powder insoluble in water and alkalis, slight in boiling Alcohol and very soluble in Chloroform. Salts all of yellow colour.

Ⓢ Laudanosine.—Yields on oxidation ★Lodol, which is used to contract the uterus in dose 1 grain *t.d.* by the month.

MULLS.

Plaster Mulls consist of soft rubber adhesive plaster basis, spread on strong muslin. On the upper surface is a coating of large mesh muslin which is to be removed before applying the plaster. Should the covering adhere too firmly moisten a little. Plaster Mulls measure 1 metre by 20 centimetres and are medicated with a large variety of substances for various skin affections. They must be preserved in a cool dry place—particularly to be preserved from direct sunlight.

No.			No.		
2	Acid boric. ...	10*	16	{ Hydrarg. ...	20*
9	„ salicyl. ...	25		{ Acid. carbol. ...	7.5
10	„ „ ...	10		{ Hydrarg. ...	20
64	{ Acid. salicyl. ...	20	88	{ Acid. carbol. ...	10
	{ Ext. cannab. ind. ...	5		{ Hydrarg. perchlor ...	2
76	{ Ac. salicyl. ...	10		{ Zinci oxidum ...	10
	{ Creosote ...	20	66	{ Ichthyol ...	10
5	Chrysarobin ...	10	72	Resorcin ...	15
68	Ext. bellad. ...	10	24	Zinc ox. ...	10
15	Hydrarg. ...	20	74	{ Zinc ox. ...	10
83	Ⓟ Hyd. precip. alb. ...	10		{ Ichthyol ...	5

Plasters, Rubber, white adhesive containing a proportion of Zinc Oxide spread on pink cotton. They are popular on spoons.

No. 522 is 2½ Cm., No. 523 is 3½ Cm., No. 524 is 5 Cm. each 5 metres long, No. 527 is 2½ Cm. 10 metres in length.

Salve Mulls, stiff ointment bases (benzoated lard and wax) medicated, spread on muslin. A large number of similar preparations are made:—

No.							1 sided	2 sided
							Gm.†	Gm.‡
15†	Acid boric	...	...	...	...	...	10	10
17	Ichthyol	...	...	...	...	...	10	10
12	Ⓟ { Zinc oxide	...	...	...	...	...	10	20
	{ Mercuric oxide	...	...	...	...	...	5	5
18	{ Zinc oxide	...	...	...	...	...	10	10
	{ Ichthyol	...	...	...	...	...	2	2

NAPHTHOL.

Beta-Naphthol. (*Off.*) P.G. iv., FR. Cx., P. Belg., U.S.; P. Austr.

$C_{10}H_7OH = 142.98$, (B.P. & U.S. Wts.), (144.064 I. Wts.)

Dose.—3 to 10 grains (0.2 to 0.65 Gm.) in cachet. FR. Cx., *Max.* single dose 15 grains; *Max.* during 24 hours 45 grains approximately.

Manufacture.—

β-Naphthol is prepared by heating Naphthalene (which is obtained by cooling the 180° to 220° C. fractions of the distillation of coal tar) with strong Sulphuric Acid at 170° to 180° C., β-Naphthalene Sulphonic Acid $C_{10}H_7SO_3H = 206.56$ (208.134 I. Wts.) being formed. This is converted firstly into the Calcium $(C_{10}H_7SO_3)_2Ca = 450.83$ 454.342 I. Wts.) and then the Sodium Salt, $C_{10}H_7SO_3Na = 228.44$ (230.126 I. Wts.) By treatment at 300° C. with Sodium Hydroxide this is converted into Sodium Naphtholate. $C_{10}H_7ONa = 164.86$ (166.056 I. Wts.), which is ultimately decomposed with Hydrochloric Acid, forming β-Naphthol and Sodium Chloride.

* Contents in Gm. per one-fifth square metre.

† Add 1,000 (*e.g.*, 1,015, &c.) to these numbers to indicate one-sided mulls or 2,000 for two-sided. ‡ Contents in ½ sq. metre (1 m. × 20 cm.).

β -Naphthol has a faint Storax odour; when sublimed it is in white shining laminar crystals; **soluble** in alcohol 1 in 2, ether 3 in 4, chloroform 1 in 24, and 1 in 24 benzol; 1 in 12 of olive oil and lard, and 1 in 80 of vaseline. Addition of boric acid increases solubility in water.

Incompatible with Camphor, Ferric Chloride, Menthol, Phenazone and Phenol.

Uses.—Internally, in enteric fever; safe and efficient, but sometimes causes too much gastric disturbance. In dilated stomach, dyspepsia and other disorders. In cholera, as preventive, and in treatment of early stages; and used as a vermifuge.

It is a powerful antiseptic and germicide. In advanced scabies, an ointment of 10 to 15% cures the eczema as well as destroys the parasite, but the

Compound Ointment (Kaposi's Ointment) is preferred.—Naphthol 15, Lard 100, Green Soap 50, Prepared Chalk 10. Useful also in psoriasis.

Naphthol 5, Alcohol 100, Glycerin 10, is a remedy for hyperidrosis of palms, soles, and axillæ.

Pilula and Tablets, β -Naphthol, 3 and 5 grains.

Charbon Naphtholé.—**Dose.**—60 to 120 grains. A granular preparation of wood charcoal, containing 5% naphthol, for use in ailments of the stomach and intestines.—Ph. Notes, Greece.

α -Naphthol $C_{10}H_7.OH = 142.98$ (144.064 I. Wts.), is said to have greater antiseptic power, but given internally causes more irritation.

A solution of 5 grains in a quart of water is used to wash out the intestines by rectal injection.

Dose.—2 to 5 grains (0.13 to 0.32 Gm.) but larger doses are given. M. Am. says: antifermentative 30 grains in 1 ounce Castor Oil, given in 2 portions within 2 hours. In typhoid fever 45—90 grains per diem.

Alcohol.

$C_6H_4(OH)CO.OC_{10}H_7(\alpha) = 262.11$ (264.096 I. Wts.).

Is isomeric with Betol, *q. v.*

Dose.—8 to 30 grains (0.52 to 2 Gm.), in cachet.

Salicylic ether of α -naphthol, in whitish powder, insoluble in water, soluble in alcohol. Resembles betol and salol in effects on articular rheumatism and cystitis.

Benzonaphthol.—**Syn.** Benzoyl - Naphthol. Beta-Naphthol Benzoate. Fr. Cx. $C_{10}H_7.OOC : C_6H_5 = 246.23$ (248.096 I. Wts.).

Dose.—4 to 10 grains (0.26 to 0.65 Gm.), in cachet or suspended in mixture. A white crystalline powder, obtained by the action of benzoyl chloride on β -naphthol. Soluble in alcohol and chloroform, almost insoluble in water. Is a powerful intestinal antiseptic and diuretic, *e.g.* in typhoid. May usefully be combined with bismuth salicylate. Externally is used 3 to 10% in ointments.

Tablets, 5 grains, to be crushed and taken in a little water.

Asaprol. **Syn.**—Abrastol.

$[C_{10}H_6(OH)SO_3]_2Ca + 3H_2O = 536.23$ (540.390 I. Wts.).

Dose.—10 to 30 grains (0.65 to 2 Gm.). A calcium salt of β -naphthol-sulphonic acid; a whitish powder freely soluble in water and alcohol; incompatible with most alkaline and alkaloidal salts, potassium iodide and antipyrine, an antipyretic and antiseptic; useful in acute articular rheu-

matism, and for influenza with high temperature. A test for albumen (*g.v.*).

Epicarín *Syn.* **Epicarinum purum.**

$C_6H_3COOH.OH.CH_2(C_{10}H_6.OH) 2 : 3 : 1$ or $C_{18}H_{14}O_4 = 291.9$ (294.112 I. Wts.).—*Am.Jl.Ph., Mar.'07, 121.*

A condensation product of β -Naphthol and Cresolic Acid, used for psoriasis, eczema, scabies, unbroken chilblains, and tinea circinata in a 10% or 20% Ointment. For seborrhœa capitis a 5% alcoholic solution with 15% of Ether is useful.

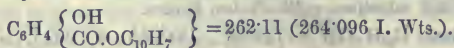
Naphthol cum Camphora. **Naphthol Camphor.**

β -Naphthol 1, Camphor 2, mix to form a viscid liquid, miscible with oils. It is a powerful (but in some instances toxic) antiseptic injected in tuberculous adenitis.

10,000 injections without grave results. On the other hand 12 deaths reported.—*L. ii./04, 1893; P.J.i./05, 177.* Injections are highly toxic.—*L. i./10, 637.*

Tuberculous joints cut to the bone, cavities scraped and treated with this preparation.—*B.M.J. ii./09, 953.*

Betol. *Syn.* **Naphthalol, Betanaphthol Salicylate.** *Fr. Cx.*



Dose.—3 to 8 grains (0.2 to 0.52 Gm.) in cachets or pills, or suspended in almond emulsion or milk.

Manufacture—Method of, *vide* Schmidt.

In small tasteless white crystals, insoluble in water, soluble in alcohol. Useful in rheumatism, cystitis, and intestinal catarrh.

Bougies of Betol 1 part, cacao butter 4 parts, have proved useful in gonorrhœa; of any length up to 6 inches, and in six diameters, *see* Bougies.

Cachets of Betol 5 grains, with 5 grains of bismuth salicylate, useful as an intestinal disinfectant. Contra-indicated where there is renal disease.

Naphthalene. *Syn.* **Naphthalinum, P.G. iv., U.S. Naphtalinum, P. Austr.** $C_{10}H_8 = 127.1$ (128.064 I. Wts.).

Dose.—2 to 15 grains (0.13 to 1 Gm.) in cachets.

Pilula Naphthalini, 3 grains.

A hydrocarbon formed in large quantities in the manufacture of coal gas. In white crystalline plates (M.Pt. 60° C.) with persistent odour.

Soluble in Ether 1 in 3, in Alcohol 1 in 25, in Olive Oil 1 in 8, in Chloroform 1 in 1½; insoluble in water. May be given in Malt Extract.

Uses.—As an intestinal disinfectant for the diarrhœa of consumption, and of typhoid and for dysentery. 8-grain enemata are useful. Is painless in action, and promotes healing of ulcers. Given internally with success to lessen fœtor of urine and stools. Used as a vermifuge in tænia and ascarides. A 10 to 20% solution in oil is successful as a parasiticide in scabies. The vapour inhaled for whooping-cough is useful.

Suppository and ointment for pruritus ani.—*M.A. 1906, 410.*

Moulded into blocks or sticks, it is sold under various trade names, such as ★Alabastrine, ★Camphylene, and Albo-carbon ("Carbon" in Lamp trade).

A Precipitated Form is also made by adding an alcoholic solution to water. For use as a dusting powder diluted 1 in 10.

Naphthalene Tetrachloride.—*Syn.* NAPHTHALIN HYDROCHLORIDE, $C_{10}H_8Cl_4 = 267.86$ (269.904 I. Wts.). *Dose.*—3 to 12 grains (0.2 to 0.8 Gm.), in cachets or pills. White crystals, melting at $182^\circ C.$, insoluble in water.

Has been used in cases of bacterial intoxication such as colitis with improvement. It is doubtful whether the substance acts as an antiseptic after leaving the stomach. It was tried in 8 grain doses in cachets every 4 hours (night as well).—J. Langford Moore, St. Barts. Hosp. Jan. 1910.

Ⓓ NARCOTINA.

$C_{19}H_{14}(O.CH_3)_3NO_4 = 410.12$ (413.194 I. Wts.).

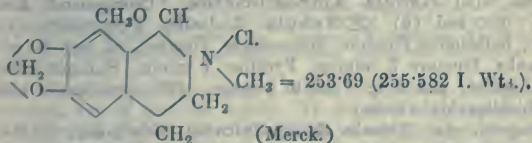
Syn. ANARCOTINE.

Dose.—1 to 3 grains (0.065 to 0.2 Gm.) or more in a pill.

An alkaloid from opium (sometimes as much as 15% of), in white crystals, insoluble in water, soluble 1 in 3 of chloroform, 1 in 100 of 90% alcohol, 1 in 125 of ether, soluble also in benzol. Possesses anti-periodic properties, has been given in ague and phthisis, producing convulsions. Resembles morphine in action, but is much weaker. In pulmonary tuberculosis.—L. ii./04, 1526.

Ⓓ Thebaine, $C_{17}H_{15}(O.CH_3)_2NO = 308.87$ (311.178 I. Wts.). White Scales melting at $193.4^\circ C.$, more closely resembles strychnine than morphine.—B.M.J. i./91, 157. A dose of $\frac{1}{16}$ grain produces distinct effects.

Ⓓ Cotarnine Hydrochloride. *Syn.* *Stypticin.



Dose.— $\frac{1}{4}$ to $\frac{1}{2}$ grain (0.016 to 0.032 Gm.) internally or hypodermically, in special cases up to 4 grains in 10% solution.

The salt of the base Ⓓ Cotarnine $C_{12}H_{15}NO_4 = 235.38$ (237.13 I. Wts.), obtained by oxidising narcotine, in primrose-coloured granular crystals, very soluble in water and alcohol. Is allied to Hydrastinine, v. p. 384. In all forms of uterine hæmorrhage, useful in checking profuse menstruation. 1 to 2% may be used on a tampon.

On the melting point of—most investigators say $132^\circ C.$, Dott finds 125° . Of little value in any case as criterion of purity.—P.J. i./07, 78.

Erysipelas, eczema and shingles may be treated with a 5% ointment.

Ⓓ Tablets of Cotarnine Hydrochloride, $\frac{1}{2}$ grain (0.05 Gm.).

Ⓓ Ointment 2% with Unguentum Lanolini, in herpes and ulcerative balanitis. In more acute similar complaints up to 10% strength.

(P) Stypticin Wool, 30% and (P) Gauze are made.

(P) Urethral Bougies of Cotarnine in cacao butter or gelatin contain $\frac{1}{2}$ grain (0.03 Gm.), four inches long, and $\frac{1}{8}$ inch in diameter, are used to check bleeding caused by sounds or catheters.

(P) Cotarnine Phthalate. * STYPTOL.



An orange red body soluble in water. Contains 73 % Cotarnine.

(P) Styptol Tablets $\frac{1}{2}$ grain (0.05 Gm.).

In dysmenorrhœa, hæmorrhage from fibroids, and in inflammatory and congestive states of the uterus.—M.A. 1908, 34.

NEBULÆ.

These are solutions for application to the throat and nose by the aid of a fine spray apparatus or atomiser. By means of a metal or vulcanite tube, a jet of fine spray may be directed into the pharynx or nares, and if a deep breath be taken at the proper moment some of the spray will enter the larynx. The patient must be taught to carry this out personally. Nebulæ are aqueous, or of Liquid Paraffin, Almond Oil or Olive Oil. The following indications may prove useful:—

Antiseptic, Healing and Demulcent.—Nebula Alkalina, *q.v.*

Antiseptic and Soothing.—(a) Nebula Acidi Borici—Glycerin of Boric Acid 1 drachm to the ounce; (b) Nebula Potassii Permanganatis, *q.v.*; (c) Nebula Acidi Tannici—Glycerin of Tannic Acid 40 minims, Rose Water to 1 ounce.

Analgesic.—Nebula Cocainæ Oleosa, or Nebula Cocainæ Aquosa, *q.v.*

Asthma.—(a) Nebula Anti-asthmatica “Compound Asthma Fluid” *q.v.* and (b) (P) Nebula Lobeliæ Composita—Lobelia Tincture, Belladonna Tincture, Stramonium Tincture, of each 10 minims, Ipecacuanha Tincture 5 minims, Pyridine 1 minim, Sodium Nitrite 10 grains, Glycerin and Rose Water to 1 ounce. (The pyridine is, however, rather objectionable in taste.)

Astringent.—(a) Nebula Zinci Chloridi, *vide* Index; (b) Nebula Cupri Sulphatis, 5 grains to the ounce; (c) Nebula Ferri Perchloridi, *q.v.*

Diphtheria.—To dissolve membrane, Nebula Acidi Lactici, *q.v.*

Catarrh, Nasal, and congestive state of the Eustachian tubes.—

(P) Nebula Cocainæ Composita—Cocaine 2 grains, Cinnamon Oil 5 minims, Menthol 15 grains, Liquid Paraffin to 1 ounce. Nebula Resorcini 1% aqueous solution for a common cold.—B.M.J.ii./05, 1679; *vide* also p. 610. Nebula Antipyrini 3%.


Catarrh, Dry.—(a) Nebula Eucalypti—Eucalyptus Oil 20 minims, Liquid Paraffin to 1 ounce; and (b) Nebula Eucalypti Composita, *q.v.*

Hay Fever.—(a) Nebula Suprarenalis Extracti 5% and 10%; (b) Nebula Quininæ Antiseptica—Quinine Hydrochloride 30 grains, Carbolic Acid 3 grains, Glycerin and Rose Water to 1 ounce.

Phthisis.—(a) *Nebula Creosoti Composita*—Creosote 5 minims, Cassia Oil 5 minims, Almond Oil to 1 ounce; (b) *Nebula Iodi Composita*—Iodine 2 grains, Carbolic Acid 8 grains, Menthol 5 grains, Camphor 2 grains, Liquid Paraffin to 1 ounce. 2% Creosote may be added (if made with Almond Oil).

Stimulant.—(a) *Nebula Menthol, q.v.*; (b) *Nebula Menthol Composita*—Menthol and Camphor, of each 20 grains, Cinnamon Oil 5 minims, Liquid Paraffin to 1 ounce; (c) *Nebula Potassii Chloratis cum Ferro, L.H.*—Potassium Chlorate 15 grains, Solution of Ferric Chloride 20 minims, Glycerin 1 drachm, Water to 1 ounce.

For a common cold where *B. Septus* is the principal cause of infection, as spray and gargle Potassium Chlorate 10 grains, Solution of Ferric Chloride 15 minims, Glycerin 30 minims, and Water to 1 ounce, are useful. This is said to be of little value after 24 hours, when give a Potassium Chlorate gargle.—L. ii./o8, 1661.

Tonic.—(a) *Nebula Pini Composita*, containing Pine Oil, Eucalyptus Oil, Cassia Oil, of each 5 minims, Menthol 5 grains in Almond Oil 1 ounce; also (b)  the same, with Cocaine 1%.

For further formulæ, consult Index.

NITROGLYCERINUM, P. Jap.

$C_3H_5(O.NO_2)_3=225.47$ (227.07 I. Wts.).

Syn. TRINITROGLYCERIN ; GLONON ; TRINITRIN ; GLYCERYL TRINITRAS.

Dose.— $\frac{1}{200}$ to $\frac{1}{50}$ grain (0.00032 to 0.0013 Gm.) increased to $\frac{1}{10}$ grain.

Manufactured by adding Glycerin to Nitric and Sulphuric Acid mixed. Nowadays a mixture of 3 parts by weight Nitric Acid Sp. Gr. 1.3 and 5 parts by weight of Sulphuric Acid Sp. Gr. 1.842 and to nitrate 1 part by weight glycerin in every 8 parts by weight of the mixture. By using Nordhausen Acid a yield of 230 per cent of Nitroglycerin is obtainable.—Chem. News, Feb. 14, 'o8, 74. See also P.J.i./o9, 160.

This nitrate is a dense, opaque, white, oily liquid, transparent when dehydrated, and of Sp. Gr. 1.600. It drops in very small drops. It has no odour, is slightly volatile, and has a sweet, aromatic, and pungent taste. It is slightly soluble in water, P. Jap. says 1 in 800, freely soluble in ether, 1 in 6 of almond oil, freely soluble in absolute alcohol, and 1 in 15 of 90% alcohol. Nitroglycerin in fatty or oily solution is perfectly safe and stable.

Uses.—Especially valuable in angina pectoris and generally to relieve dyspnoea of cardiac, pulmonary, or renal origin.

Nitroglycerin, in two minutes after taking a dose accelerates the pulse, relaxes the arteries, produces a feeling of fulness all over the body, but particularly in the head by a throbbing at the sides of the temples. It also causes headache, which lasts from 15 minutes to several hours, according to the quantity taken; but to patients accustomed to its use the headache is not felt. In treating angina pectoris, neuralgia, asthma, headache, sea-sickness, and Bright's disease, its action is like that of amyl nitrite and the other nitrites, but its effects last much longer. For the weak

heart of fatty degeneration and of old persons, this lessened tension proves valuable.

Hale White states that *physiologically* it belongs to the class of nitrites—probably, therefore, sodium nitrite is formed directly it gets into the blood.

The circulation is distinctly affected by even $\frac{1}{1000}$ grain.—D. J. Leech. It is absorbed into the blood practically unchanged, hence its powerful and prolonged action (Brunton) *ex Pharmacol.*

Strychnine, Ergot and Belladonna are recommended to counteract the headache produced by large doses.

Injectio Nitroglycerini Hypodermica.

Dose.—1 to 4 minims (0.06 to 0.24 Cc.).

Nitroglycerin Solution 5, Alcohol (90%) 2, Distilled Water to 12.

Contains about $\frac{1}{30}$ grain in 1 minim. Acts promptly; useful in collapse, &c., when the patient cannot swallow.

Tablets, Hypodermic, $\frac{1}{30}$ and $\frac{1}{100}$ grain.

Liquor Nitroglycerini, 1%. Made official as

Liquor Trinitrini (Off.). F.E., P. Jap. P. Hung.

Dose.— $\frac{1}{2}$ to 2 minims (0.03 to 0.12 Cc.) gradually increased to 10 minims, if necessary, every 3 or 4 hours, in any aqueous vehicle.

Trinitroglycerin 1 part by weight, Alcohol (90%) *q.s.* to 100.

Dissolve. Sp. Gr. 0.840. 110 minims contain 1 grain. A colourless neutral liquid; 10 Cc. with an equal volume of water keeps clear, but the further admixture of 1 Cc. of water causes opacity (presence of full proportion of trinitroglycerin). Diluted further, the latter separates in oily drops, which explode when struck with a hammer. Should be kept from sunlight. A 5% and a 10% solution in absolute alcohol are also prepared commercially, but are not safe for use in dispensing. (*Spiritus Glycerylis Nitratis*, U.S., has 1% by weight.) U.S. cautions that violent headache may be caused when freely applied to the skin. A little caustic potash solution should be poured over it to decompose should it be accidentally spilled.

Incompatibility.—Nitroglycerin is decomposed by caustic alkalies. The alcoholic solution is also precipitated by water in excess.

Haustus Nitroglycerini. Vic. Park. *Dose.*— $\frac{1}{2}$ to 1 ounce.

Solution of Trinitrin 1 minim, Compound Chloroform Tincture 10 minims, Pimento Water to $\frac{1}{2}$ ounce.

In asthma $\frac{1}{2}$ to 1 minim doses with *Spiritus ætheris nitrosi* 20 minims every hour for 3 doses useful.—Haviland, Hall, Tilley.

Oleum Nitroglycerini, 1% in almond oil.

Dose.—1 to 2 drops or more on sugar. Recommended as being more stable than the alcoholic solution.

Capsules (gelatin) of Nitroglycerin.

Dose.—1 or 2. Contain $\frac{1}{100}$ grain, or more or less as prescribed.

Tabellæ Nitroglycerini, B.P. 1885.

Introduced by the late William Martindale in 1878, $\frac{1}{100}$ grain in each. These tablets have the nitroglycerin in solution in chocolate, $2\frac{1}{2}$ grains, in a

perfectly safe and inexplusive, stable and non-volatile, portable and palatable form. The small bulk, precise dose, and quick action, if well masticated and swallowed, render this mode preferable for administering nitroglycerin.

Dose.—1 or 2.

Tablettæ Nitroglycerini P. HUNG contain 0·0005 Gm.

Additional Strengths of Tabellæ.

The tablets are also prepared containing $\frac{1}{15}$, $\frac{1}{20}$, and $\frac{1}{25}$ grain, and 1 milligramme respectively, for those accustomed to their use, as well as $\frac{1}{200}$, $\frac{1}{300}$, and $\frac{1}{600}$ grain in each, for administration to ladies, delicate persons and children, for whom this is a sufficient dose to ward off sea-sickness. The tablets appear to be non-poisonous even to children; a surgeon records that on one occasion two children, one three and the other six years of age, ate between them straight away two dozen, $\frac{1}{100}$ grain in each, without any injurious effects.

An employé in the author's laboratory (1905) ate a piece of the nitroglycerin mass weighing about 2 ounces, mistaking it for ordinary chocolate. A bad headache supervened, necessitating his lying down, but he was at work again the following day.

Single doses of 5 grains and *daily dose* of 20 minims of Pure Nitroglycerin tolerated.—B.M.J.E. ii./05,52.

Uses of Nitroglycerin Tablets.—One tablet every three or four hours to relieve or ward off attacks of angina pectoris, asthma, sea-sickness, neuralgia, headache, epilepsy, and may be tried for Bright's disease and dysmenorrhœa. A dose of any preparation of nitroglycerin acts more promptly if taken on an empty stomach.

Fifty per cent. of cases of sea-sickness are benefited by the nitroglycerin tablets.—B.M.J. ii./93,596.

Nitroglycerin tablets should be taken when the patient is threatened with an attack of asthma; or, if the attacks occur in the night, at bedtime, or whenever the patient wakes.—B.M.J. ii./81,424,543.

In arterio-sclerosis patients made much more comfortable by small doses or a week or two.—B.M.J. i./07,63.

Should be carried about in the pocket to be taken immediately any pain comes on in the chest. These not only relieve pain but lessen the dangerous condition of which the pain is a symptom.—B.M.J. ii /09,66.

Tabellæ Trinitrini. Trinitrin Tablets (Off.).

Tablets of chocolate, each weighing 5 grains (0·324 Gm.), and containing $\frac{1}{10}$ grain (0·00065 Gm.).

These *Official* tablets are now double the weight of those in B.P. 1885, and as first manufactured by W.M. This dilution diminishes value as a remedy of prompt action. *Dose.*—1 or 2, *vide* Tabellæ Nitroglycerini, *ante*.

The ordinary lozenges of commerce are unreliable, as they do not contain the proper amount of the drug.—M.A. 1906,37; but the tabellæ with chocolate and fat basis are accurate and lasting.

The Tablet Triturates of American manufacture reputed to contain $\frac{1}{10}$ grain Nitroglycerin contained $\frac{1}{100}$ grain only. 'Need of honest weights.'—B.M.J. i./07,1498.

Tablettæ Nitroglycerini et Sodii Iodidi cum Arsenio.
dose.—1 in every four hours. Each equivalent to Nitroglycerin $\frac{1}{10}$ grain,

Sodium Iodide 15 grains, with Fowler's Arsenical Solution 2 minims. This dosage may be considered a routine treatment of aortic disease. The quantity of Nitroglycerin employed is frequently too low, but the above may be given with perfect safety.—B.M.J. i./07,611.

① **Tabellæ Nitroglycerini** $\frac{1}{100}$ grain (0.0004 Gm.) **et Strychninæ** $\frac{1}{25}$ grain (0.0026 Gm.).

Also $\left\{ \begin{array}{l} \text{Nitroglycerin } \frac{1}{100}, \frac{1}{100}, \frac{1}{100} \text{ grain} \\ \text{with} \\ \text{Strychnine } \frac{1}{25}, \frac{1}{25}, \frac{1}{100} \text{ grain} \end{array} \right\}$

In migraine Nitroglycerin, especially if in combination with Strychnine, is of value. Gowers.—B.M.J. ii./06,1622; v. also L. i./07,872. It relieves headache almost immediately. Its vasodilator effect lowers blood pressure in the peripheral vessels, and so reduces cerebral and arterial pressure.

In high arterial tension where the heart is beginning to fail and such symptoms as irregularity of pulse, giddiness, shortness of breath, or even œdema of ankles begin to appear, combine cardiac tonics—Strophanthus, Digitalis or Strychnine—with Vasodilators. Rest is of utmost importance.—Brunton, L. ii./08,1133.

In headache, the benefit from this combination, though most conspicuous, is not invariable.—Gowers, L. i./09,1403.

Tabellæ Nitroglycerini Compositæ, W.H.

Contain Nitroglycerin $\frac{1}{100}$ grain, Amyl Nitrite $\frac{1}{4}$ grain, Menthol $\frac{1}{50}$ grain, Capsicum $\frac{1}{100}$ grain.

② **Tabellæ Anti-Asthmaticæ. (H.)**

Dose.—1 to 4 thrice daily.

Nitroglycerin $\frac{1}{200}$ grain, Sodium Iodide 2 grains, Potassium Bromide 2 grains, Fluidextract of Euphorbia Pilulifera 3 minims, Tincture of Lobelia 4 minims.

Very useful in asthma; the nitroglycerin depresses the peripheral ends of the vagus nerves, and stimulates the heart by removing the inhibitory action of the vagus and relieving blood vessels elsewhere.

Tabellæ Digitalini et Nitroglycerini aa. $\frac{1}{100}$ gr. are also prepared v.p. 305.

References to use of Nitroglycerin.

Blood Pressure in Man:—

Maximum pressure at various ages in men, women and children. From 8 to 14 it is about 90 mm., from 15 to 21 it is 100 to 115 or 120, from 21 to 65 from 120 or 125 up to 135 or 150, above 65 it may still be 135 to 150 or up to 200 or higher. In women it is about 10 to 15 mm. lower than in men. In athletic men it may be about 10 to 15 mm. higher than in moderate development. The cases in which low tension, below 100 in men and 80 or 90 in women generally are (1) weakness after some illness, especially influenza, (2) in commencing phthisis, (3) in heavy smokers.

In lowered pressure abundant food (animal) meat extracts, tonics as

Iron, Arsenic, Malt, Cod Liver Oil, Hypophosphites, Glycerophosphates, and ascardiac tonics, Strychnine, Strophanthus, Digitalis and Caffeine are advised.

In Raised Tension.—High tension, especially in advancing age, though giving rise to sense of power and desire for action both physical and mental, may be a danger signal. It is not only a direct cause of cardiac failure or ruptured vessels, but produces atheroma of the arteries, and thus weakening them, renders them liable to break. By detecting the rise in time in middle life, tension may be kept down, changes in the arteries leading to arteriosclerosis and atheroma may be prevented, and life prolonged.

Nicotine is almost the only drug which nearly equals Adrenalin in power of raising blood pressure. Tobacco, tea, and coffee must be prohibited.

Mercurials are beneficial, $\frac{1}{2}$ grain or 1 grain of Calomel, or 3 to 5 grains of blue pill once or twice a week, followed by Saline, Potassium Iodide, in dose of 1 to 10 grains thrice daily useful. The Hippurates, Sodium Benzoate, Sodium Nitrite $\frac{1}{4}$ grain, gradually increased to 4 or 5 grains, as also *Pulvis Sodii Nitritus Compositus*, *q.v.*, all tend to keep pressure down. Nitroglycerin and Erythrol Nitrate act similarly. A doctor was able to keep himself free from attacks of angina by daily use of Erythrol Nitrate for 3 or 4 years, beginning with $\frac{1}{2}$ grain thrice daily, and gradually increasing it. When the pain is acute, Amyl Nitrite is the quickest means of relieving, or a little Chloroform as inhalation.—Sir L. Brunton.—L. ii./08, 1126; B.M.J. ii./09, 64.

Employing the Riva Rocci instrument, the blood pressure has been found to rise for a few seconds 5 to 7 m.m. or more after Nitroglycerin $\frac{1}{100}$ grain, before falling in the case of aged persons. It was thought that cardiac stimulation occurred before vascular dilatation in old vessels. Erythrol thought better as action is slower.—B.M.J. ii./09, 1314.

A clinical apparatus for obtaining graphic records of blood pressure.—L. i./10, 365.

Bright's disease, acute and chronic, and in vascular tension of the aged, 1 to 3 minims of the 1% solution was successful.—B.M.J. ii./80, 803; L. i./06, 1028; B.M.J. ii./98, 1047.

Myxœdema, case of, treated successfully with $\frac{1}{80}$ grain doses with elaterium purgings.—L. i./82, 440.

In puerperal eclampsia strongly recommended. Lowers blood pressure, and increases amount of urine.—B.M.J. ii./08, 1670.

Puerperal convulsions, arrested by $\frac{1}{100}$ grain every hour in 4 or 5 doses.—B.M.J. i./82, 573.

In epileptic vertigo, small doses quite relieved.—Pr. xxx.105.

Angina pectoris gravior, treated with nitroglycerin tablets and amyl nitrite, prompt relief.—B.M.J. i./06, 304.—B.M.J. i./09, 994.

In raised arterial tension if source of danger, Brunton.—L. ii./08, 1132.

In uræmic asthma, $\frac{1}{100}$ gr. doses thrice daily, useful.—B.M.J. i./83, 811.

On account of its stimulating effect on the heart and blood vessels, is recommended as a substitute for alcohol where brandy is indicated; dose is small and tasteless, and its action is almost immediate. Useful in collapse from chloroform, or typhoid and other fevers, shocks from accidents, and nausea and faintness from surgical operations.—L. ii./85, 257.

Its administration relieves morphine craving.—L.i./87,1278; i./90,1334.

Paroxysmal headaches much improved and made less frequent.—L.ii./87,1135; i./88,1195 (tablets used).

In tinnitus aurium, doses of $\frac{1}{100}$ grain found useful.

Exerts a permanent steadying effect on the vaso-motor centre in vagal and vaso-vagal attacks—acts 'like a charm.'—L. i./07,1554.

Locomotor ataxia, very useful if increased arterial tension; may be given for prolonged period, in increasing doses, relieving the crisis and lessening the pain.—B.M.J. ii./07,1823.

Nitroglycerin has the advantage over amyl nitrite that it can be more readily used to keep up a steady diminution in blood pressure—chocolate tablets the best method—one to be broken up small and a piece taken every 10 or 15 minutes. Thus the action is kept constant.—Pr. xlvii.259.

Gallstone colic quickly relieved by Nitroglycerin tablets.—L. i./96,353.

Dose in tablets may in exceptional cases be increased to $\frac{1}{4}$ grain with safety and advantage.—L.ii./96,634.

Senile restlessness relieved by $\frac{1}{100}$ grain tablets.—B.M.J. ii./99,1542.

Paroxysmal tachycardia, nitroglycerin and amyl nitrite the treatment.—B.M.J. ii./04,109.

Gangrene of the hand, severe case, successfully treated by Nitroglycerin Tablets, $\frac{1}{100}$ grain. Of great value to the surgeon in all cases of impaired circulation in which contracted arterial walls are present.—B.M.J. i./05,16.

In hæmoptysis.—B.M.J. i./06,917.

In Stokes-Adams disease with sclerosis of arteries Nitroglycerin useful.—M.P., Jan. 23, 07, p. 97.

In Mental disease. In certain cases depending on cerebral anæmia from vaso-constriction Nitroglycerin produced rapid cure.—M.A. 1908,37.

In hæmoptysis more lasting in effect than amyl nitrite.—L. i./08,565.

Migraine, treatment of severe forms of. In arteriosclerosis from contracted granular kidney, severe headache is common, lasting for weeks. Both in this, and in anæmia, which is also a cause of headache, there is cerebral œdema, raising the intracranial pressure. Nitroglycerin gives the most relief in these forms of headache. Remedies to relieve the intracranial pressure relieve the pain of migraine.—B.M.J. ii./08,298.

Neuritis, 32 cases treated successfully with $\frac{1}{100}$ grain at first, increased to 1 every 3 hours; headache and flushing controlled with Sodium Bromide. The effect was marked, all the acute cases cured in one week.—B.M.J.E. ii./08,40.

Subacute neuritis, a case of, with general dropsy. After usual remedies had been tried without benefit, Nitroglycerin in small doses increased the quantity of urine, and the dropsy disappeared completely in ten days.—B.M.J. ii./08,1670.

In Carbon Monoxide poisoning $\frac{1}{100}$ grain injected, together with inhalation of Oxygen advised.—Pr. Dec. '08,842.

Cordite, which contains Nitroglycerin 58% and Gun-cotton 37%, eaten by soldiers, produces headache.—C.f. Edn. XII. 501.

No cases of poisoning by absorption through the skin.—B.M.J. i./10,120.

NUTRIMENTA.

Foods may be classified as follows:—

1. **Proteids.** (a) free and (b) combined.
 (a) These include the Albumins and Globulins and the results of proteolysis of these, viz., Albumoses and Peptones.
 (b) These contain Hæmoglobin, which is an albuminous compound with a complex iron body; Glycoproteids, which are compounds of proteids with carbohydrates; Nucleoproteids, which are compounds of proteids and Nucleic Acid, which latter is an organic compound of Phosphoric Acid.
 The decomposition of proteids produces the nitrogenous extractions, i.e., Urea, Purin or Alloxuric bodies, such as Xanthin, Hypoxanthin and Uric acid, Creatin and Creatinin.
2. **Fats.** This group of proximate principles of the tissues, is represented by the glycerides, triolein, tripalmitin and tristearin (v.p. 617). Here is to be included also Lecithin, which on hydrolysis yields glycerophosphoric acid and Choline—the latter is an alkaloid allied to Neurine, and when in excess is a sign of nervous tissue degenerating and will produce toxic symptoms when existing in quantity in excess of the amount which can be oxidised into urea.
3. **Carbohydrates.** These may be in part decomposition products of the proteids and in part material about to be dealt with by the bioplasm, they are Monosaccharides, $C_6H_{12}O_6$ (Glucose, Galactose and Mannose), Disaccharides $C_{12}H_{22}O_{11}$ (Cane Sugar, Milk Sugar, and Maltose), Polysaccharides $(C_6H_{10}O_5)_n$ (Glycogen, Starch, and Cellulose).^{*} They are all converted into glucose in the body, whilst they are also stored up as glycogen or animal starch pending metabolism in the liver, muscles, &c.—“Nutrition and Malnutrition”—Allchin, L. i/05, 1111.

The analysis (hydrolysis) of Proteins gives glycocoll, alanine, leucine, etc.,—amido-acids. Fischer, starting with glycocoll, has synthesised 100 bodies closely allied to peptones,—he designates them ‘polypeptides’—the work gives biology a clearer insight into the chemistry of animal and plant life. He thinks the synthesis of enzymes also possible.—P.J. 1/07, 260; Am. Jl. Ph. April, '07, 168.

Biuret Reaction.

This reaction is used as one of several general reactions for albuminoid substances. *Fide* Schmidt, Vol. II., 2, 1777.

It is used in particular to recognise Urea, which heated in a capillary tube, until the melted Urea is distinctly turbid, and dissolved on cooling in water with a few drops of Soda Solution added, gives, on adding a drop of dilute Copper Sulphate Solution a red to violet colour, which turns to blue on further addition of the Copper Solution.

To obtain good results with this test in the recognition of Protein, the test solutions of Albumin, Copper Sulphate and Sodium Hydrate are best of following strengths:—Albumin in Distilled water 0.2%, Sodium Hydrate 1 Gm. in 10 Cc., and Copper Sulphate 5 Gm. to 100 Cc. water. Limits of delicacy both with this and cold Nitric Acid are given.—Bio. Chem. Jl., Vol. IV.; L. ii/09, 302.

^{*}NOTE.—Importance of removing Carbohydrate matter from the teeth. Many organisms in the mouth ferment Carbohydrates producing chiefly Lactic Acid. MONOSACCHARIDES are the most readily fermented. DISACCHARIDES require to be first inverted to MONOSACCHARIDES by an enzyme formed by certain of the mouth organisms before Lactic Acid can be produced. STARCHES require a double inversion—the first stage brought about by ptyalin or organisms before fermentation to an acid can occur. Formulae are given showing that 1 mol. $C_6H_{12}O_6$ (glucose) produces 2 mols. Lactic Acid; 1 mol. of the Disaccharide Cane Sugar $C_{12}H_{22}O_{11} + 1$ mol. H_2O gives 1 mol. each Dextrose and Laevulose, with ultimate formation of Lactic Acid; and that the polysaccharide $C_6H_{10}O_5)_n$ (Starch) + $H_2O = C_6H_{10}O_6$ Dextrin + $C_{12}H_{22}O_{11}$ Maltose, which Maltose is converted into 2 mols. Dextrose, and ultimately to Lactic Acid. The Lactic Acid dissolves the lime salts of the enamel and a cavity is originated at the point of action.—B.M.J. i/09, 396.

Proteins, Nomenclature of. Desirability for revision. I. 'Proteid' should be rejected. II. 'Protein' is recommended. If used at all the word 'Albuminoid' to be viewed as a synonym of Protein. III. The sub-classes to be protamines, histones, albumins, globulins, selero-proteins, phospho-proteins, conjugated proteins, derivatives of proteins, polypeptides. IV. The term 'Caseinogen' to be used for the principal protein in milk and Casein for its derivative,—the result of action of rennet. V. The two principal proteins of the muscle plasma to be called paramyosinogen and myosinogen,—soluble myosin to take the place of v. Fürth's soluble myogen fibrin. The term myosin to be restricted to the final product formed during rigor mortis.—L.i./07, 672; P.J.i./07, 283.

AMIDO-ACIDS.—These are very important constituents of Proteins. It has been suggested that all proteins are derived from Aspartic Aldehyde by condensation. They are both basic and acidic, *e.g.*, the following:—

Carbamic Acid (Amido-formic).

Glycocoll $C_2H_5NO_2$ (Amido-Acetic Acid) and Sarkosin (Methyl-Glycocoll).

Alanine $C_3H_7NO_2$ (Amido-Propionic).

Leucine $C_6H_{13}NO_2$ (Amido-Caproic).

Aspartic Acid $C_4H_7NO_4$ (Amido-Succinic).

Glutamic Acid $C_5H_9NO_4$ (Amido-Glutaric).

Tyrosine $C_9H_9NO_3$ Hydroxyphenyl Amido-propionic Acid.

Taurine $C_2H_7NSO_3$ Amido-ethane Sulphonic Acid.

At the moment of death proteins change in composition. Dead proteins consist of a mixture of Amido Acids.—Tibbles *q.v.* for a full account of the theory of Proteins.

Carbohydrate Metabolism (Pavy).—L.i./05, 1704; ii./05, 4342.

Pathology and treatment of diabetes mellitus. Three lectures dealing principally with the physiology of diabetes. Several Diabetic Foods are shown to contain a large proportion of Carbohydrate as starch—these constitute source of great harm. As to drugs something is wanted to set metabolism right in the way that Thyroid Extract acts in myxœdema—but a strong believer in Opium and some of its derivatives.—Pavy.—L. ii./08, 1499, 1577, 1727.

Further remarks by Halliburton on.—L. i./09, 21.

The amount of proteid or albuminoid food needed daily for the actual physiological want of the body is not more than half that ordinarily consumed by the average man. A diet of low proteid value is strongly recommended for the average healthy man and for those suffering from arterio-sclerosis.—B.M.J.i./06, 123.

Numerous treatises against excessive meat diet have appeared. Man was not intended to be the carnivorous animal he has become.

Some Strange Foods—Agar, Seaweeds, &c.—L.i./05, 1524.

Metabolism experiments and treatment of diseases.—L.i./06, 1154.

Metchnikoff has suggested removal of the large bowel as owing to its content of 28 billion bacteria produced daily he thinks it is a source of mischief.—B.M.J.i./07, 194.

Experiments on rats showed that a meat diet is prejudicial to powers of reproduction and lactation, suggesting that the increased consumption of animal food in this country may tend to the decrease in birth-rate, and diminished powers of lactation—B.M.J.i./07, 193.

DIETETICS, SYSTEM OF, edited by G. A. Sutherland should be consulted for special diets in various conditions.—Reviewed B.M.J.i./09, 537.

In tuberculosis very high feeding often results in arrest of the disease; in diet of gout and rheumatism Luff repudiates the idea that meat is a poison, and will have nothing to do with purin-free diet. In urinary and renal diseases lime and foods containing lime to be excluded. Preference for Magnesia bases to be given in treatment of oxaluria. Sir P. Manson deals with diet in diseases of hot climates.

Preparations of Meat and Blood

Origin, Manufacture, etc. (Historic) of Meat Extracts.—L.ii./o8,1233.

Analysis of Meat Extract and similar preparations.—L.ii./o8,1541.

Extractum Carnis.—*Syn.* LIEBIG'S EXTRACT; ★LEMCO. It contains little or no albuminous principles or gelatin, but consists of creatin, creatinin, globulin, and urea, with organic potash and other salts. A food for invalids and healthy persons; is added to soups, beef-tea, &c., and it is a *nerve* food allied to tea.

METHOD OF MANUFACTURE.—A temperature of 70° C. is used for repeated extraction.—Gamgee.—B.M.J. ii./o8,450.

★BOVRIL is not merely a stimulant, like Extract of Meat, but is a nourishing food, INVALID BOVRIL containing 21·42% of proteid.

Yeast extracts have been made and substituted for meat extracts; a test has been published for detecting this substitution.—P.J.ii./o3,516,704; *vide* also Y.B.P. 1907, 101

The test is based on the fact that Meat Extract contains both creatine and creatinine, whilst Yeast Extract contains neither. The "Lancet" (i./o7,1505) believes the test to be a conclusive one if carried out satisfactorily. We have tried the test on Yeast Extract and a well-known brand of Meat Extract, and must confess we obtained brownish red colours with both—difficult to distinguish one from the other.

Liquid foods, according to recommendation in America, should contain at least 8·8% solid constituents, and should possess at least as much nutritive power as milk. One-fourth of it, exclusive of Alcohol and Glycerin, should be in the nitrogenous matter. The protein matter should be converted by pepsin or pancreatin—not by acids.—L.ii./o7,308.

Ju-via was condemned. Creatin + Creatinine Estimations indicate that it contained only 8% of Meat Extract. Creatin + Creatinine in genuine Meat Extracts is on an average 10·85%. It was stated to contain 18% Meat Extract, 21% Yeast Extract and the rest Gelatin, flavouring and water. Yeast Extracts *in toto* are objected to.—Gamgee.—B.M.J. ii./o8,449.

Meat Extracts and their substitutes at the best are only stimulants.—P.J.ii./o8,615. They often contain too much vegetable extractive.—P.J. i./o7,584.

Concentrated Beef-Tea.

A firm jelly, in tins and skins, contains the natural gelatin of the meat, and, diluted, forms a nutritious substitute for true beef-tea.

Meat Juice (Brand's).

A teaspoonful in a wine-glassful of water is a useful pick-me-up. Is prepared by cold process resulting in retention of full activity of juice of the raw beef.

Essence of Beef.

A soft, transparent, amber-coloured jelly, prepared from beef by exhausting with tepid water. It is agreeable to the palate and stomach of a delicate invalid; is useful in allaying obstinate vomiting. It is best taken cold by teaspoonful. Similar essences are made from mutton and chicken.

Meat jelly is suitable for ulcerated stomach. Gelatin is a powerful proteid parer, easily digested, and fixes a great deal of acid.—Pr. Nov./o8,679.

Beef, Chicken, Mutton and Veal Peptones, are also prepared.

Restorative Essence of Beef is made from fresh beef, freed from fat, finely chopped up—1 pound mixed with distilled water 8 ounces; add 5 drops of hydrochloric acid, and 60 grains or less of salt; stir well and allow to macerate for 3 hours; strain. The product has an agreeable taste, and should be taken cold. *Dose.*—A wineglassful or more (Ringer). It is also prepared *Peptonised* by digestion with pepsin at the body temperature.

These are best freshly prepared for the patient, but may be preserved a reasonable time by addition of formalin or chloroform.

Raw meat for tuberculosis.—B.M.J.E. ii./or, 24.

Beef and Malt Wine.—Extract of Beef, 4 ounces, Extract of Malt, 8 ounces, Port Wine, 1 gallon (Ph. Form.); or a Meat Juice and Liquid Malt Extract may be used instead of the solid extracts.

For Bovril Wine, Lemco Wine, also Coleman's Wincarnis *see* Patent Medicine Chapter.

Peptonised Beef Jelly, v.p. 515.

Peptonised Beef Suppositories, v.p. 527.

Meat Juices, Liquor Carnis and others.

Dark, reddish-brown liquids consisting of the expressed juice of meat concentrated at a low temperature *in vacuo*. A teaspoonful is added to 3 table-spoonsful of cold or tepid water, and taken in tablespoonful doses or more for sickness or exhaustion. Hot water coagulates the albumen.

★**Valentine's Meat Juice.**

Dose.— $\frac{1}{4}$ to 2 drachms, diluted.

Two ounces are said to equal 4 pounds of beef; keeps good in warm climates.

★**Wyeth's Meat Juice.**

Dose.— $\frac{1}{2}$ to 1 drachm. It contains the albumins of meat in an active and soluble form and the hæmoglobin is unaltered (bright red colour). Should be mixed only with iced, cold, or luke-warm fluids.

Capsulæ Cruoris. BLOOD CAPSULES.

These contain 20 grains of the red corpuscular matter of fresh sheep's blood. To be prepared for the patient twice weekly, and are of great value in anæmia, debility and marasmus.

In this direction they should prove of greater utility than the customary dried blood preparations, as the blood is in an easily assimilable condition, and being coated with soluble white gelatin coating the capsules are not unsightly to the patient as are some of the liquid compounds.

Hæmoglobin. *Dose.*—1 to 2 drachms (4 to 8 Gm.)

$C_{600} H_{960} N_{154} Fe S_3 O_{179} (?) = 13246.34 (13341.28 \text{ I. Wts.})$.

The principal constituent of red blood corpuscles. Is supplied commercially in reddish black powder or of extract consistence or in scale form. May be given according to condition in cachet, capsule, or mixed with wine.

Halliburton states that hæmoglobin is useful in ordinary secondary anæmia. Hæmoglobin solution gives a characteristic absorption spectrum and contains in organic combination iron equal to about $\frac{1}{2}\%$. *Cf.* p. 866 for estimation in the blood and further details. It combines readily with oxygen, forming **oxyhæmoglobin**, which is the substance known in trade as hæmoglobin.

In the arterial circulation, hæmoglobin is present as oxy-hæmoglobin (brilliant red in colour) the oxygen of which is given up to the tissues in its course, returning de-oxygenated (dark red) to the lungs by the venous system, where it is ready to take up fresh oxygen and so continue the process.

Hæmoglobin Capsules.

Contain 5 grains (0.32 Gm.), and possess the advantage of not being unsightly to the patient.

In Hæmol (Kobert) and *Hæmozallol (Kobert) the normal absorption lines of the blood cannot be identified.—P.J. ii./00,258.

Sicco. *Dose.*—15 grains (1·0 Gm.). A blood preparation in dry powder, soluble in water.

Elixir Hæmoglobin.

Dose.—1 drachm (3·5 Cc.) or more.

Hæmoglobin 10, Water 15, Aromatic Syrup (carefully neutralised), *q.s.* to 100 (approximately 5 grains in 1 drachm). An agreeably flavoured preparation of hæmoglobin as hæmatinic.

Nutrient Powder (Brand's).

On bread and butter or mixed with other food is very palatable—it retains the nutritive value of fresh meat.

***Somatose.** A light yellow granular powder, easily soluble in water, prepared from meat, principally albumose (semi-digested proteid).

Dose.— $\frac{1}{2}$ to 1 drachm thrice daily, in wasting diseases and in convalescence. Liquid-Somatose is a syrupy form. Iron Somatose contains about 4·5 % of ferric oxide. In amenorrhœa, chlorosis, leucorrhœa, &c. *Dose.*—75 to 150 grains (5 to 10 Gm.) daily.

Lacto (Milk) Somatose.

Dose.—1 to 2 drachms for children, 2 to 3 tablespoonsful for adults. Desiccated albumose of milk.

***Guaiaçose.**—Somatose with Calcium Guaiaçol Sulphonate in aromatic syrup. *Dose.*—For adults 3–4 drachms; children 1–2 drachms after meals in milk.

For diseases of the respiratory system, also for preventing bronchial catarrhs following influenza, &c.

Albumin Ovi Siccum, Ph. Ned., P. Jap.

Dose.—*Ad lib.* The molecular weight of albumin has been given as approaching 14,000. Yellowish, transparent, horn-like pieces obtained by evaporating white of egg at not exceeding 50° C. (the fresh white of egg is used as antidote in case of poisoning by mercurial and copper salts). Should be easily soluble in about 10 parts of water, producing a neutral solution. Insoluble in alcohol and ether.

Incompatible with mineral acids, alcohol, mercuric chloride, tannin containing preparations.

Constitution of the albuminous molecule.—Fischer, B.M.J. i./06,221.

In hyperchlorhydria occurring in nervous disorders egg albumen is a food which binds and neutralises Hydrochloric Acid. For Albumen and Milk diet (Lenhartz's) consult Pr. Nov./08,680.

Albumin Water, for infantile diarrhœa, white of one egg mixed with Sterile Water 8 ounces, Sodium Chloride 5 Gm., and a little whisky or brandy added. In the treatment of appendicitis.—B.M.J. ii./07,68.

Albumin Sanguinis.

Dose.—*Ad lib.* Made by inspissating blood serum. Brown horn-like scales, not so soluble in water as the above.

Milk Preparations.

For Milk Analysis vide p. 887.

The milk supplied in this country in 99% of cases is from cows in calf. That from cows not in calf is more digestible, as the drain of the embryonic calf interferes with quality of the pregnant cow's milk.—L. ii./08,1554.

Very nearly a quarter of the milk samples taken at random from the Metropolitan area were tuberculous.—L. ii./o8,1616.

'Upper Milk' Feeding for infants and invalids commends itself for certain reasons. 'Upper Milk' consists of the upper portion of milk that has stood in a cool place until a cream layer has formed. An aluminium dipper (holding 1 ounce) is devised by Chapin for the purpose. By diluting with water, or with water and whole milk, mixtures are obtained containing a high percentage of fat with a normal percentage of proteid. Upper milks are much superior to cream mixtures for feeding—the fat percentages are more uniform and the dilutions do not so readily separate as those employing cream.—Am. Jl. Ph. Feb./o8,55.

Colostrum.—The milk from mammals shortly after birth of their young, differs from normal milk in containing a very high percentage of an albumen closely resembling blood albumen. The proteids it contains are soluble. Colostrum provides readily absorbable nutriment, as the infant's stomach contains no gastric juice at the commencement. It is highly laxative in properties, probably owing to its high fat content.

The fat content of the faeces of the infant is always high—ranging from 10 to 20%—during the first week it is as high as 40 to 50%.

The salts in human and cow's milk vary very greatly. Nearly $\frac{1}{3}$ of the salts of cow's milk are alkali citrates and alkali earth citrates. Human milk contains 0.5 Gm. of Citric Acid as citrates, whilst cow's milk contains from 1 to 1.5 Gm. per litre.

The proteids of Milk consist almost entirely of Casein and Albumen. Koenig's Analyses show mean percentages as follows:—

		Casein.	Albumen.	Maximum.	Minimum.
Cow's Milk	...	6	1	7 to 1	4.5 to 1
Goat's	...	3	1	3 to 1	2 to 1
Sheep's	...	3	1	4 to 1	3 to 1
Mare's	...	1.5	1		
Asses'	...	1	2.3		
Human	...	1	1		

The proportion of these two forms of Proteid is adjusted to the needs of the animal, the albumen being easily digested, and the casein digested with difficulty. A sixteen pound infant requires more casein than one weighing 12 lbs., though of the same age, and the human milk changes accordingly. More and more casein and less and less albumen is required by the child as time goes on.—Am. Jl. Ph. Feb. o8,55.

Lecithin contained in various milks. Human average 0.0499%, cows' 0.0629%, asses' 0.0165%.—P.J.ii./o8,840.

The use of **Dried Milk for Infant Feeding** has latterly been greatly on the increase. Several Public Corporations are using it in large quantities. The 'Half Cream' Milk is preferred by some authorities for the purpose as being less rich—indeed a healthy child has been reared on *Dried Separated Milk*. This contains perhaps 1% fat. Obviously if a child is capable of digesting the full cream variety it should have it in preference.

B. Tuberculosis and all other bacteria are killed in the process of desiccation.

For infant feeding and general use:—

Dried Full-Cream Milk (with all its original cream) is re-converted into milk by mixing $2\frac{1}{2}$ ounces (5 heaped tablespoonsful) with 1 pint of hot water. To re-convert

Dried Half-Cream Milk (with half its original cream), employ $2\frac{1}{2}$ ounces (5 tablespoonsful) to the pint of hot water. For

Dried Separated Milk (containing 1% of its original butter fat), employ 2 ounces (4 heaped tablespoonsful) to the pint of hot water.

Feeding Trial with the Dried 'Full' and 'Half' Cream Milk on infants of the poorest class in London.—The milk so made, on dilution with water, is sterile, or nearly so. Diarrhœa was practically absent throughout the trials. Roughly 1 of powder to 7 of water is the strength of food to start with. The following table is supplied to the mothers :

The milk in the bottle to be shaken occasionally whilst feeding, as the fat separates. No food to be kept over.	Age of Infant.	Intervals of Day Feeding.	No. of Night Feeds.	Boiling Water.	Dried Milk.
	1 week	2 hourly	2	1 to 1½ ozs.	1 measure (holding about 1 dr. weight)
	2 to 3 weeks	2 „	2	2½ ozs.	2 ditto
	4 to 5 weeks	2 „	1	3 oz.	2-2½ „
	6 to 12 weeks	2½ „	1	4 oz.	3-3½ „

And so on in about same ratio.

Deserving of trial, especially during summer months when epidemic enteritis is prevalent.—B.M.J.i./09,398.

Excellent results at Sheffield.—B.M.J. ii./08,570.

It has been shown that milk after desiccation is much more easy of digestion, a fact which is easily demonstrable in the case of infants recovering from acute diarrhœa. These are often unable to take fresh milk even in extreme dilution without recurrence of diarrhœa, yet can digest comparatively concentrated mixtures of dried milk.

Dried Milk forms a very useful medium for feeding where diarrhœa occurs. The object is to get the child back again on cow's milk gradually. A teaspoonful to be added to the Dried Milk at first, and gradually increased, but even this was found to be sometimes too much,—Naish, Sheffield Medical Officer, Dec. 1909,427.

For infants Milk in preference to Patent Foods. If Milk is cooked, or pure Dried Milk be used fresh fruit juices, or raw meat juice must supplement.—Infantile Scurvy, Lecture on. T. D. Lister. M.P.ii./09,54.

***Lacvitum** is a trade name for full-cream Dried Milk.

* **Lacumen** is Lacvitum (above) freed from fat.

It is only soluble on the addition of alkali.

Milk, Artificial Human.

New Milk 30, Cream 1½, Milk Sugar 1½, Water 18; with instructions for sterilizing.—P.J. 1892,652; 1893,346,785; i./05,59.

Artificial Human Milk, partially pancreatised and sterilised, is now supplied in bottles.

Normal Human Milk has the composition:—Fat 3·4%, Milk Sugar 6·4%, Albuminoids 1·7%, Mineral Matter 0·2% (c.f. also p.480). Notice the difference between the human milk and cow's milk (p. 887) in the relationship between the albuminoids and the mineral matter. *Vide* also 'Whey Powder,' p. 480.

A recently introduced 'Milk Humaniser,' a simple device like a wash-bottle, is arranged to syphon off the lower half of 1 pint of fresh milk which has been allowed to throw up its cream, adding 60 grains Milk Sugar and making up to volume again with pure water. It is also arranged to do half a pint of Milk.

Infant Feeding.—If artificial feeding has to be resorted to, healthy cow's milk should first be tried; that known as 'Nursery Milk' is taken from tuberculin-tested cows and may be more usually relied on from large dairies than ordinary milk supply. As a general rule dilute with equal quantity of water. A grain of Sodium Citrate to the ounce will increase digestibility (5 and 10 grain tablets are prepared *q.v.*), Milk Sugar, a drachm to the pint, is also a useful addition. Fresh Milk is better than Pasteurised, but in case of doubt Pasteurisation or the use of Dried Milk (*q.v.*) or Condensed Milk (containing not less than 13% fat) should be considered. Of the last mentioned use 1 teaspoonful of the sweetened variety to 3 ounces of water, adding 1 teaspoonful of cream. (Condensed Milk should not be given after the child is four months old.)

If none of the above are digested, Peptonised Milk must be given employing Peptonising Powders or Liquor Pancreaticus (*q.v.*). After the child is six months old a Malted Food may be given as a supplementary food, but farinaceous foods of all kinds should be discouraged until the child has teeth.—R. Hutchison.

Infants' Food 'A' (for children up to three months contains all the Milk Solids prepared with antiseptic precautions. Three to five heaped tablespoonsful to be added to a pint of water which has been brought to the boil (and kept boiling for fifteen minutes), and allowed to cool down slightly in a covered jug.

For bacteriological reasons and owing to the fact that the milk fat will rise to the surface on allowing to stand for a few hours, a sufficient quantity only for use at the time is to be prepared in order that the Food may be as fresh as possible at the time of administration.

Food 'B' for Infants (from three to six months) and Invalids contains the milk solids with a small proportion of cereal carbohydrates treated to render them assimilable. Prepared for use as the latter.

Food 'C' for Infants (from six months and upwards) and Invalids similar to 'B' with a larger proportion of farinaceous constituent. Five heaped tablespoonsful to be used to the pint of water as above.

Cocoa Food is also prepared.

Malted Foods described.—B.M.J. i./10, 86.

The Pasteurisation of Milk—So-called "sterilizing"—consists in raising it to the temperature of 70° C. (158° F.) and maintaining it at this temperature for 30 minutes. This effectually removes all pathogenic and the bulk of the non-pathogenic organisms. So treated, milk keeps sweet two or three days. The process may be approximately carried out by plugging convenient sized bottles filled with the quantity for one meal, heating in a pan surrounded with water to nearly boiling point, remove from the fire, cover with a clean cloth and allow to stand half-an-hour. Then cool rapidly, and store in a cool place.

To obviate the constipating effect of Pasteurised milk for infant feeding add 5 to 20 grains of sodium bicarbonate to the quart of milk, also a little milk sugar. The Sp. Gr. of the final product must be 1.033.—B.M.J. i./05, 1182.

Next to Mother's Milk comes Cow's Milk simply brought to the boil (scalded) and *diluted with water* in the usual proportion. Barley or lime water not desirable. Sterilised milks not good,—children may become anæmic. *It is often contaminated worse bacterially than ordinary milk.*

A lot of nonsense on sterilised milk has been written. Gain in weight of a child is not everything,—not necessarily progress in development. Scalded milk and water, equal parts, every 2½ hours, brought a child up to normal after it had sampled four kinds of foods and two milk mixtures.—Burnet, Pr. Apl. '08, 484.

Proprietary foods for infants are too often only impositions upon a credulous public.—L.i./o6,98.

Rickets, a study of. In artificially fed infants the disease is often considered to be due to deficiency of fat and proteid, with an excess of carbohydrate. These factors may apply to naturally fed children as well. Improper feeding, however experimentally, was insufficient to account conclusively for the disease. Lack of exercise, however, invariably caused it.—B.M.J. ii./o8,13 *et seq.*

Lack of exercise does not, however, seem to be sufficient explanation of infantile rickets.—Ewart, B.M.J. ii./o8,117.

Cause and prevention of dental caries. A useful article on child feeding, to which, however, it is quite impossible to do duty in an abstract here, consult L. ii./o8,790.

For composition and nutritive value of proprietary foods, consult Cautley in 'System of Dietetics,' *c.f.* B.M.J. i./o9,537.

INFANT FEEDING AND TREATMENT IN THE TROPICS.—The most efficient food, in the absence of breast feeding, is a good brand of Condensed Milk—adaption has of late materially reduced infant mortality.

In gastro enteritis stop milk feeding and give nothing but warm albumen water in large quantities (20 to 40 ounces containing the whites of 3 or 4 eggs) according to age of child during 24 hours. Castor Oil a few drops. In dysentery stimulants are not to be used. Intestinal injections, Boric Acid, Simaruba, etc., essential.—B.M.J.ii./o9,770.

Are infants capable of digesting foods which contain starch? Infants from birth secrete an amylolytic ferment. The glands, notably the pancreas, can be trained by means of a starchy diet to the secretion of an increased amount of the amylolytic ferment. This training can be begun shortly after birth in the case of bottle-fed infants. Barley water contains about 2% of starch. If mixed with an equal quantity of milk there will only be 1% in the mixture. This is almost certainly beneficial, for it encourages the growth of lactic acid bacilli and the formation of lactic acid, thus preventing the growth of proteolytic bacteria. Commence with a milk mixture containing not more than 0.5% of starch, and gradually increase the amount very slowly up to 3 to 5%. If the stools become very acid, or if they give a distinct starch reaction, the percentage of starch in the diet must be reduced.—L. ii./o9,1343.

Sterilisers (for milk). The ★Soxhlet and Aymard's Patents are in use.

The evidence of Dentists on the ground of the poorness of the teeth seems to be that cow's milk (better not sterilised) is more valuable than Foods.—B.M.J. ii./o7,1485 *et seq.*

Milk contains more calcium than lime water. Milk is, therefore, of value in hæmorrhage—where it is desirable to increase the calcium in the blood—also in many forms of pneumonia. Butter-milk useful in typhoid and in gastro-intestinal disorders of children.—B.M.J. i./o6,124. *c.f.* Trilactine, p. 50 *et seq.*

Brunton says it is possible that the benefit found from a milk diet in heart disease may be in part due to the amount of Calcium Salts contained.—B.M.J. i./o7,617.

Dangers of Pasteurised milk.—L.i./06,1280,1349.

In post-partum hæmorrhage $\frac{1}{2}$ to 1 litre of milk by rectal injection is good as hæmostatic.—M.A. 1908,23.

Whey Powder.

This we understand to be virtually Desiccated Milk deprived of fat and Casein. It has approximately the composition: Soluble Lactalbumen 14.25, Milk Sugar 74.45, Fats 0.27, Mineral Matter, chiefly Phosphate 9.8, Moisture 1.2%. It is stated to be practically sterile. It is employed in conjunction with cows' milk for producing a milk with a reduced proportion of Casein, and also of higher Sp. Gr., with the result that the amount of fluid is proportionally lessened. Or it may be prepared with water and cream,—the cream being low in Casein, sugar and ash, but high in fat, whilst the whey is low in fat, but high in ash, sugar and lactalbumen.

It may also be used alone to produce Milk Whey by dissolving in water. C.f. B.M.J. i./09,1491.

Human Milk, according to recent analysis, contains on an average 0.8% Casein and 0.6% Lactalbumen; **Cow's Milk** 2.7% to 3% Casein and 0.2 to 0.3% Lactalbumen. C.f. also pp. 477, 887. In diluting Cow's Milk with water to reduce the Casein content it is obvious that the deficiency in Lactalbumen is rendered still more in error.

It is also clear, if the above figures be correct, that a breast fed child taking 1,000 Gm. of milk in a day, will receive 6 Gm. of Lactalbumen. *A child receiving, say 600 Gm. of Cow's milk would receive only 1.8 Gm. at most of the same albumen. This lactalbumen is soluble, i.e., it does not undergo precipitation with acid and digestion with vepsin and pancreatin before assimilation.*

Arguing by analogy with the high albumen content in Colostrum which the newly born calf receives (c.f. p. 476), the advocates of Lactalbumen, as an addition to cow's milk for infants' milk, claim that it is important to supply the infant with a form of proteid which makes small demand on the digestive glands, and which does not require much transformation before it can be absorbed.

***Albulactin** is a special preparation for adding to cow's milk diluted with water and sweetened with milk sugar to produce the equivalent of human milk. It is stated to be pure soluble Lactalbumen.

A number of cases have been recorded in which Albulactin in dose of 2 Gm. (30 grains) was added as a rule to each of six feeds during 24 hours. In all there was marked increase in weight. The curd formed by its use in the infant's stomach is stated to be in a finely broken-up condition.

The dose thus given is obviously more than the lactalbumen content in human milk would direct, but the excessive dose was purposely given to demonstrate safety of the preparation. Further results have been obtained using a less quantity—8 grains (0.5 Gm.) per feed—and experiments at hospitals in London were proceeding at the time of going to press.

The manufacturers issue a table of directions from which we take the following:—

Age of Infant.	No. of Meals <i>pro die</i> .	Amount of Milk and Water.	Total daily amount of Albulactin.
2nd to 4th day ...	10	Milk 1 } Water 3 } 1 ounce	25 grains.
5th to 7th day ...	10	Milk 1 } Water 3 } 1½ ounces	30—41 grains.
2nd week ...	8	Milk 1 } Water 2 } 2 ounces	40 grains.
3rd and 4th week ...	8	Milk 1 } Water 2 } 2½ ounces	60 grains.
2nd month ...	8	Milk 2 } Water 3 } 3 ounces	80 grains.
&c. &c.			

It will be seen that the quantity of Lactalbumen given in the table approximates the amount stated to occur in human milk, viz., 0·6%.

Strong statements on methods in milk trade.—L. ii./08,1226.

Regulations in Australia for a pure milk supply for infants.—L. ii./08,1340.

Glaxo. Infants' Food, contains proteid higher and the sugar somewhat lower than in dried human milk. The fat is practically identical however. To prepare it is mixed with hot water. Practical trials are stated to have given good results.—B.M.J. ii./08,1687.

Ortho-Methyl Amino-Phenyl-Sulphate, or ★Ortol (which is a mixture of this body with Quinol and is used in photography) are recommended for milk testing. One drop of a 1% solution is added to the specimen and followed by 1 drop of weak Peroxide of Hydrogen solution. Raw milk, or milk that has not been heated above 75° C., gives a reddish pink colour.—L. ii./03,23. We found by some experiments that a 1 in 30 Solution of 10 volume H₂O₂ in water is a limit of dilution in working on the above lines.

Tests for Ortol.—P.J. i./07,429.

Milk Preservation.

Experiments show that Boric Acid 1 in 2,000 and Formaldehyde 1 in 50,000 preserve milk for 24 hours. Refrigeration and pasteurisation preserve without intervention of these chemical aids.—B.M.J. i./05,1412.

Filtration by means of sand has been suggested. This is largely done on the Continent. See also article on milk preservation.—B.M.J. i./08,936.

Budde Process of Preserving Milk.

Consists in adding 15 Cc. of a 3% Solution of Hydrogen Peroxide to 1 litre of Milk and warming to 51–52°C. for at least three hours. 48°C. is not sufficient and 55° is too high.—L. ii./05,209.

The organisms found in milk may be classed as follows:—(i.) Acid-producing (100 varieties), the principal member of which is *B. acidilactici*; (ii.) *B. acidibutyrici* (has very resistant spores, not killed by pasteurisation); (iii.) those responsible for fermentation to alcohol, as koumiss, butter milk, red milk, blue milk, &c.; (iv.) the mould *Odium albicans* produces thrush in infants' mouths; (v.) *B. tuberculosis* (20 to 30% of the cows in this country are tuberculous); (vi.) *Streptococci* associated with contagious mammitis; (vii.) *B. diphtheriæ*; (viii.) *B. coli communis* and *B. typhosus*.—B. & C.D. ii./05,576.

Koumiss (Artificial). *Syn.* KEFIR.

Dissolve Grape Sugar $\frac{1}{2}$ ounce in water 4 ounces, and add 20 grains of yeast and cow's milk 4 ounces. Place in a quart bottle and fill up with milk, cork and wire. Keep it cool and shake it frequently during four days. Koumiss thus prepared contains some alcohol (1 to 2%) and lactic acid (about 1 to 2%). The original Koumiss of the Tartars was made from mare's milk by using the peculiar Kefir ferment, which swells up on soaking in milk. This consisted in reality of yeast cells with certain bacteria. (*B. Caucasicus*, Kern).

Full details on manufacture of Koumiss.—*Am.Jl.Ph.*, Jan./08, 20.

Uses.—As a stimulant in exhaustion and in convalescence of phthisis. Is recommended by Metchnikoff as a good nutritive, and also as an intestinal antiseptic. Is a specific in whooping cough. Is a diuretic, of use in chronic nephritis.—*M.A.* 1906. 30.

Casein Preparations.

Casein is the principal albuminoid constituent of milk and is present in solution in the aqueous portion of the milk as an alkali-albuminate (the alkali in milk is about 0.5%). It is precipitated by dilute acids (*e.g.*, acetic acid, which is utilised in method of estimation, *v.p.* 888). Casein is, furthermore, thrown out of solution by the action of the rennet ferment. Casein is present in milk to the extent of 3 to 5% (usually about $3\frac{1}{2}\%$). Once thrown out of solution it is not readily dissolved again except with added alkali or hydrochloric acid.

Flocculent Casein, *see* Casumen, *infra* (specially prepared) is, however, soluble in water.

Cheese is essentially casein with a little fat. In diabetes.—*L. ii./OS*, 262.

The following preparations are believed to contain casein:—

***Savore** is a preparation of milk and cereal proteids and albumoses with carbohydrates.

***Plasmon.**

Is a soluble milk albumin (Casein) containing the original organic salts. It possesses nutritive properties, and is easily digested. Plasmon Biscuits, Arrowroot, Cocoa, and Chocolate are prepared.

Contains Phosphorus in organic combination to extent of 1.46%. Total Phosphoric Acid found being 2.83%. Milk proteid differs from other proteids in containing Phosphorus in combination.—*L. i./09*, 1186.

For gastric ulcer this and similiar foods are much employed.

***Protylin** is a phosphorus and albumin compound. *Dose.*—4 grains. (0.26 Gm.) for anæmia, neurasthenia and osteomalacia.—*B.M.J.E.ii./04*, 52.

***Casumen.**

A soluble form of Casein (Flocculent Casein) containing a very high percentage of proteid (90%). For use in all cases where there is poor nutrition. It contains practically no fat or sugar. It may be mixed with cocoa, chocolate, bread (10%) for diabetics, &c.

Hammersten's Casein enjoys a certain amount of repute for determining peptic and tryptic activity. For method of proceeding consult *M.* '08, 179.

Pigmentum Casein, St. M.'s H. This ointment contains Casein 14, Potassium Carbonate $\frac{1}{2}$, Glycerin 7, Vaseline 21, Zinc Oxide $\frac{1}{2}$, Phenol $\frac{1}{2}$, Water to 100. If good flocculent Casein be used we find this is almost too thick and tacky,—our experiments indicate that it may with advantage have a little more water added.

Unguentum Caseini of Unna is almost identical with the last.

Other Food Preparations.

Benger's Food. A wheaten flour preparation containing Trypsin and Amylopsin. It is used with fresh milk or milk and water in any proportion required, artificial digestion being stopped at any point by boiling. It gives the body nourishment with complete or partial rest to the digestive system. The point of the preparation is that if the digestive system, however weak, can do any work at all, it should be given it to do to the extent of its power. The fat may be increased by adding cream or upper-milk.

***Glidine**, a vegetable protein food made from wheat, in yellowish powder, free from starch, and containing albuminoids 96%, Lecithin 0.87%, Carbohydrates and ash 3.1%. Nutritive and easily digested.

Consists almost entirely of Gluten, *v.* also B.M.J. ii./09, 1352 (Analysis slightly different).

Ferroglydine Tablets contain each Iron 0.35 Gm. For anæmia, chlorosis, and as a tonic in exhaustion and convalescence. *Cf.* Bromoglydine, Iodoglydine.

Ⓢ***Arsan**.—Name given to a combination of Glidine with Arsenic.

Tablets, weigh average 8.6 grains, and contain 2 grains of Protein and $\frac{1}{35}$ grain (0.002 Gm.) of Arsenic. The Arsenic is gradually absorbed. —B.M.J. ii./09, 1352.

Chemical Control of food stuffs *vide* Nature, Mar. 3, 1910, p. 3.

Ⓢ NUX VOMICA (Off.)

Ⓢ and all preparations containing 0.2% or more of Strychnine.

Antidotes. See **Strychnine**.

Dose.—1 to 4 grains (0.065 to 0.26 Gm.) in powder.

Fr. Cx. (*vide infra*) approximates latter as a maximum dose during 24 hours.

The dried ripe seeds of *Strychnos Nux-vomica* (*Loganiaceæ*), imported from India and Ceylon, contain from 0.7 to 1.5% of Strychnine.—P.J. ii./00, 574. Farr & Wright find 1.0 to 1.5%.—P.J. ii./06, 83.

A minute quantity of copper is said to be present in the seeds, and this may colour mixtures made with Tinctures of Nux Vomica and Sal Volatile a bluish green shade.

Fr. Cx. requires not less than 2, nor more than 3% (combined) alkaloids.

U.S. standardises to 1.25% Strychnine. *U.S. Assay*.—Nux Vomica 20 Gm, in No. 60 powder is shaken with a mixture of Ether 137.5 Cc., Alcohol 13.5 Cc., Chloroform 44 Cc. and Ammonia 5 Cc., and allowed to stand 12 hours; 100 Cc. is decanted and shaken with repeated amounts of Normal Sulphuric Acid. Chloroform and Ammonia are added, and the mixture shaken and Chloroform drawn off. Chloroformic solution is evaporated and residue dissolved in warm Sulphuric Acid, and when cooled a cooled mixture of equal volumes Nitric Acid Sp. Gr. 1.42 (at 25° C.) and distilled water is added and the solution is shaken with Chloroform in the presence of excess of Soda. The Chloroformic solution is evaporated and the residue dissolved in N/10 Sulphuric Acid and back-titrated with N/50 Potassium Hydroxide in usual manner, using Iodosis as indicator, the factor 0.0332 being employed to obtain percentage of Strychnine. (1 Cc. N/10 Acid = 0.03317 Gm. Strychnine.)

Alkaloidal strength of powdered drug to be 2.5%—F.I. Standardisation for total alkaloid does not ensure the presence of any strychnine whatever. Here Great Britain will probably take exception.—C.R.

Method of assay and results.—P.J. i./03,426; Y.B.P. 1903,158,160,161. That of U.S. satisfactory—the oxidation to proceed at a somewhat elevated temperature—50°C. being best.—Farr and Wright—P.J. ii./06,83.

Bird's method modified for dry Extract.—P.J. ii./05, 864.

A menstruum of Amyl Alcohol 1, Chloroform 3, and Ether 4 is a useful solvent for the alkaloids in assaying.—P.J. ii./00,574. A little Amyl Alcohol added to the Strychnine residue prevents decrepitation in drying.

Naylor favours a method based on Bird's or Alcock's process, concluding with Doward's Nitric Acid method of separating the two alkaloids.—P.J. ii./05,126.

Composition of Nux Vomica Fat constituting about 4% (Greenish finds 2.6 to 4.7%, *vide infra*). It contains high percentage of unsaponifiable matter and great variation of free acid, from 56.7 to 6.9 calculated as Oleic Acid.—P.J. ii./05,223.

The addition of 1 Cc. of 5% solution of Sodium Nitrite solution is suggested after dissolving the alkaloidal residue in 15 Cc. of 3% H_2SO_4 and adding 3 Cc. of a mixture of nitric acid and water, in the U.S. process. To ensure the oxidation of the Brucine.—Am. Jl. Ph. 1907, p. 1, *et seq.*; Feb./08,74.

By using Nitric Acid Sp.Gr. 1.435 containing 1% Nitrogen peroxide, the Brucin. is destroyed in a mixture of the alkaloids in 15 minutes.

The lower oxides of nitrogen necessary in the acid can easily be secured by warming the strong acid with a few mgrs. of sugar until fumes appear, before diluting it.—A. B. Lyons, Int. Cong.

Flavoring for Nux Vomica preparations, see Strychnine.

Uses.—A bitter stomachic and tonic. Stimulates the bowels, hence added to aperients. Increases nervous energy. Given to relieve shock and collapse from anaesthetics. Is employed in dyspepsia, heart weakness, and as a general tonic in all conditions of debility and neurasthenia. In China for hydrophobia.—L. i/04,1341.

① **Extractum Nucis Vomicae (Off.).**

Dose.— $\frac{1}{4}$ to 1 grain (0.016 to 0.065 Gm.).

Is prepared from the liquid extract by distilling off the alcohol and adjusting the strength with milk sugar so that it contains 5% of strychnine.

U.S. is a liquid acetic extract precipitated from inert matter with alcohol, dried, adjusted to 5% Strychnine, and powdered. **Average dose.**— $\frac{1}{4}$ grain. Assay p. 483.

F.I. prepares with Alcohol 70% and alkaloidal strength 15%; this refers to total Alkaloids, and is not as good as B.P. C.R. points out 5% Strychnine much better. FR. CX. conforms with F.I. making the preparation 16% total alkaloids with *max. single dose* $\frac{1}{2}$ grain and *max.* in 24 hours $1\frac{1}{2}$ grains approx. Nux Vomica Extract elsewhere abroad is called—

① ***Extractum Strychni**, P. Austr., P. Dan., Ph. Ned., P. Helv., P. Hung., and P. Belg., contains 16% alkaloids

P. Hung. has in addition to the F.I. Extract, **Extractum Nucis Vomicae cum Dextrino Exsiccatum**, $\frac{1}{2}$ strength of the latter.

In the official process for estimating the liquid extract which may be employed also for the solid extract, 2 hours is sufficient for the precipitation of the Strychnine Ferrocyanide if the temperature be kept at 65° to 70° F. In cold weather the Strychnine Ferrocyanide is not properly freed from the Brucine Salt by washing.—J. ii./00,214.

② **Extractum Nucis Vomicae Liquidum (Off.).**

Dose.—1 to 3 minims (0.06 to 0.18 Cc.).

Prepared by percolating the seeds in No. 20 powder with Alcohol (70%), and adjusting the strength so that the extract contains 1.5% of Strychnine. A "blunder."—P.J. ii./06,85.

By filtering the weak percolate in the official process, after evaporating to $\frac{1}{2}$ of its volume, the fat (2.6 to 4.7% in the seeds) is removed. This will produce a tincture which will not deposit in the cold. A No. 20 powder is the most suitable.—P.J. ii./01,667,672.

* Although Strychnine content in these may not be specified it is only common sense to bring them into ①.

Alcock's modified method of estimation in place of the B.P. one.—P.J. i./07,30. Wright finds fault with it. Ammonia is unsuitable as alkaliser, as the Strychnine becomes highly coloured and impure.—P.J. i./07,49.

Naylor favours the following modification of the B.P. process. To 5 Cc., in a separator, add Potassium Carbonate 1 Gm. in 2 Cc. water, then light petroleum spirit 15 Cc. Agitate well and run off the 2 lower layers into a separator and repeat shaking with 15 Cc. petroleum. Transfer aqueous layer to a clean separator and add the petroleum ether to portion previously obtained. Rinse second separator with 5 Cc. water and add the washings to the alkaloidal liquid in the third separator. From this liquid extract the alkaloids by three agitations with 10 Cc. of chloroform, warming after each agitation. Take the B.P. quantities of dilute sulphuric acid and water, divide into three parts, and agitate each portion successively first with the petroleum ether and then with the bulked chloroforms, assisting the chloroformic separations by warming. Collect the united acid solutions and separate the alkaloids by Dowdard's or other method.—C.D. i./07,454; P.J. i./07,395.

Nux Vomica is extracted sufficiently well with 60% alcohol—this leaves most of the oil behind.—P.J. ii./09,142.

① Fluidextractum Nucis Vomiceæ, U.S.

Aceto-alcoholic, contains 1% Strychnine. *Average dose*.—1 minim.

Naylor investigated the U.S. and other methods of standardising. His method, found to work well, is based on the original of Dowdard, and should be referred to P.J. i./07,395.

In the U.S. process no need to evaporate the alcohol from the fluidextract taken. Shake out 5 or 10 Cc. of same direct with immiscible solvent in presence of alkali.—Am. Ph. Jl. 1906,157.

The U.S. assay process is an improvement on that of the B.P., for the brucine is entirely destroyed by the nitric acid in ten minutes if the solution is heated to 50° C., as recommended by Farr and Wright. In the B.P. method the separation of brucine from strychnine is not complete, the strychnine extracted being never quite free from brucine, while a small proportion of the strychnine remains in the ferrocyanide solution.—Umney. C.D. ii./08,493.

② Tinctura Nucis Vomiceæ (Off.).

Dose.—5 to 15 minims (0·3 to 0·9 Cc.), often less.

Liquid Extract of Nux Vomica 2, Distilled Water 3, Alcohol (90%) *q.s.* to 12. This contains not less than 0·24 or more than 0·26% of strychnine. One ounce contains about one grain, or about double the quantity contained in the Tincture of B.P. 1885.

F.I. adopted strength 0·25% and to be prepared with Alcohol 70%. This is for total alkaloids. A figure for Strychnine would be more satisfactory—*c.f.* C.R. remarks under "Nux Vomica." p. 493.

③ Fr. Cx. prepares by dissolving 1·582 Gm. Extract (Fr. Cx.) in Alcohol 70% *q.s.* to produce 100 Gm. This contains 0·25% combined alkaloids (F.I.). *Max. single dose*, 19 minims. *Max.* during 24 hours 95 minims approximately.

④ U.S. 1 in 50 of Alcohol (94·9% vol.) and water in the proportion of 750 and 250. Strychnine 0·1%.

⑤ Ph. Ned. frees seeds from fat with petroleum ether, requires 0·25% alkaloids. P. Hung. has also F.I. strength. Removal of fat by means of a paraffin cake.—P.J. ii./06,86,115;

⑥ Tablets equal 5 and 10 minims of the tincture.

⑦ Tinctura Ignatiæ.

Dose.—3 to 20 minims (0·18 to 1·2 Cc.).

From St. Ignatius' Beans, the seeds of *Strychnos Ignatii* (*Loganiaceæ*) (containing about 1½% Strychnine and 1% Brucine)* 1 part, and a mixture

* Fr. Cx. requires about 2·5% combined alkaloids. *Max. single dose* of the Powdered Beans 1½ grains, *Max.* during 24 hours 5 grains approx.

of 90% Alcohol 3 and Water 1, *q.s.* to produce 10 parts. A preparation known as **Gouttes Amères de Baumé** (Fr. Cx.), is of strength 1 in 5. (It is $2\frac{1}{2}$ times weaker than that of 1884). *Max. single dose* 4 minims. *Max. during 24 hours* 30 minims approximately.

OLEA ESSENTIALIA.

The various essential oils used in medicine prepared either by distillation or expression, or a combination of the two are dealt with under their respective headings.

PROCESSES OF ASSAY OF ESSENTIAL OILS PROPOSED FOR INCLUSION, IN THE APPENDIX TO THE NEXT B.P.—Hill and Umney, C.D. i/10,271.

Saponification Process, (P. Off.). 2 to 5 Gm. of the Oil (according to the proportion of esters present) is heated for an hour with 25 Cc. of normal alcoholic potash and 25 Cc. of pure alcohol. The excess of potash is then titrated with normal sulphuric acid, and the number of Cc. required deducted from the number of Cc. required by a blank experiment conducted under the same conditions without the oil. The number of Cc. of normal potash absorbed multiplied by the ester equivalent and by 100, and divided by the quantity of oil taken, gives the percentage of esters in the oil. *Note.*—If the oil contains free acid (which must be first ascertained by experiment), the amount of alcoholic potash required to neutralise must be deducted before the ester percentage is calculated.

Acetylation Process (P. Off.).—10 Cc. of the oil is heated for $1\frac{1}{2}$ hours with 10 Cc. of acetic anhydride and 1 Gm. of anhydrous sodium acetate; 100 Cc. of water is added, and the aqueous layer removed by means of a separator, and the oil washed until free from acidity with successive portions of 100 Cc. of water, thoroughly shaking and allowing to separate. The acetylated oil is then dried by the addition of anhydrous sodium sulphate, and filtered; 2 to 5 Gms. of the acetylated oil is then saponified with alcoholic potash, as described under the saponification process, and the percentage of alcohol calculated from the formula $\frac{x \times Y \times 100}{W - 0.042x}$; where x is the number of Cc. of normal alcoholic potash absorbed, Y is the number of grams of alcohol equivalent to 1 Cc. of normal potash, and W is the weight of the acetylated oil taken.

See also Essential Oils.—C.D. i./10,63, 77, 94, 117, 151, 178, 304, 341. *Refractive Index of Essential and Fixed Oils.*—C.D. i./10,50.

OLEATA.

Acidum Oleicum, Oleic Acid (Off.). P. Jap,

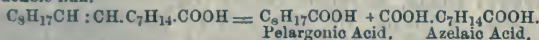
$\text{CH}_3(\text{CH}_2)_7\text{CH}(\text{CH}_2)_7\text{COOH} = 280.14$ (B.P. and U.S. Wts.)
(282.272 I. Wts.)

A pale-sherry-coloured faintly acid oily liquid (at ordinary temperatures) with a slight odour. **Solubility**, readily in 90% alcohol, ether, chloroform, benzol, and fixed oils; insoluble in water; it dissolves most metallic oxides, thus forming indefinite oleic solutions of oleates in an excess of Oleic Acid; such combinations of bismuth, copper, lead, mercury, and zinc are used medicinally; they are soluble in fats. Mercuric Oleate made this way is better than the Official, *q.v.* Oleic Acid also dissolves alkaloids, but not their salts, *e.g.* Oleate of Aconitine (*see* Aconitina, p. 88), Oleate of Atropine ($2\frac{1}{2}\%$ perfumed with Otto), Oleate of Morphine (*see* p. 454), and Oleate of Veratrine (*see* Veratrina, p. 681), are used medicinally. One part of Quinine (alkaloid) dissolved by 3 of Oleic Acid forms **Oleatum Quininae (U.S.)**, which

is applied externally and is readily absorbed, and 8 grains (=2½ grains of Quinine) added to one ounce of cod liver oil forms **Oleum Morrhuæ cum Quinina** for rubbing on to the skin prior to X-ray treatment. Oleic Acid is much more readily absorbed by the skin than oils. It also aids the absorption of drugs with which it is combined.

No oily drops should separate from Oleic Acid mixed with equal volume of Alcohol absence of fixed oils U.S.).

The splitting up of Oleic Acid into Pelargonic and Azelaic Acid shows position of the double link.



—L. i./09,598.

To prepare pure Metallic Oleates.—Caspari recommends the preparation of (a) Sodium Oleate and (b) Potassium Oleate Solutions in place of ordinary Soap solutions. (a) Warm 1,217 grains Oleic Acid to 60° C. and add slowly 192 grains Sodium Hydroxide (90%) dissolved in a mixture of 2 ounces Distilled Water and 6 drachms of Alcohol, stirring constantly until acid neutralised (use Phenolphthalein Solution). Dissolve finally in 3 pints of water and filter. (b) Neutralise 410 grains Potassium Bicarbonate with 1,156 grains, Oleic Acid in 1 pint of water by boiling. When cold make up to 3 pints. To the Solution (a) add Lead Acetate crystallised 819 grains, Copper Sulphate 540 grains, Zinc Sulphate 621 grains, Mercuric Nitrate 711 grains, or to (b) Lead Acetate crystallised 777 grains, Copper Sulphate 510 grains, Zinc Sulphate 591 grains, or Mercuric Nitrate 675 grains, each dissolved in 1½ pints of water to produce the corresponding pure Oleates.

Capsules of Oleic Acid, contain 7½ minims.

These are given for hepatic colic, and to hinder the formation of gall stones one or two are taken daily—best in the morning on an empty stomach.

Ⓜ Oleanodyne.

A special preparation combining the alkaloidsaconitine, atropine, morphine, and veratrine, with oleic acid. It is rapidly absorbed, and forms a strong anodyne liniment, which can be diluted with chloroform, alcohol, or oils. It is not so compatible with compound camphor or soap liniment.

Cupri Oleas, Copper Oleate.

$(C_{17}H_{33}COO)_2Cu = 621.40$ (626.098 I. Wts.). (Theoretical formula for Pure Oleate.)

May be prepared by the double decomposition of a hot solution of copper sulphate 8 in 8 of water, added to a hot solution of Castile Soap 8 in 32, washing and drying the pasty precipitate. When cold it is in solid dark-green masses. It is an oleo-palmitate of copper, containing copper equivalent to about 10% Capric Oxide. Soluble in ether.

Unguentum Cupri Oleatis, U.C.H.

Copper Oleate 12, Yellow Soft Paraffin 88 (L.H. 1 and 7). Melt together. For some purposes it may be employed half strength.

Is specially useful in ringworm—lightly rubbed in night and morning,—for indolent ulcers, warts and corns, and has been used to remove freckles.

In favus in conjunction with "X" rays, satisfactory.—L. i./07,510.

Bougies of Copper Oleate Drage, are prepared 4 inches long containing each 5 grains (0.32 Gm.) Copper Oleate with Theobroma basis. For treatment of malignant disease. These bougies are useful adjuvants to the Sodium Comurate treatment, reaction to treatment being more readily obtained with their aid.

Ovules of Copper Oleate, with Cacao Butter basis contain 5 grains Copper Oleate. Used in the treatment of malignant disease (Drage). These have been found of value in uterine and vaginal cancer in conjunction with the *Coumaric treatment, q.v.*

Emplastrum Cupri Oleatis contains 20% of Copper Oleate made with Soap Plaster spread on Adhesive Plaster. Employed as adjuvant to the *Coumaric Treatment, q.v.* of malignant disease of breast, rectum, &c.

Hydrargyri Oleas, Mercuric Oleate (Off.).

Hard Soap, in powder, 16, Oleic Acid 1. Mix, dissolve in boiling Distilled Water 88, and add Mercuric Chloride 8, dissolved in boiling Distilled Water 80. Boil the mixture for 10 minutes, decant, and wash the deposited mercuric oleate (really oleo-palmitate) with hot distilled water until free from chlorides. Dry on a water-bath. Is liable to turn brown.

Dott found 23.13% Hg. in the official oleate by Naylor's method.—Y.B.P. 1901, 200.

The method in B.P. 1885 by acting on Mercuric Oxide with Oleic Acid gave better results (will possibly be re-instated in next B.P.), *v. infra*.
Unguentum Hydrargyri Oleatis (Off.).

Mercuric Oleate 1, Benzoated Lard 3.

Hydrargyri Stearas, Mercuric Stearate.

$(C_{17}H_{35}COO)_2Hg = 761.08$ (766.56 I.Wts.).

A stiff greyish unctuous paste formed by the interaction of mercuric chloride and curd soap. In other respects it resembles official mercuric oleate.

May also be made as a "white powder" according to Dott (C.D.i/09, 785) as follows:—

Dissolve commercial stearic acid 20, in boiling caustic soda solution $3\frac{1}{2}$ in water 140. Then add hydrochloric acid till there is a slight permanent oily separation. Next add sodium carbonate solution in just sufficient quantity to redissolve the oily acid, stirring well after each addition. Dissolve mercuric chloride $18\frac{1}{2}$ in about 70 of hot water. Mix the two solutions thoroughly, collect the precipitate, wash till practically free from chloride, dry under $100^\circ C.$, and powder. Much more permanent and satisfactory in its properties than the oleate. By reduction with hypophosphorous acid in presence of alcohol was found to contain 24.28% Mercury—practically the same as that of the oleate.

Emplastrum Hydrargyri Stearatis.

Lead Plaster 6, melt and add Mercuric Stearate 2. Is a substitute for mercurial plaster, and for joints requiring Mercurial treatment, but pharmaceutically inelegant.

Emplastrum Hydrargyri, U.S.

Triturate Mercury 30, with Oleate of Mercury (U.S.) 1, and add Hydrous Wool Fat 10. Incorporate lead plaster to 100.

Oleatum Hydrargyri, B.P. 1885. 10%,—i.e., of Mercuric Oxide employed to make it.

Yellow Mercuric Oxide 1, Oleic Acid 9. Into the acid, kept agitated in a mortar, sprinkle the oxide gradually, and stir frequently during 24 hours, until the latter is all dissolved and a light brown unctuous jelly is formed. Contains a large amount of free Oleic Acid.

U.S. has Yellow Mercuric Oxide 25, Water 25, Oleic Acid *q.s.* to 100.

③ Oleatum Hydrargyri (10%) cum Morphina.

Morphine (base) 1, is dissolved in 60 of the above. Linimentum

Hydrargyri Oleatis cum Morphina, R.O.H., is similar. For use where the plain Oleate causes pain.

Oleatum Hydrargyri Liquidum, 5%. An efficient means of introducing mercury into the system.

Is prepared with one-half as much oxide as the 10% and when ordered with morphine, 1 part is added to 60 parts of the oleate when dispensed. These preparations do not keep well with the morphine in combination. The 10% is always dispensed unless one of the others is specially ordered. They should be applied with a brush without much friction.

Uses of Mercuric Oleate Preparations.—For syphilis in secondary and tertiary stages. The application does not salivate unless used in excessive quantity. In persistent inflammation, especially of glands, and joints (such as synovitis), and in non-ulcerated syphiloderma, the Oleates of Mercury are much more active, definite, and cleanly, than the mercurial ointment. They are very effective parasiticides for pediculi. Ringworm has been cured by them, but Croton Oil (*q.v.*) is more popular now amongst specialists, and if extensive the X-rays treatment will cure it.

Oleatum Hydrargyri cum Sulphure.

Mercuric Oleate 5% (85' B.P.), 4, Precipitated Sulphur 1, Ether 3. For pediculi pubis.

Unguentum Hydrargyri Oleatis Compositum.—BROOKE'S OINTMENT.—Mercuric Oleate Ointment (5%), Compound Zinc Paste (Lassar's Paste) of each $\frac{1}{2}$ ounce, Salicylic Acid 30 grains, Ichthyol 60 grains.

In (septic) œdema of the face—applied covered with cotton wool in thick layer and pressed down by cotton elastic bandage—at bed time.—B.M.J. ii/09,934.

Syphilitic Disease of the Nervous System.—It is not advisable to give Potassium Iodide and Mercury together in full doses, except in a very urgent case. A drachm of the 10% oleate should be rubbed in near the affected part twice daily for three or four days, and then once daily for remainder of the week; wear the scalp if in the brain, and down the back if in the spinal cord; treatment to be brief, to last eight weeks or so, and be renewed after two, four or six months.—Gowers, B.M.J., i/03,773.

Emplastrum Plumbi. *Syn.* DIACHYLON PLASTER.

Lead Plaster (*Off.*) is a crude Oleate of Lead, made by the combination of olive oil (oleate and palmitate of glyceryl) and oxide of lead heated together in the presence of water. Thus made, the oleate is more adhesive than when prepared by the oleic acid solution of the oxide.

U.S. makes this by precipitating a solution of soap 100 in 350 of hot water with a solution of lead acetate 60 in warm water 250.

Lump Diachylon should be on Schedule of Poisons. It is supplied as readily as an ounce of Epsom Salts.—P.J. ii/08,795.

This is used as an abortifacient in the Midland Counties with some success.—B.M.J., i/05,584,653; i/06,456.

Diachylon poisoning: Treatment by potassium iodide, opium, and bismuth.—B.M.J., i/06,259.

Emplastrum Diachylum (Gummatum) Fr. Cx.—Form a plaster with Litharge 620, Lard 620, Olive Oil 620, and Water 1,250. Allow the water to evaporate.

Then warm in a water bath with four times their weight of water, gum ammoniacum 100, galbanum 100, and Turpentine Oil 60, stir to emulsify pass through a cloth, evaporate on an open fire to a thick honey consistence. (*Cure!*

Mix with the warmed plaster, then add previously melted together and passed through a cloth Yellow Wax 120, Burgundy Pitch 120, Venice Turpentine 120, stir and make plaster in the usual way.

On trial we found the formula to work satisfactorily—it forms a bright yellow mass spreading with ease and easily softening with warmth.

Emplasto Confortativo De Vigo, F.E. (designated Emplastrum Plumbi Rubrum, F.E., Emplasto Rojo de Plomo).—Mastich, Armenian Bole, Olibanum, Myrrh of each 20, Dragon's Blood 30, Red Oxide of Lead 60, Resin 40, Olive Oil 60, Yellow Wax 70, Lead Plaster 710. Figured recently in a case in the Courts, in which a medical man advertised to cure ear diseases by correspondence. — *c.f.* Daily Press, Nov. 8, 1907.

Emplasto de Vigo con Mercurio is also F.E.

The latter is a 'specialty' for the 'cure' of hernia in Spain—applied to the groin.—Ph. Notes. FR. Cx. has also a similar Emplâtre de Vigo cum Mercurio—*Syn.* Emplastrum Hydrargyri.

Emplastrum Resinæ, Adhesive Plaster (Off.).

Melt separately with slight heat Resin 10, Lead Plaster 80, Hard Soap 5, and mix. **Emplastrum Saponis** is similar. Melt separately Hard Soap 15, Lead Plaster 90, and Resin 2.5, and evaporate with stirring until suitable. Contains less resin and is therefore less adherent. U.S. contains no resin. Is Soap 10 with Lead Plaster 90, and Water *q.s.*

Emplastrum Adhesivum, U.S., contains no resin.

Melt Rubber 20, at not exceeding 150° C. (302° F.), add Petrolatum 20, and heat until rubber is dissolved. Add Lead Plaster 960, and then strain.

The following ointments are prescribed for eczema, excessive perspiration of the feet, &c.

Unguentum Diachyli, B.S.H.

Lead Plaster 1, Vaseline (Soft Paraffin, yellow, G.H.) 1.

Melt together and stir till cold. Made thus, the ointment keeps well, and does not acquire a disagreeable odour. Kaposi has adopted this, when perfumed with oil of bergamot, as *Unguentum Vasellini Plumbicum*.

With the addition of 2% of phenol this ointment forms *Unguentum Diachyli Carbolisatum* (Lassar).

To be rubbed in 1 to 3 times a day, or spread on linen and applied as a plaster.

U.S. has Lead Plaster 50, Olive Oil 49, with Lavender Oil 1.

Ceratum Plumbi Subacetatis, U.S. Lead Subacetate Solution 20, Wool Fat 20, Paraffin 20, White Petrolatum 38, Camphor 2.

Thorii Oleas *v.p.* 668.

Unguentum Zinci Oleatis (Off.).

Precipitated Zinc Oleate (see below) 1, Soft Paraffin, white, 1. Melt together and stir till cold. For some cases further dilution with vaseline is advisable. This ointment, having the zinc in solution, has the advantage over zinc ointment B.P., in most cases in which the use of this is indicated, in not coating the sore, to which it is applied, with a crust of débris, which checks healing and irritates the part on removal.

In making the official ointment press the oleate dry rather than heat on water bath.—P.J. i./02, 175.

Chronic eczema is curable with this ointment.

Zinci Oleas.—*Syn.* ZINC OLEO-STEARATE.

$(C_{17}H_{33}COO)_2Zn = 623.19$ (627.898 I. Wts.). Theoretical formula for the Oleate.

Hard Soap in shavings 16, Boiling Water 120; apply heat till dissolved.

[If made with a soap (*q.v.*) the fatty acid of which has a fairly high melting point, 44° C. or thereabouts, the product keeps better.] Zinc Sulphate S, Boiling Water 16; dissolve and add to former solution; stir well, separate the water from the Oleate, and wash the latter with hot water till free from sulphate, cool, and dry. Reduced to powder is useful for dusting on eczematous surfaces and parts troubled with excessive perspiration. It may be perfumed by the addition of $\frac{1}{500}$ of thymol, and diluted with kaolin or starch. It is the remedy for hyperidrosis and osmidrosis.

Powdered Zinc Oleate, rubbed in, is the best preventive of relapse in cases of eczema.—L. i./09,1114.

OLEUM GYNOCARDIÆ, I.C. Add.

Chaulmoogra Oil.

Dose.—5 to 10 minims (0.3 to 0.6 Cc.), increased to 1 drachm (3.5 Cc.) in capsules, cod-liver oil, or milk.

The oil (constituting about 30%) expressed from the seeds of *Gynocardia odorata*, imported from India. It has a pale brownish colour and a disagreeable taste and smell. It is always solid and unctuous in this climate, as it contains a quantity of palmitic acid, with three other fatty acids; of these **Gynocardic Acid** $C_{14}H_{24}O_2 = 222.50$ (224.192 I. Wts.) is supposed to be the active ingredient—a 'mixture' (for constitution see P.J. i./04, 831; i./05, 856); this causes it to give a reddish-brown coloration, changing to green with sulphuric acid. *Dose*.— $\frac{1}{2}$ to 3 grains (0.032 to 0.2 Gm.). The oil is applied externally, and given internally *after meals* for leprosy, phthisis, scrofula, rheumatism, marasmus, psoriasis, and lupus. For phthisis 2 to 4 ounces should be rubbed into the chest weekly. Applied to raw surfaces, however, causes great pain.

Leprosy is also well treated by half-an-ounce doses per rectum daily.

The Oil is said to be from *Hydnocarpus Sp.* Description.—L. ii./05, 982. Constituents.—P.J. i./05, 856. A query regarding use in syphilis.—L. ii./05, 498.

A case of lepra tuberosa, approximate recovery under L. ii./06, 1506.

In the knowledge of the writers a patient suffering from leprosy took over a long period a large quantity of Chaulmoogra Oil Capsules. The dosage employed was two 15 minim Capsules four times daily, increased. He found that he could take up to 200 minims per diem, but larger quantities had a tendency to make him sick. The spots on the face and hands disappeared almost entirely, but there remained the deadened feeling of the tissues of which there was hope of complete disappearance.

Leprosy. Treatment of, with Chaulmoogra Oil—rubbed in locally for 20 minutes twice daily, and by the month in 10 minim capsules thrice daily, increasing until at least 2 drachms are taken daily. The treatment should be persisted in for six or seven years.—Brooke 258.

Capsules of *Gynocardia* Oil contain 5, 10 and 20 grains.

Unguentum *Gynocardia*, I.C. Add. *q.v.*

*Antileprol, Chaulmoogra Oil in $\frac{1}{2}$ and 1 Gm. Capsules. L. ii./09, 1678.

Nastin is described as a crystallisable neutral fat. Deycke extracted the substance from either the *Lepra bacillus* or an organism closely allied to it in the form of a streptothrix.—*S. leproides*. On injection into lepers he states it produces a reaction similar to that produced by tuberculin in tuberculosis. Combined with Benzoyl Chloride it is supplied as 'Nastin 'B' and in this form is

stated to be suitable for treatment of leprosy. This combination is thought to deprive the bacillus of its fatty element, thereby killing it. (It was found that Benzoyl Chloride will rapidly deprive the tubercle bacillus of its fat).

Injectons are made into subcutaneous fatty tissue, not intramuscularly. Causes transitory burning pain. Sealed tubes contain 1 Cc. *Dose*.—1 injection of $\frac{1}{2}$ to 1 Cc. per week at first, later 2 Cc. a week.

In ophthalmic leprosy and *lepra nervorum*, a more dilute solution, *Nastin BO*, is employed. Prolonged treatment may be necessary. *Nastin B1* is the Standard Solution for use. *Nastin B2* is more potent, and should only be used in patients with very persistent neoplasms. Benzoyl Chloride alone termed 'K' is also employed.—*B.M.J.* i./08, 892, 827; *L. ii.* /09, 516; *Therapist*, June 15, 1909, *vide* also *Sodii Cinnamas*.

OLEUM MORRHUÆ (*Off.*).

French—*Huile de Foie de Morue*.

Dose.—1 to 4 drachms (3.5 to 15 Cc.).

The oil is separated from the livers of codfish, *Gadus Morrhua* (*Teleostei*), by means of steam at a temperature not exceeding 82.2° C. It is then cooled to a temperature of -5°C. and the liquid portion, producing the "non-freezing" oil of commerce, is pressed through canvas. Inferior brands are prepared by heating.

Iodine may be demonstrated in Cod Liver Oil by fusing with Sodium Carbonate.

To cover the taste may be taken with a little salt, Worcester Sauce, in steel or orange wine, coffee or milk.

Sp. Gr. (Parry) 0.924—0.931 includes all genuine samples.

Unsaponifiable Matter. Good quality oil rarely exceeds 1.6%; use full excess of alkali before extraction; wash Ethereal Extract at least 4 times (Parry).—*C.D. i.* /05, 492.

Free Fatty Acid calculated as Oleic should not exceed 1%, easily estimated, Many samples fall below 0.5%.

Iodine Number 155 to 170 (Hübl's Solution 18 hours).—*P.J. ii.* /04, 477. *C.D. ii.* /04, 577; *i.* /05, 129, 491. — *Vide also* Caspari. *U.S.* 140-150 for 4 hours. *Fr. Cx.* 140-152 ditto.

A good sample gave *Sp. Gr.* 0.926, saponification No. 185.8, unsaponifiable matter 1.01%, free acid (as oleic) 0.49%, Iodine absorbed (18 hours) 162.47.—*Southall's Lab. Rep.*, 1907.

In estimating the Oil dried Sodium Sulphate has been used to absorb the quantity taken, sand is mixed with it and the mass extracted with Carbon Tetrachloride.—*P.J. ii.* /09, 135.

Soluble.—1 in 2 of Ether, slightly in Absolute Alcohol, soluble in Chloroform.

Flavoring.—*Syl Lavandulæ*, *Glyl Pini*, or as Emulsion.

The following mixtures of essential oils have been suggested for the purpose: *Oleum Amygdalæ Essentiale* 2½, *Oleum Cinnamomi* 7½, *Oleum Limonis* 16. Further, *Oleum Amygdalæ Essentiale* 4, *Oleum Gaultheriæ* 2½, *Oleum Cinnamomi* 6½, *Oleum Myristicæ* 2½, *Chloroform* 5½.—*P.J. ii.* /09 758.

Uses.—Nutritive, nervine tonic given in rickets, phthisis, chronic bronchitis, general debility and malnutrition.

In tuberculosis the value of Cod Liver Oil appears to depend on the scientific facts that the liver has the power of desaturating fats and yielding to the blood 'unsaturated' fatty acids. These have chemically a loose double linkage and are capable of exerting chemical action more markedly. Fish, particularly Cod Liver, and vegetable oils are richer in these constituents than animal oils. The effects of Cod Liver Oil on the acid-fast

properties of the tubercle bacillus showed that the oil had attacked the waxy coating of the bacillus and rendered it, after several months, non-stainable by usual methods. 'An increase in the amount of unsaturated fatty acids in the environment of the bacillus tends to disintegrate it.' It is assumed, from analogy with animal experiments, that an increase of unsaturated fatty foods yields an increase of the same in the blood, and that the tubercle bacillus is present in the blood in comparatively early cases of phthisis. Increase of saturated fat above a certain point retards its absorption from the intestine. The saturated fat is assimilated up to about 14% only. Unsaturated, on the other hand, are absorbed to extent of 98%. In mixed diet the unsaturated help the saturated to become absorbed. Two cases showed that on increasing the proportion of unsaturated fat there was equal increase of absorption of fat.—B.M.J. ii./09, 1120.

In trypanosomiasis has been reported on (in conjunction with organic arsenic) favorably. Should be tried in a large number of cases.—Bagshawe, L. ii./09, 1197.

In the knowledge of the writers a case of incipient phthisis with repeated blood spitting was cured about the year 1880 by a prolonged course of large quantities of Cod Liver Oil, and strong Iodine applications to the chest and back. The idea of the treatment at that time was the production of counter irritation. The patient was ordered rest and warmth, but had occasion to run a mile to procure a doctor. He expected this would be his end, all that resulted, however, was a little more blood spitting the next day. At the time of writing the patient is 60 years of age and in excellent health.

Dry condition of pharyngeal mucous membrane sometimes seen in weak anæmic women, with no other cause than general ill-health, treated with Cod Liver Oil and Iron, with change of air.—B.M.J. ii./09, 197.

To allay skin irritation Cod Liver Oil 2 mixed with Huile de Cade 1 has been ordered to be applied with a shaving brush.—Ph. Notes.

Capsules contain $\frac{1}{2}$ or 1 drachm. *Dose*.—1 or more.

Capsules of Cod Liver Oil 19 minims and **Creosote** 1 minim are for use in phthisis.

Capsules of Cod Liver Oil ($\frac{1}{4}$ drachm) with **Blaud Pill** (4 grains), —Ingredients, Sodium Carbonate and Ferrous Sulphate 2 grains each. A satisfactory method of giving iron—the ferrous carbonate is in *statu nascendi*.

Emulsio Olei Morrhue (50%). (Martindale).

Dose.—2 to 8 drachms (7 to 30 Cc.).

Soak Irish Moss 2 drachms in Water 12 ounces, six hours, boil and strain off 10 ounces. Allow to cool and add in three portions Cod Liver Oil 12 ounces. Then add Simple Tincture of Benzoin 1 ounce, Alcohol 90% 1 ounce, Essential Oil of Bitter Almonds 10 minims, Elixir of Saccharin 10 minims. This produces a good white preparation.

U.S. has Cod Liver Oil 500, Accacia 125, Syrup 100, Oil of Gaultheria 4 Water to 1,000, or may be flavoured with Oil of Bitter Almonds or other suitable flavouring.

Ferrated Emulsion of Cod Liver Oil consists of the plain Emulsion with Citrate of Iron and Ammonium 5 grains per ounce.
Emulsion of Cod Liver Oil with Glycerophosphates, v.p. 63.

Emulsio Olei Morrhue et Hypophosphitum.

Dose.—2 to 8 drachms (7 to 30 Cc.). Contains Hypophosphites of Sodium and Calcium, of each 1%, in the form for Emulsio Olei Morrhue above.

We find this to be a permanent Emulsion which does not separate. Experiments with Acacia produced a white Emulsion, but not so permanent.

U.S. contains Calcium Hypophosphite 1%, Potassium and Sodium Hypophosphites of each 0.5%.

Oleum Morrhue Aromaticum.

Dose.—1 to 4 drachms.

Coumarin 0.01, Saccharin 0.5, Vanillin 0.6, Absolute Alcohol 10.0, Lemon Oil 20.0, Peppermint Oil 3.0, Cod Liver Oil to 1,000. The taste is covered but the odour persists to some extent.

*Lofotol is Cod Liver Oil charged with carbon dioxide.

In congenital pyloric stenosis the inunction of Cod Liver Oil *if* of any value at all seems to be specially suited to this affection.—L. i./07,728.

Cod Liver Oil Substitutes. See Maltolive, *Marrubin.

Mistura Olei Olivæ. Syrupus Tann-Iodo-Phosphoratus.

Dugong Oil from two species of halibore, sebaceous animals inhabiting the rivers and bays of N. and E. Australia may have some value.—B. M. J. ii./07,1528.

Dermosapol. A superfatted soap made with Cod Liver Oil 50%. Peruvian Balsam, Glycerin, Wool Fat and Alkali. Is medicated with Potassium Iodide or Mercury, Iodoform, Formaldehyde, &c.

Oleum Jecoris Aselli cum Benzoate Ferrico, Ph. Ned.—**FERRATED COD LIVER OIL.** Contains not less than 0.14% Fe, also WITH **FERROUS IODIDE** 1.3%.

The following is an improvement on the Ph. Ned. method. It is said to contain more Iron.

Dissolve in a flask sodium benzoate 12 in water 60, add a solution of ferric chloride 4.2, alcohol 90%, 50, adding also carbon tetrachloride 12.5. Close the flask with parchment paper, and warm till the mixture separates into two clear liquids. Let the flask cool, separate the supernatant liquid, add to it cod-liver oil 1,000, and warm at 100° C. till a clear solution is obtained.—Abst. in C.D.

OLEUM OLIVÆ. (Off.)

Dose.— $\frac{1}{4}$ to 1 ounce (7.5 to 30 Cc.).

The oil expressed from the ripe fruit of *Olea europæa* (*Oleacea*).

Tests.—Inferior brands are obtained by addition of the pulped fruit to boiling water and by fermentation processes.

U.S. provides tests for Cotton-Seed and Sesame Oil. It gives Saponification No. 191 to 195 and Iodine Number not less than 80 or more than 88.

Halphen's Test for Cotton-Seed Oil.—Shake 3 Cc. of the oil with an equal volume of fusel oil after the addition of 1 Cc. of sulphur in carbon bisulphide (1% solution). Heat cautiously in water bath for half an hour. In the presence of cotton-seed oil a beautiful red colour makes its appearance in a few minutes, the intensity of which is roughly proportional to the amount present.

Works better using boiling brine.—Southall's Lab. Rep., 1907.

The official test for Cotton Seed Oil is useless: Halphen's best.—P. J. ii./09,762.

Sulphuric Acid Test.—To 20 drops of oil placed in the lid of a porcelain crucible add two drops of concentrated H_2SO_4 and note appearance before and after stirring:—Olive oil, before stirring, yellow, green or pale brown; after stirring, light brown or olive green. Rape oil, crude, before stirring, green with brown rings; after stirring, light green turning brownish. Rape oil, refined, before stirring, yellow with red or brown rings; after stirring, brown. Hydrocarbon oil (petroleum lubricating), before stirring, brown; after stirring, dark brown with blue fluorescence.

Nitric Acid Test.—Agitate 5 Cc. of the oil with an equal measure of HNO_3 of 1.30 specific gravity and note colouration, also appearance after heating for five minutes and after standing 12 to 18 hours. Olive, rape, sesame and cotton-seed oil, &c., all behave differently.—B. & C. D. i./06,549.

The action of oxygen on the oil increases the Saponification No. and reduces the Iodine No.—Am. J. Ph. July, '07,303. For further tests.—P. J. i./07,589.

Examination of Olive Oil for the presence of Arachis Oil.—C. D. i./10,329.

Uses.—Olive Oil is a nutrient and has laxative properties (*vide* Formagules. It is frequently used as rectal injection, as much as 10 ounces at bedtime for constipation.—L. ii./04,943.

Often gives relief to patients who have gall stones.

In typhoid tablespoon doses *per os*, and a breakfast cupful by the bowel daily gives great relief.—B. M. J. i./05,414.

Capsules (Gelatin) of Olive Oil, each containing $\frac{1}{2}$ drachm.

These capsules are also prepared **Formalised** for lubricating the intestines in cases of habitual constipation.

Olive oil in $\frac{1}{2}$ to 2-ounce doses has been recommended for the treatment of gastric ulcer. It is said to inhibit the secretion of hydrochloric acid. Hyperchlorhydria is generally associated with gastric ulcer. The oil may be administered by the stomach tube if necessary, or in the form of

Mixture or Capsules.

Hypophosphites may with advantage be given at the same time; or iodine or one of its salts if alterative influence desired.—H.

Emulsion of Cotton Seed Oil with Oleic Acid—for rickets.—B. M. J. i./07,20.

Emulsio Olei Olivæ. *Dose.*—1 to 2 ounces.

Olive Oil 1 ounce, Tragacanth Powder 25 grains, Simple Syrup $\frac{1}{2}$ ounce, Water to 4 ounces.

Oleum Olivæ depuratum atque sterilisatum.—FR. CX. Wash Olive Oil 100 with Alcohol 95% 30 in a bottle, shaking occasionally; separate the Alcohol and repeat. Then heat the oil for 10 minutes on a sand bath at a temperature not exceeding 115° . Preserve in 50 Cc. sterile bottles.

Maltolivine.

Dose.—2 to 4 drachms (7 to 14 Cc.).

A combination of Olive Oil and Malt Extract. Is recommended as a substitute for Cod Liver Oil. Is palatable, cheap, and of considerable value as a nutrient in marasmus, rickets, and emaciated and wasting conditions in children.

In colitis of children, olive and cod liver oil are beneficial.—L. i./06,94.

Tinctura Oleæ Follorum.

Dose.—15 to 30 minims (0.9 to 1.8 Cc.).—A tonic and febrifuge,—antiperiodic in larger doses. Prepared with Olive Leaves, 1 in 5 of Alcohol 60%. **Incompatible** with Strychnine Salts, Nux Vomica Tincture and Ferric Salts.

Extractum Oleæ Foliorum Recentum is also prepared.

Dose.—5 grains, in pill or emulsified in mixture. Sea-green in colour, also as a tonic.

Constituents of Olive Leaves and Bark.—Power and Tutin, May 1908.

OLEUM RICINI. (*Off.*).

Dose.—1 to 8 drachms (3·5 to 30 Cc.).

Expressed from seeds of *Ricinus communis* (*Euphorbiaceæ*). *Soluble* 1 in 5 of Alcohol 90%. Also soluble in ether and glacial acetic acid. Sp. Gr. 0·950 to 0·970. U.S. has Saponification No. 179 to 183, Iodine No. 84 to 89. The seeds, but not the oil, contain the poisonous proteid Ricin; the 'press cake' therefore is poisonous. The purgative action is due to the fatty acids of which ricinoleic is a principal member.

Total acidity (as oleic acid) should not exceed 1%.

Flavoring.—Prescribed as *Mistura Olei Ricini* or *Oleum Ricini Aromaticum* or 2 drachms of *Tinctura Cardamomi Composita* to the ounce.

Uses.—A mild but effectual purgative rarely causing pain. The oil rubbed on the breasts will often increase the flow of milk. Castor oil is a soothing application to the conjunctiva, and is employed for making solutions of the alkaloidal bases (*q.v.*). In spruce 1½ drachms every morning.—Cantlie, B.M.J. ii./05, 1281.

Capsules of Castor Oil contain ½ or 1 drachm.

Capsules of Castor Oil, Compound, contain Croton Oil ¼ minim, with Castor Oil 8 minims. *Dose*.—One or two.

Mistura Olei Ricini, Castor Oil Mixture. (*Off.*)

Dose.—1 to 2 ounces (30 to 60 Cc.).

Castor Oil 6, Mucilage of Gum Acacia 3, Orange Flower Water (undiluted) 2, Cinnamon Water 5.

To the mucilage contained in a mortar add alternately, in portions, the castor oil and the mixed waters, with constant trituration. An agreeable dose, the oil being made more active by emulsification. A mixture of tragacanth and acacia mucilage makes a thinner emulsion.—C.D. i./06, 344.

In emulsifying oils in general proceed as for Castor Oil Emulsion or rub the oil with fresh mucilage and then add the menstruum in small quantities at a time. It is often preferable to rub the oil in a dry mortar with sufficient powdered acacia, then to dilute with water, *q.s.*

Enema.—Castor Oil 1, Olive Oil 4. *Dose*.—5 to 10 ounces.

Oleum Ricini Aromaticum.

Dose.—1 to 8 drachms.

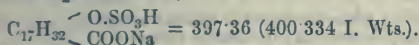
Vanillin 1 grain, Peppermint Oil 10 minims, Saccharin 4 grains, Absolute Alcohol 60 minims, Tincture of Alkanet 1 in 5 Alcohol (90%) 10 minims, Castor Oil 4 ounces. The taste is covered; is suitable for children.

Gastric and intestinal troubles of infants due to bacterial infection treated by small doses of Castor Oil and diet; better than various antiseptics, Salol, β-naphthol, etc.—B.M.J. ii./07, 526.

Castor Oil Solutions of Alkaloids.

Uses.—Instillation of Castor Oil to the eye allays the irritation caused there by foreign bodies. The alkaloidal bases (not their salts) dissolved in Castor Oil are used in ophthalmic work. They keep well. A (P) 2% solution of the combined bases Homatropine and Cocaine has been of great service (*q.v.*). A 2% solution of Euphthalmine and 1% solutions respectively of (P) Atropine, Cocaine ((P) 4% will dissolve), (P) Gelseminine, (P) Homatropine, (P) Hyoscine, (P) Hyoscyamine and (P) Pilocarpine have also been used. Physostigmine (Eserine) is used in (P) $\frac{1}{2}$ % solution. Morphine is barely soluble in it to the extent of (P) $\frac{1}{2}$ %

Sodii Sulphoricinas,



Prepared by the action in the cold (not exceeding 50° C.) of sulphuric acid 1, on castor oil 3 (sulphurous acid must not be evolved), washing with plenty of water and nearly neutralising the product with soda, is used in the form of suppository as a purgative.—P.J. 1895,706.

Concentrated solution of Sodium Sulphoricinate will dissolve iodine, resorcinol and naphthalene, forming strongly antiseptic solutions.—U.S.D.

(P) Phenol Sodio-Sulphoricinate. A mixture of phenol 1, and sodium sulphoricinate 4, is a yellowish brown thick syrup miscible with water. Used in 20 to 50% solution for papilloma and tuberculosis of larynx and oæna.—P.J. ii./oo,305; B.M.J. ii./o4,1225.

Pharyngo-keratosis (mycosis) improved under 10% solution, also 10% solution of Salicylic Acid in the sulphoricinate.—L.i./o7,1163,1316; M.P. Apl. 27, '07,456, and May 8,515.

Magnesii Ricinoleas. *Syn.* 'Maricol.'

Dose.—1 to 4 drachms (4 to 16 Gm.).

A white powder, employed in several proprietary preparations known as 'Castor Oil Powders.'—L. ii./o5,1339. ★Risicol is a Castor Oil powder. Some Castor Oil Pills, however, contain Calomel without Oil.

As much as 50% of Castor Oil can be incorporated in this way, but extraction with Ether in a Soxhlet demonstrates that the mixture is by no means a soap—95—98% can be recovered by this means—a small part of the Alkali is saponified by the free fatty acids in the oil, which then emulsifies the rest of the oil in this way.—Otto May.—J.S.C.I. per, P.J. ii./o9,296.

Acute poisoning by a single Castor Oil Seed.—B.M.J. i./o5,988.

Calcium Iodo-ricinoleate.—As an innocuous mode of giving Iodine without upsetting digestion, being absorbed from the bowel. Capsules 3 grains.—B.M.J. i./o8,936. In syphilis and ulcerated wounds used with advantage.

OLEUM ROSÆ. (*Off.*; U.S.)

Syn. Otto (*Off.*) or Attar of Rose.

Distilled from the fresh flowers of *Rosa damascena* (3,000 yield 1).

Sp. Gr. 0.856 to 0.860 at 86° F. Congealing and melting points should lie between 19.4 and 22.2° C. Mixed with an equal volume of chloroform it does not congeal and is convenient for use. Saponification

value (U.S.) not less than 10 nor more than 17.* It contains 70 to 75% of Geraniol $\begin{matrix} \text{CH}_3 \\ | \\ \text{CH}_3 > \end{matrix} \text{CH} - \text{CH}_2 - \text{CH} = \text{CH} - \text{C}(\text{CH}_3) = \text{CH} - \text{CH}_2 - \text{OH}$ or $\text{C}_{10}\text{H}_{18}\text{O} = 152.98$ (154.144 I. Wts.) (three-quarters of the liquid portion), and Citronellol $\text{C}_{10}\text{H}_{20}\text{O} = 154.98$ (156.16 I. Wts.) (the remaining 25%). The solid Stearoptene Rhodinol is odourless. Synthesis of Rhodinol.—J.C.S.A. i./1904, 756. Linalool is isomeric with Geraniol Sp. Gr. 0.870. Boiling at 197°. It is contained in Coriander, Thyme and other oils and is either + or - rotatory.

OLEUM ROSÆ (*P. Off.*)—Sp. Gr. at 30° C. (compared with water at 15° C.) 0.855 to 0.862, O.R., -2° to -4°; R.I. at 25°, 1.456 to 1.465; M.Pt., 20° to 22.5° C.

75 or 76% at most is the highest amount of alcohol calculated as Geraniol that should be allowed in a normal pure Otto—Parry.

Aqua Rosæ (*Off.*)—*Syn.* Eau de Rose. *Dose.*—1 to 2 ounces (30 to 60 Cc.) of the diluted water, i.e. with twice its volume of distilled water immediately before use.

Liquor Rosæ Dulcis (*Ph. Form.*).

Otto of Rose 8 drops, Carmine 2 drachms, Potash Solution $\frac{1}{2}$ ounce, Glycerin 1 ounce, Alcohol 90% $\frac{1}{2}$ ounce, Syrup to 10 ounces. Useful for scenting and colouring pharmaceutical and toilet preparations.

Pulvis Rosæ Compositus. *Dose.*—Ad libitum.

Oil of Rose and Chloroform of each 1 (or combined 4 drops), Acacia 145 (grains), Sugar 840 (grains), Solution of Carmine 13 (drops). Useful to dilute powders such as Calomel, Grey Powder and Jalapin, also as a colouring and flavouring agent in mixtures— $\frac{1}{4}$ or $\frac{1}{2}$ ounce in 6 ounces.

Unguentum Aquæ Rosæ (*Off.*)—*Syn.* CERATUM GALENI; COLD CREAM.

White Beeswax 45, Spermaceti 45, Almond Oil 270. Melt together; add gradually, with constant stirring, Rose Water (*Eau de Rose*) 210, and while cooling, Oil of Rose $\frac{1}{2}$, stir till cold.

U.S. has Spermaceti 25, White Wax 24, Almond Oil 112, Sodium Borate 1, Stronger Rose Water 38. When used as vehicle for Metallic Salts the Sodium Borate should be omitted.

Oleum Rosmarini (*Off.*).

A colourless or pale yellow oil. Distilled from flowering tops of *Rosmarinus Officinalis* (*Labiatae*), Sp. Gr. 0.900 to 0.915. U.S. requires not less than 2.5% Ester calculated as Bornyl Acetate, and not less than 10% total Borneol. Schimmel favours 2½ and 10% as limits.—Am. Jl. Phcy., June, 06, 260.

Soluble 2 in 1 of Alcohol 90%. Internally is a carminative and externally promotes the growth of the hair.

The oil distilled at Hitchin has been both + and - rotatory in different years. In 1905, 6, and 7 was -0.21'; 0.36' and -2.48' respectively. Temperature being 20° C., 20° C. and 14.5° C. A pure oil is soluble in one-fourth its bulk of alcohol.—P.J. ii./07, 599.

Optical rotation varies enormously. Total borneol 10 to 16%. Esters 2 to 5%.—P.J. ii./08, 624.

OLEUM ROSMARINI (*P. Off.*)—Sp. Gr., 0.900 to 0.920, O.R., 0° to +15°, R.I., 1.463 to 1.470; Soluble 1 in 1 of 90% alcohol and 1 in 5 to 10 of 80% alcohol.

*Schimmel 8.5 to 19.—Am. Jl. Ph., June, 06, 260.

Should contain not less than 10% of alcohols, calculated as borneol and determined by the acetylation process, and at least 2% esters, calculated as bornyl acetate and determined by the saponification process, *v.p.* 486.

Spiritus Rosmarini (*Off.*).

Dose.—5 to 30 minims (0.3 to 1.8 Cc.).

1 in 10 of Alcohol 90%. Carminative and flavouring.

OLEUM SANTALI. (*Off.*) P.G. iv., Ph. Ital. U.S.

With data as to Copaiba and Cubebs.

Dose.—5 to 30 minims (0.3 to 1.8 Cc.).

Santal or Sandal Wood Oil is distilled by steam under pressure from the wood of *Santalum album* (*Santalaceæ*), the yield being from 1 to 6%. A yellowish oil, with an aromatic odour and pungent taste. Consists (principally) 90% of the Alcohol Santalol (*v. infra*). Sp. Gr. (*Off.*) 0.975 to 0.980. According to U.S. must yield 90% alcohols (as Santalol). U.S. also tests for chloroform and other chlorinated products. Ph. Ital. requires between 77 and 84% Santalol.

OLEUM SANTALI (*P. Off.*)—Sp. Gr., 0.973 to 0.985. O.R., -16° to -20° (*Off.*) R.L., 1.498 to 1.508; Soluble 1 in 6 of 70% alcohol at 20° C. Should contain not less than 90% alcohols, calculated as santalol, $C_{15}H_{24}O$, when determined by the acetylation process *q.v.* Cf. C.D. ii./oo, 581; *vide* also P.J. ii./o8, 624.

A few samples gave Sp.Gr. 0.975 to 0.990 O.R. -15.75° to -19.5° Santalol 91.61 to 93.79%, all soluble in 6 vols. of Alcohol 70%.—Southall's Lab. Rep., 1907.

O.R. by general consensus of opinion should be lower than given in U.S.P. Should be -12° to -20° . B.P. and U.S. limits are unjust, preventing many genuine oils from being sold. Solubility 1 in 5, in alcohol 70% at 30° C. and Sp. Gr. 0.965 to 0.966 at 25° C.—Am. Jl. Ph., Feb., o8, 51. *Vide* also C.D. i./10, 293.

Soluble in all proportions in alcohol 90% (1 volume with 6 of alcohol 70% is clear-absence of Cedar Wood Oil, *Off.*). Readily in ether and chloroform.

Flavoring.—Best given as Capsule.

Uses.—Internally in chronic bronchitis, *e.g.*, a few drops taken on a lump of sugar is found to relieve cough without expectoration. Is much employed in the treatment of gonorrhœa and gleet. It quickly checks the discharge in dose of 15 minims 3 times a day, and with the use of iodoform and eucalyptus bougies gives good results; also in 10-minim capsules, for chronic cystitis, with benzoic and boric acids as adjuvants.

Santalol. *Syn.* Arhéol. $C_{15}H_{26}O = 220.53$ (222.208 I. Wts.), more correctly $C_{15}H_{24}O = 218.53$ (220.192 I. Wts.) (Schimmel, Am. Jl. Ph. June, o6, 260).

Dose.—3 minims (0.2 Cc.) 6 to 12 times a day. The use of Santalol as distinct from its parent substance the oil has been recently advocated. Even in large doses there is no disturbing influence on the stomach or kidneys in gonorrhœa, cystitis, vesical and bronchial catarrh.

Santalol Capsules contain 5 minims (0.3 Cc.)

Santalol Methyl-Salicyl Capsules contain 4 minims (0.24 Cc.) with 1 minim (0.06 Cc.) Methyl Salicylate. This combination has been found very useful in gonorrhœa.—*Campbell Williams*.

***Santyl**, $C_{15}H_{25}C_6H_4.OH.CO.O = 339.66$ (342.24 I. Wts.), Salicylic Ester of Santalol.

Dose.—15 to 30 minims (1 to 2 Cc.).

Yellow Oil with balsamic odour free from acrid taste. Stated not to irritate the stomach or kidneys; given for urethritis and cystitis.

***Allosan**.—ALLOPHANIC ESTER OF SANTALOL.

$\text{NH}_2\text{.CO.NH.CO.OC}_{15}\text{H}_{23}=303\cdot99$ (306\cdot228 I. Wts.).

(Based on Schimmel's formula for Santalol.)

Dose.—15 grains *ter die*. Tasteless, white crystals, insoluble in water, but soluble in most organic solvents. Thought to split up in the intestine.

Camphosan.—*Dose*.—2 Capsules each containing 5 grains (0·3 Gm.) 3 to 5 times daily.

An insoluble 15% solution of Camphoric Methyl Ester in Santalol, forming an oily liquid. Sp. Gr. 0·991 at 18·5° C. Miscible with Alcohol. The Camphoric Ester is mildly astringent and disinfectant.

***Thyresol**, a Methyl ester of Santalol. *Dose*.—4 to 8 grains or drops (0·26 to 0·52 Gm.). In treatment of gonorrhœa best taken in Tablet form with Magnesia base, or the liquid in milk or in capsules (5 grains). It is stated that Santalol is not split off in the system.—L. ii./09,342 *vide* also B.M.J.E. i./c9,99.

Colourless liquid insoluble in water, but soluble in Absolute Alcohol.

Tablets stated to contain 5 grains Thyresol and weigh 10 grains approx.

Capsules of Santal Oil are prepared, containing 5, 10, 15 and 20 minims in each. Gonal Capsules are similar.

Those known as ***Savaresse's Capsules** contain 10 minims, and are prepared with an animal membrane, and it is claimed are less nauseating, as they generally remain entire until they have passed the stomach. The patent described.—P.J. i./07,538.

Capsules of Copaiba contain 5, 10, and 15 minims; capsules of Copaiba and Santal Oil of each 5 minims; also Oil of Cubebs and Santal Oil of each 5 minims; also Copaiba and Cubebs Oil of each 10 minims, and of each 5 minims.

Copaiba, the Oleo-Resin, *Off.* U.S.

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Is obtained from the trunk of *Copaifera Lansdorphii* and other species (*Leguminosæ*), and is imported from the northern coast of South America.

Soluble almost completely 1 in 1 of Alcohol 90%, almost entirely in absolute Alcohol, Ether, and in four times its volume of Petroleum Ether.

That known as Para Copaiba is transparent, yellowish and thinner than the Maracaibo variety, which is brownish and somewhat fluorescent. Sp. Gr. about 0·920 to 0·990. **Uses**.—Diuretic and stimulant to mucous membranes, chiefly used for urethral diseases, and occasionally for chronic bronchitis. May produce a red rash. Given emulsified with mucilage or saponified, but best in Capsule. *See* also Liquor Copaibæ.

For Maranham and Maracaibo varieties Acid number at least 75. Para and Bahia varieties contain a greater proportion of volatile oil, consequently lower acid number.—Umney, C.D. ii./09,579.

Test for Gurjun Balsam (*q.v.*)—Dissolve four drops of the sample in 3 Cc. of glacial Acetic Acid, one drop of freshly made 10% Aqueous Potassium Nitrite Solution is added and the mixture poured carefully on to surface of 2 Cc. of Concentrated Sulphuric Acid. A dark colour always appears, but in the presence of Gurjun Balsam a violet colour produced in the clear upper layer.—Am. Jl. Ph., Jan. 08,11.

Oleum Copaibæ (*Off.*) U.S.

Dose.—5 to 20 minims (0·3 to 1·2 Cc.) which is distilled from it, and constitutes at least 40% of the oleo-resin. Sp. Gr. 0·900—0·910. Soluble in its own volume of Absolute Alcohol (distinguishes 'African') about 1 in

20 Alcohol 90%; requires 5 to 10 volumes of 95% Alcohol to dissolve it.—Schimmel, Am. Jl. Ph., June 06, 257. U.S. says 2 volumes.

OLEUM COPAIBE. (*P. Off.*).—Sp. Gr. [as above] O.R., -7° to -35° ; R.I., 1.491 to 1.500; distils between 250° and 270° C. 1 Cc. of the oil dissolved in 5 Cc. of glacial acetic acid, and 4 drops of nitric acid added, should not develop more than a faint violet coloration (absence of gurjun oil). *Note*.—Hill and Umney suggested that a medical inquiry be instituted into the relative values of the oil and the resin of copaiba, with a view to the possible omission of the present monograph and to the framing of a satisfactory one for copaiba itself.

O.R.—5 to -35° .—Umney, C.D. ii./09, 580. See also P.J. ii./08, 623.

Adulterants of Copaiba are Castor Oil, rendering the resin obtained from it difficult to powder; Oil of Turpentine, recognisable in the distillate, and Gurjun Balsam r. p. 693.

Acidum Copaibicum (Copaivicum) $C_{20}H_{30}O_2=299.96$ (302.24 I. Wts.). A constituent of Copaiba supplied in amorphous brownish powder or lumps. Soluble in alcohol and ether. May be prepared by shaking out Copaiba with concentrated Ammonium Carbonate solution and precipitating this solution with Acetic Acid (Schmidt). Used as—

Sodii Copaibas.—SODIUM COPAIVATE.

Dose.—10 to 30 grains (0.65 to 2 Gm.).

Yellowish powder, soluble in water: has been used in gonorrhœa and gleet.—M.Am.

Copaiba Resin is the residue left after distilling off the volatile oil from Copaiba.

Mistura Olei Santali. *Dose*.—One ounce (30 Cc.).

Oil of Sandalwood 4, Tragacanth, in powder 1. Mix, and add quickly Water to 128. Shake well. Aromatic water with syrup may be used.

Mistura Santali Composita. *Syn.* NISBET'S SPECIFIC.

(This name may be used for a preparation of the following composition without rendering it liable to stamp duty providing this book and the page be mentioned on the label.)

Dose.— $\frac{1}{2}$ to 1 drachm in water or milk thrice daily.

Santal Oil $12\frac{1}{2}$ drachms, Cassia Oil $1\frac{1}{2}$ drachms, Pimento Oil 40 minims, Alcohol (90%) $3\frac{1}{2}$ ounces.

Capsules of Nisbet's Specific are prepared containing the Oils of $\frac{1}{2}$ drachm dose of the above in 20-minim capsules.

Another formula $\text{\textcircled{C}}$ containing in addition Morphine Hydrochloride 9 grains in twelve ounces is given.—Ph. Form., 1908, 710.

Haustus Copaibæ, St. Bart.'s H. Copaiba 15 minims, Solution of Potash 5 minims, Spirit of Nitrous Ether 15 minims, Mucilage of Gum Acacia 60 minims Camphor Water to 1 ounce.

Liquor Copaibæ, Soluble Copaiba.

Dose.— $\frac{1}{2}$ to 1 drachm well diluted.

Copaiba 18, Solution of Potash 26. Boil for 15 minutes, dilute whilst hot with 10 of water, transfer to a bottle and set aside to clarify; then syphon off the clear liquor from the supernatant oily portion and the sediment. Make volume of same 36 with water.

Flavoring.—Glyl Lavandulæ, Glyl Pini; Extractum Glycyrrhizæ Liquidum, Syrupus Zingiberis.

Mistura Copaibæ.

St. M.'s H. Copaiba 15 minims, Mucilage 1 drachm, Magnesium Sulphate $\frac{1}{2}$ drachm, Cinnamon Water to 1 ounce.

Liquor Copaibæ cum Buchu et Cubeba.

Dose.—1 to 2 drachms, well diluted.

Buchu in powder 5, Cubebs in powder 2, Alcohol (60%) *q.s.*
Percolate and press to obtain 14. Mix 1 part with 2 of Soluble Copaiba.
Flavoring,—see Liquor Copaibæ.

Liquor Santali cum Buchu et Cubeba.

Dose.—1 to 2 drachms.

Yellow Santal Wood in powder 4, Buchu in powder 1, Cubebs in powder 1, Alcohol (60%) *q.s.* to moisten. Macerate 2 days and percolate with more alcohol and press to obtain 20.

Liquor Santali Compositus. Martindale.

Dose.—1 to 2 drachms. Mix 2 volumes of Soluble Copaiba with 1 of the last preparation. This produces a thick preparation which can be almost cleared by adding 4% Potash Solution (1 in 2).

Liquor Santal cum Kava.

Dose.—1 to 2 drachms (3·5 to 7·0 Cc.).

Yellow Santal Wood in powder 4, Alcohol 60% *q.s.* to 15, Liquid Extract of Kava-kava 5 (*v.p.* 710). Is used in gonorrhœa, and is said to suppress the *ardor urinæ* and tendency to chordee, to increase the output of urine and to reduce pus.

Gelatin Capsules are prepared. *Dose*.—2 capsules 3 or 4 times a day.

*Gonosan is a special preparation of Kava resins in Santal Wood Oil, in Capsule form.

❶ OPIUM (*Off.*). U.S., P. JAP., FR. CX., P. HUNG., P. SVEC. AND OTHERS.

❶ *Opium and its preparations or admixtures containing 1 or more per cent of morphine.*

Dose.— $\frac{1}{2}$ to 2 grains (0·032 to 0·13 Gm.).

FR. CX.—*Max. single dose* 3 grains; *max. during 24 hours* 9 grains.

Antidotes.—See Morphine.

The inspissated juice obtained by incision of the capsules of *Papaver somniferum* (*Papaveraceæ*) (from any geographical source). The Turkey product is best suited for pharmacy. Persian and Indian contain a large proportion of Narcotine.

Papaveris Capsulæ, Poppy Capsules (*Off.*).

❷ "Poppies, all preparations of, excepting red poppy petals and syrup of red poppies (*Papaver rhœas*)."

In the dried condition are used to prepare

❷ *Decoctum Papaveris* 1 in 10. This is employed as fomentation in neuralgia, peri-dental abscesses, gum-boils, and

❷ *Decoctum Papaveris et Anthemidis*. Poppy Capsules 10, Chamomile Flowers 5, Water *q.s.*, boiled 10 minutes to produce 100. Employed as above.

For galenical preparations generally, *Opium Off.* must contain, when dried and powdered, between 9·5% and 10·5% of anhydrous morphine. FR. CX. 10 to 11% on the drug dried at 60°C. F.I. requires morphine 10% in dry opium as in P. Belg. dried at 60° C. (U.S. 12% to 12·5% crystallised morphine); for the Tincture and Extract may (*Off.*) be used if containing when dry not less than 7·5%, these being standardised when prepared.

The B.P. method of estimating modified.—The difficulty of obtaining the 104 Cc. of filtrate is obviated. The Ether is not removed before collecting the precipitate on the filter, but after. Back-titration is conducted with $\frac{N}{10}$ Soda, after dissolving the Morphine in $\frac{N}{10}$ Acid, and this without drying. In estimating the tincture an error is pointed out—after treating 80 Cc. with lime, &c., it should be made

up to 81.9 and not to 85 Cc. A table is given showing the equivalents of Morphine to $\frac{1}{15}$ Sulphuric Acid.—Dowzard's Process, P.J. ii./03,909. Dott's criticism of this method.—P.J. i./04,7.

Dowzard's further investigations showed it necessary to take 50.9 Cc. of the filtrate to equal 4 Gm. when working with 8 Gm. of *Opium* and 3 Gm. of slaked lime and 100 Cc. of water.

When working with 100 Cc. *Tincture* and 3 Gm. slaked lime, the final volume must be made up to 102 Cc., 50 Cc. of filtrate will then equal 50 Cc. of the original *Tincture*. The increase in volume due to the extractives is found by Dowzard to be lower than that given in the B.P.—P.J. i./04, 397.

The '85 Cc.' mentioned in the B.P. test is found by Farr & Wright to be correct. Experiments show that the volume should be 83.5 Cc. to 84 Cc. for Turkey Opium and 85 Cc. for Indian (Dowzard found fault with this previously, *vide* above).—C.D. i./07,266.

Ash should not exceed 4% to 8%, moisture about 12%.

Opium should be 64% water-soluble.—Ph.

Caesar and Lorentz's method of estimation.—C.D. i/08,21.

Turkey, Persian, Egyptian, and Indian Opium of Commerce.—Am. Jl. Ph., April '07,156. Capsules estimated Y.B.P. 1907,131.

Estimation of Narcotine and Codeine in Opium.—Y.B.P. 1903,122.

① **Opium, U.S.** In its normal moist condition to yield not less than 9% crystallised morphine (as in 1890).

Average Dose.— $1\frac{1}{2}$ grains (0.1 Gm.).

Assay method (U.S.).—Shake Opium 10 Gm. in small pieces if fresh, or if dry in very fine powder, with water 100 Cc. during three hours. Filter, wash the marc, and repeat the process with a further quantity of water until 150 Cc. of filtrate are obtained, and again collect 150 Cc., and finally a further 20 Cc. of filtrate. Evaporate the filtrates to 14 Gm., dilute with water to 20 Gm., add Alcohol 10 Gm., shake and add Ether 25 Cc. and Ammonia Solution $3\frac{1}{2}$ Cc., shake and allow to stand sixteen hours. Decant the Ether through a double filter paper, then add Ether 20 Cc. in two portions and wash out flask with water, 15 Cc. (not more), collect the crystals, wash with water until free from mother liquor, then with a little morphinated Alcohol and dry at not exceeding 60° C, and weigh. Then wash the crystals with lime water until the washings cease to precipitate with Mercuric Potassium Iodide Solution, after acidifying. Dry, weigh, and deduct the weight of the insoluble residue from the weight of impure morphine first found; this gives the content of pure morphine.

International Opium Commission (Shanghai) Resolutions. — B.M.J. 1907,620.

Incompatible with Vegetable Astringents, Alkaline Carbonates, Salts of Mercury, Iron, Lead and Zinc.

Uses.—The oldest and most certain remedy for pain, also tends to check inflammation and relieve nervous diseases; lessens cough, arrests diarrhoea and dysentery (but *vide* Brooke *infra* for cholera). Externally the liniment is used for rheumatism, neuralgia, and sciatica and is added to fomentations, and the ointment is applied to piles and fissures of the anus. Has some power in controlling the amount of sugar in diabetes. Children are very susceptible to its action.

It relieves the pain in appendicitis but must not be given for this, as, apart from the danger of the symptoms being masked, opium is a source of danger by paralysing the intestines and causing tympanites.—B.M.J. ii./07,63.

Koch stated that even if a certain natural immunity exists against cholera it is immediately abolished directly the peristalsis is interfered with by Opium.

Administration of Opium in any form is highly dangerous.—Brooke, 165.

A great actress faces the ordeal of the first night by means of 7 drops of Laudanum. John Hunter who disliked public speaking nerved himself for

Lecturing with 30 drops. The procedure may, however, bring about failure or lead to Opium habit.—B.M.J. i./09,1379. L. ii./08,439.

De Quincy took 9 ounces of Laudanum a day (*circa* 300 grains of Opium). Two cases on record in which 16 ounces per diem were taken,—these lived to advanced age.

'Speech' fright and stage fright are well treated by small doses of Opium just before the effort has to be made, *e.g.*, $\frac{1}{4}$ grain or 6 to 10 minims of Vinum Opii just before going into an examination, or a first appearance on the stage. Some advise a little Cannabis in addition.—B.M.J. i./09,1456.

Opium is stimulating to nerves, brain, &c., as well as being sedative,—in this respect is stronger than Morphine. Stimulating effect, *e.g.*, in indolent ulcers of skin and mucous membrane, best obtained by small frequent doses.—B.M.J. ii./09,1606.

Ulcerative stomatitis, common amongst ill-fed children, well treated by 2 to 5 drops of Laudanum twice daily.—*ibid.*

Gangrenous varicella in year old child cured by Iodoform dressing and 1 minim of Laudanum every 4 hours.—*ibid.*

Quiets nervous irritability, and gives a welcome spur to jaded nerves.

For infants dose is $\frac{1}{4}$ minim of Laudanum for every three months of life. Can be repeated every 6 hours. With care no danger of undesirable consequences.—*ibid.*

In cases of peritonitis from perforation of stomach or bowels where surgical treatment is undesirable Opium may be usefully resorted to. In peritonitis there is marked tolerance to Opium even by youngest infants. Must be pushed boldly.—*ibid.*

Looseness of bowels well treated by Laudanum. In colitis where tenesmus is distressing, and stools contain blood and mucus, supplement dose by mouth by rectal injections (2 to 5 minims for a child) with a few grains of powdered Ipecacuanha in $\frac{1}{2}$ oz. of thin boiled starch.—*ibid.*

Given as hypnotic, and not to relieve pain, Opium should be taken 2 to 3 hours before bedtime.—*ibid.*

Its use in acute pneumonia may be attended with risk. In uræmic convulsions may be useful. To test truthfulness of statement of morphine maniacs who have undertaken to cure themselves, the urine should be examined for Morphine. At the end of 8 d ys from the beginning of abstinence the drug should have passed completely from the system.—*ibid.*

Opium has no local effect upon sound skin though the B.P. has 3 local applications containing it.—Dixon. B.M.J. ii./09,329.

Ⓢ **Opium Deodoratum, U.S.** *Average dose.*—1 grain (0.065 Gm.).
Standard as Opii Pulvis, U.S. Deodorised by petroleum benzine.

Ⓢ **Opium Granulatum, U.S.** *Average dose.*—1 grain (0.065 Gm.).
Standard same as Opii Pulvis. Prepared by drying at not exceeding 85° C. and reducing to No. 20 powder.

Ⓢ **Acetum Opii, U.S.**

Average dose.—8 minims (0.5 Cc.).

Opium Powder 10, Nutmeg 3, Sugar 20, Diluted Acetic Acid (6%) to 100. By maceration.

① **Emplastrum Opii** (*Off.*). 1 in 10 of Resin Plaster.

① U.S. has Extract of Opium 6 in adhesive Plaster *q.s.* to 100.

Dixon says, Opium locally has no effect.—B.M.J. ii./09,329.

Fr. Cx., Opium Extract 1, Elemi 1. Diachylon Plaster (Fr. Cx.) 2.

① **Extractum Opii** (*Off.*). U.S., P. AUSTR., NED., HELV., BELG. HUNG. Foreign Synonym—EXT. TEBALACO.

Dose.— $\frac{1}{4}$ to 1 grain (0.016 to 0.065 Gm.).

An aqueous extract standardised to 20% of morphine.—F.I. adopts.

Fr. Cx. has the same with maximum single dose $1\frac{1}{2}$ grains; maximum in 24 hours 3 grains approximately.

① P. Jap. has approx. 7% morphine.

① **Extractum Opii Liquidum** (*Off.*).

Dose.—5 to 30 minims (0.3 to 1.8 Cc.).

Extract of Opium 0.75, Distilled Water 16, Alcohol (90%) 4. Is o. same strength as Tincture of Opium, containing 0.75% of morphine. Resembles Battley's ① **Liquor Opii Sedativus**.

① ***Papine**. A proprietary article.

Dose.—1 drachm ($=\frac{1}{8}$ grain Morphine). Children under one year 2 to 10 drops. Said to contain the anodyne principles of opium without the narcotic and convulsive properties.

① **Linctus Opiatus**, St. Th. H.

Dose.—Tincture of Opium 2 minims (Linctus) St. Th. H. to 1 drachm, Linctus, St. Th. H.

Oxymel Scillæ 15, Mucilage Tragacanth 15, Glycerin 15, Emulsion of Chloroform 3, Syrup to 60.

① **Linctus Opiatus C. X.**

Liquid Extract of Opium 2 minims, Oxymel of Squill 20 minims, dilut. Sulphuric Acid 5 minims, Treacle 20 minims, Water to 1 ounce.

① **Linctus Scillæ**, St. M.'s H.

Oxymel of Squill $\frac{1}{2}$ drachm, Compound Tincture of Camphor 15 minims, Honey to 1 drachm.

① **Linctus Scillæ Opiatus**.—*Syn.* Linctus Camphoræ Compositus. St. Barts'. H. Gee's Cough Linctus, N.H.W., E.L. *Dose.*—1 drachm (3.5 Cc.).

Paregoric, Oxymel of Squill, and Syrup of Tolu, equal parts.

① **Linctus Tolutanus cum Opio**. Brompton H. uses Syrup of Squill *vice* Oxymel in latter.

① **Linimentum Opii** (*Off.*).

Tincture of Opium 1, Liniment of Soap 1; filter after a few days. A commonly used anodyne for pain.

Dixon says, has no effect.—B.M.J. ii./09,329.

① **Mistura Acidi Sulphurici cum Opio**, St. M.'s H.

Dilute Sulphuric Acid 10 minims, Opium Tincture 10 minims, Spirit of Chloroform 0 minims, Camphor Water to 1 ounce.

① U.C.H. has Diluted Sulphuric Acid 15 minims, Tincture of Opium 6 minims, mixture of Capsicum 2 minims, Water to 1 ounce.

① **Mistura Sodæ cum Opio**, St. M.'s H.

Liquid Extract of Opium 3 minims, dilute Hydrocyanic Acid 2 minims Sodium bicarbonate 6 grains, Water to 2 drachms.

Ⓟ Pilula Plumbi cum Opio (Off.).*Dose.*—2 to 4 grains (0·13 to 0·26 Gm.).Lead Acetate 6, Opium 1, Syrup of Glucose $\frac{2}{3}$ or *q.s.***Ⓟ Pilula Saponis Composita (Off.).***Dose.*—2 to 4 grains (0·13 to 0·26 Gm.).

Opium 1, Hard Soap 3, Syrup of Glucose 1.

Ⓟ Pulvis Cretæ Aromaticus cum Opio (Off.).*Dose.*—10 to 40 grains (0·65 to 2·6 Gm.).Contains Opium 1 with 39 of Pulvis Cretæ Aromaticus. *Dose.*—10 to 60 grains (0·65 to 4·0 Gm.) which was the old "Aromatic Confection."**Ⓟ Tablets** each 5 grains (0·32 Gm.).**Sys Specific.** An Indian cure for sprue, dysentery, and diarrhœa. It consists of 'powders' containing principally Calcium Carbonate,—one to be mixed with 12 ounces of water and **Ⓟ**laudatum to be added, if necessary.**Ⓟ Pulvis Kino Compositus (Off.).** Opium 1 in 20.*Dose.*—5 to 20 grains (0·32 to 1·3 Gm.).**Ⓟ Pulvis Opii Compositus, B.P. 1885.***Dose.*—2 to 10 grains (0·13 to 0·65 Gm.).

Opium 3, Black Pepper 4, Ginger 10, Caraway Fruit 12, Tragacanth 1. Contains 1 of Opium in 10.

Ⓟ Solubes Plumbi et Opii represent:—

Lead Acetate 2 grains, Opium Tincture 20 minims. For dilution with warm water 5 ounces, more or less according to the purpose required.

Ⓟ Suppositorium Plumbi cum Opio (Off.).Lead Acetate 3, Opium 1, Oil of Theobroma *q.s.* In grains for one suppository, in grammes for fifteen.**Ⓟ Tablets** of Opium $\frac{1}{2}$ and 1 grain.**Ⓟ Syrupus Opii, P. Austr.** Opium Extract 1, Simple Syrup 999.**Ⓟ Tinctura Camphoræ Composita.—Syn. PAREGORIC. (Off.).** Is known on the Continent as *Tinctura Opii Benzoica*. *Syn. FR. CX.* 'Elixir Parégorique.' *Dose.*— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).Tincture of Opium 585 minims, Benzoic Acid 40 grains, Camphor 30 grains, Oil of Anise 30 minims, Alcohol (60%) *q.s.* to 1 pint. One drachm=about $\frac{1}{4}$ grain opium. F.I. requires 0·05% Morphine (*Off.*), the name to be as above, or *Opii Tinctura Benz ica. FR. CX.* kept this strength.**Ⓟ Ph. Ned.** has 0·05% Morphine, but amounts of other ingredients varied. **Ⓟ P. Jap.** has 1 of Opium in 200.**Flavoring.**—Syl Coriandri, Glyl Pini; Elixir Aromaticus.**Ⓟ Tinctura Thebaica Benzoica. P. Dan.**—Opium Tincture (F.I. 1 in 10, *i.e.* 1% Morphine) 1 in 20.**Ⓟ Tinctura Opii Camphorata, U.S.***Average dose.*—2 drachms.

Similar in composition, 1 of opium in 250.

The presence or otherwise of Morphine may be detected and indeed compared with a Standard Paregoric by working on as small an amount as 2·5 Cc. of a specimen. The details of the method must be carefully adhered to.—Bird, P. J. ii./05, 155.

Ⓢ **Syrupus Camphoræ Compositus, Bristol Infirmary (revised).**

Dose.—1 drachm (=Laudanum 2 minims) occasionally.

Benzole Acid 45 grains, Glacial Acetic Acid 7 drachms 20 minims, Vinegar of Squill and of Ipecacuanha each 10 ounces, Anise Oil 30 minims, Camphor 30 grains, Opium Tincture 2 ounces, 5 dr. 20 minims, Sugar 7 lbs., Caramel *q.s.*, Water to 1 gallon. Pharm. Form. advises at least 2½ ounces of Spirit to dissolve the oil, Camphor and Benzole Acid. Mix the solution with the Laudanum and add to the cold syrup with stirring, then the colour.

Ⓢ **Tinctura Opii.**—*Syn.* LAUDANUM (*Off.*).

Dose.—20 to 30 minims (1·2 to 1·8 Cc.), or 5 to 15 minims (0·3 to 0·9 Cc.), repeated.

Standardised to contain 0·75% of anhydrous Morphine. Alcohol strength 45% approx. might be made with 30% Alcohol.—P.J. ii./09,142.

Ⓢ U.S. has 1 of Granulated Opium (12 to 12·5% Morphine) in 10 of Alcohol (approximately 48% by vol.). Ⓢ Ph. Ned. P. Hung. and Ⓢ P. Belg. contain 1% Morphine, made with 70% Alcohol. Ⓢ Fr. Cx. dissolves 1 Gm. Extract in 19 Gm. Alcohol 70% to produce the same strength.—*Maximum single dose* 35 minims, and during 24 hours 110 minims approximately. We found Sp. Gr. of this to be 0·902. F.I. requires 10% strength by percolation with Alcohol 70% and to contain 1% Morphine.—C.R. says this will be ⅓th stronger; dose may require adjustment.

It is desirable to mix the dried Opium in coarse powder with twice its weight of washed and dried sand and to percolate with Spirit without macerating first of all. Conducted in this way the Opium will not 'block,' similarly also in the case of Tinctura Opi Crocata.—P.J. ii./09,2.

For estimation, see note under Opium, p.p. 502, 503.

Flavoring.—Syl Menthæ Piperitæ, Syl Rosæ; Syrupus Zingiberis.

Typhoid (the insomnia of), treated by 15 to 20 minim doses.—B.M.J. ii./04,1452.

Diphtheria, laryngeal stenosis of, treated by small doses every four hours (with Antitoxin).—B.M.J.E. i./06,63.

In acute peritonitis 5 drops every 2 hours according to amount of pain, has been given with advantage.—Berl. Klin. Woch.

Ⓢ Tablets representing Tincture of Opium 5 and 10 minims are prepared.

Ⓢ ***Nepenthe (or ANODYNE TINCTURE)** is similar and is given in dose as Tinctura Opii (*Off.*). Incompatible with alkalis.

Tinctura Opi Crocata. SYDENHAM'S LAUDANUM.

Dose.—5 to 20 minims (0·3 to 1·2 Cc.).

Ⓢ F.I. requires 1% Morphine. The following all approximate;—

Fr. Cx.—Opium 100, Saffron 50, Cinnamon Oil 1, Clove Oil 1, Alcohol 30% 1000—all by weight (conforms with F.I.).

Max. single dose 2 Gm. (= 30 minims), max. during 24 hours 6 Gm. (= 90 minims) approx.

P. Austr., P.G. iv., P. Helv., Ph. Ned., P. Hung, P. Svec., and P. Belg.

Originally Sydenham's Laudanum was a Vinum; his original formula was Opium 2 ounces, Saffron 1 ounce, Cloves 1 drachm, Cinnamon 1 drachm, and 'Mountain' (i.e. Spanish) Wine 1lb. The Wine in course of time became a Tincture.—C.D.i./08,394,385.

Vinum Opi Crocatum, as used in Thieleman's Koleradraber (*q.v.*) in Norway, has the composition:—Opium Powder 15, Ceylon Cinnamon 1, Cloves 1, Saffron 5, Malaga Wine 150, i.e., approximating the Tincture of P.G.

Ⓟ **Tinctura Opii Deodorata, U.S.**

Average dose.—8 minims (0·5 Cc.).

Granulated Opium 100 (purified by Petroleum Benzin 75), in Alcohol 200, Water to 1,000.

A modified method of deodorising (Gordon's) is mentioned by Caspari. Macerate Opium 100 Gm. in water *q.s.*, and concentrate infusion to 500 Cc. Heat to 82° C, add Paraffin, melting at about 50°C, 150 Gm. in small pieces, and when liquefied shake thoroughly 10 minutes. Allow to cool, remove paraffin cake, and make up filtered liquid to 800 Cc. with Water and Alcohol 200 Cc., finally with Water to 1,000 Cc.

Ⓟ **Tinctura Opii Ammoniata (Off.).—Syn. SCOTCH PAREGORIC.**

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Tincture of Opium 3 ounces, Benzoic Acid 180 grains, Oil of Anise 1 drachm, Solution of Ammonia 4 ounces; Alcohol (90 %) *q.s.* to 1 pint when filtered. One ounce contains $\frac{1}{2}$ grain anhydrous morphine.

Ⓟ **Trochisci Opii, B.P. 1885.**

Contained $\frac{1}{10}$ grain Extract of Opium in each, with liquorice. Trochisci Sedativi, T.H., contain the same quantity with fruit basis, and are marked 'S.'

Ⓟ **Unguentum Opii.**

1 of extract in 10 of Unguentum Cetacei.

Ⓟ **Unguentum Gallæ cum Opio. (Off.)**

Contains 7·5% of Opium with Gall Ointment (Galls 1, Benzoated Lard 4).

Ⓟ **'Collapsubes'** with rectal tube are prepared for use in hæmorrhoids.

Dixon says opium locally has no effect.—B.M.J.ii./09,329.

Ⓟ **Vinum Opii, B.P. 1885.**

Dose.—10 to 30 minims (0·65 to 1·8 Cc.).

Contained 1 of Extract in Sherry 20, with Aromatics.

Ⓟ **U.S.—Granulated Opium 10, Saigon Cinnamon 1, Cloves 1, Alcohol 15, White Wine 85.**

Combretum Sundaicum, Miq. (? Rubiaceae) ANTI-OPIMUM PLANT.

The leaves and twigs of this plant dried in the sun, chopped finely and roasted, have been used as a cure for the opium habit in the East by a weaning process, as fully described in our last edition. At the time of its issue, the drug was attracting some attention.

Extractum Combreti Sundaici Liquidum (hydro-alcoholic). 1=1.

Dose.—17 minims (1 Cc.) approximately corresponding to the natives' dose is taken (diluted with chloroform water to 1 oz.) thrice daily. Has better keeping qualities than the native decoction.

E. F. Harrison found neither Glucoside nor Alkaloid in the plant, but a resin which presumably is the active constituent.

Inquiries into action of reputed virtues have not been definitely established.—B.M.J. i./10,337.

Blumea (? *lacinata*) (*Cruciferae*) is another anti-opium plant.—P.J.ii./07,358.

Argemone Mexicana contains berberine, protopine and a large quantity of potassium nitrate. In morphine habit. Has attracted attention in U.S.—L. i./07,477,629.

OVULES VAGINALES.

Ovules are oviform vaginal pessaries for gynecological use. They may be prepared with Glycerin Suppository mass (*Off.*), but if this be found too hard the following is softer:—

Ovule Mass containing Gelatin 8, Glycerin 60, Distilled Water 30.

This softer form may, however, not be suitable to export to hot climates. *Fr. Cx.* has Gelatin 1, Water 3, Glycerin 6. *P. Helv.* has Globuli of Gelatin 1, Water 4, and Glycerin 10.

Ovules may if preferred be made with Theobroma Oil basis.

Ovules dissolve slowly and hence produce a continued action of the medicament on the parts in cases of leucorrhœa, also for ulceration and inflammation of the cervix uteri.

Each Ovule weighs approximately 4 drachms. The following are prepared:—

Adreucaine = $\frac{1}{2}$ and 1 Cc. (anodyne and astringent).

Apiol, 5 minims (to relieve amenorrhœa).

Aristol, 5 to 10 grains (antiseptic).

(P) Belladonna Extract, 1 grain (sedative).

Boric Acid, 15 grains (soothing).

Carbolic Acid, $\frac{1}{2}$ grain (antiseptic).

(P) Cocaine, $\frac{1}{4}$, $\frac{1}{2}$ and 1 grain (local anæsthetic).

(P) Cocaine, 1 grain with Adrenalin $\frac{1}{100}$ grain (anæsthetic and astringent).

Copper Oleate, 5 grains, *c.f.* p. 488.

(U) Ergot Extract, 2 grains (astringent?).

Hæmamelis, 10 minims of Liquid Extract (anti-hæmorrhagic).

(P) Hyoscyamus, 5 grains of extract (sedative).

Ichthyol, 5 and 10% (in ulceration, antiseptic and stimulant). Preferably made with Theobromabasis.

Iodine, 1 grain (astringent and antiseptic).

Iodoform, 5, 10 or 15 grains (antiseptic).

Iodol, 2 grains (antiseptic).

(P) Morphine Hydrochloride, $\frac{1}{4}$ and $\frac{1}{2}$ grain (anodyne).

Naphthol, 1 grain (antiseptic).

(P) Opium, 1, 2 grains (sedative).

Potassium Bromide, $7\frac{1}{2}$ grains (sedative).

Potassium Iodide, 5 grains (anti-syphilitic).

Quinine Hydrochloride, 3 grains (in leucorrhœa and to check conception).

Resorcin, 3 grains (antiseptic).

Suprarenal Extract, 5 minims (hæmostatic).

Tannic Acid, 8 grains (astringent).

Trypsin, 5 grains or as ordered (theobroma basis).

In preparing the Tannin Ovules it is important to use only the slightest amount of heat. Dissolve the tannin in the cold water of the mass. Add the gelatin and allow to soak up completely, then mix in the glycerin slightly warmed and proceed in the usual way.

In order to be efficient these ovules must be inserted as far as possible whilst the patient is in the supine position with the hips raised. A sanitary towel may worn at the same time. Most effectual at bedtime.

OXYGENIUM.

OXYGENE. *Fr. Cx.*

O = 15.88 (M.Wt. 31.76) (16 I.Wts., M.Wt. 32).

Oxygen is obtained from the air by first dehydrating and decarbonising it with quicklime; the oxygen is then separated from the nitrogen by

absorbing with barium monoxide exposed to a high temperature at ordinary atmospheric pressure; continuing the heat (at the same temperature) the barium peroxide formed yields pure oxygen on slightly reducing the pressure by suitable exhaust pumps—*Brin's process*; it is sold compressed in **Cylinders** containing the equivalent of 20 cubic feet (560 litres approximately) at normal temperature and pressure and upwards for inhalation from an **Inhalation Bag**. By the aid of this, if desired, the oxygen may be mixed with air as it is administered to the patient. Failing this apparatus the gas may be passed direct into the patient's mouth by means of a glass mouthpiece, or by a glass funnel which is suspended above the face (latter method probably of little use—*vide infra*).

Sp. Gr. 1.10527 (Air = 1). It is therefore slightly heavier than air. 1 litre weighs 1.429 Gm. at 0°C and 760° m.m. pressure. At 20° C. and under normal pressure 1 litre of water dissolves 28 Cc. of oxygen.

Ozone. $O_3 = 47.64$ (48 I. Wts.).

Is known as active or tri-atomic oxygen. It is a very powerful oxidising agent, the third atom of oxygen in the molecule being in the labile condition.

The effect of passing electrical currents through oxygen is to produce ozone, which may be recognised by the peculiar odor. When in large quantity it is irritating to the air passages, giving rise to cough and also producing headache. Mildly ozonised air may be inhaled for a few minutes several times a day with advantage in the spasmodic stage of whooping cough.—M.A. 1904, 572.

Eos Ozoniser has an induction coil worked direct from the mains.—L. ii./06, 1598.

A case of cavity of the lung successfully treated with Ozone.—L. i./08, 1118.

Uses of Oxygen.—Inhalation of **oxygen** is of great service in pneumonia (Li. ii./01, 840), bronchitis, asthma, angina, and some stages of phthisis, it relieves dyspnoea, and reduces temperature. May be used after chloroform to accelerate recovery. It is the best cardiac and respiratory stimulant. It is inhaled with success in cardiac failure and Bright's disease.

A successful antidote to morphine, opium, strychnine, cyanide, and carbon monoxide poisoning; for resuscitation after partial drowning, and threatened death from inhalation of nitrous oxide.

Its local use is valuable in ulcers and alopecia.

Endovenous injection of 120 Cc. of oxygen slowly in the case of a patient *in extremis*.—L. i./03, 75.

Sciatica has been treated by the hypodermic injection (deeply) of 250—400 Cc. of Oxygen.—P.J. i./07, 735.

In tuberculous peritonitis injected after fluid removed.—M.A. 1908, 26.

Intra-abdominal use of oxygen in tuberculosis. In tuberculous peritonitis injected intraperitoneally until the distension by the gas corresponded with the previous distension by fluid.—L. i./09, 1543.

Puerperal infection, certain forms of, treated with continuous current of Oxygen.—B.M.J.E. ii./08, 82.

Whooping cough, severe cases treated by inhalation of Oxygen. Best given just before onset if possible, as much as 10 to 20 litres being given through a funnel.—B.M.J. ii./09, 517.

Benjamin Moore states usual method of administering Oxygen practically useless; doubts whether patient ever gets a mixture containing more than a few degrees of Oxygen above the atmospheric amount, as all escapes into the air of the room. The patient should have a plentiful supply each time he breathes, not a continuous bubbling. Apparatus consists of a

collapsible gas-bag having trays of Caustic Soda or Soda Lime to take up the CO_2 —the bag is filled from a cylinder. Patient breathes backwards and forwards through an air-tight mask and wide tube.—B.M.J. ii./09,840.

B. tuberculosis, *B. pestis* and *Staphylococcus pyogenes aureus* are completely inhibited by Oxygen in certain proportion. These organisms alone of many, curiously enough, exhibit radio-activity.—Bio. Chem. Jl. Vol. V. Nos. 3 and 4. B.M.J. ii./09,873.

Leonard Hill has devised an Oxygen generator and inhaler employing Sodium Peroxide (Oxylith) and water for generating the Oxygen for use in places and conditions where cylinders cannot be easily obtained for patients with heart disease, asthma, etc. He states the apparatus is of less use in pneumonia, etc., where the gas can only be tolerated when given through a funnel or light mask, but even for these it may be worth having for emergency. The bag holds about 15 litres. Considerable heat is evolved, and it is, therefore, desirable to hold the bag in water whilst making the Oxygen. The patient should expire deeply before inhaling so as to diminish the dilution of the Oxygen by the Nitrogen within the lungs. Found of great service in high altitudes in Mexico, and during malarial fever. Irregular pulse fell from 136 to 98 and became regular. Usual length of inhalation about 15 minutes.

Panting is due to excess of CO_2 produced in the tissues and carried to the brain. The inhalation of Oxygen counteracts this effect, and has no deleterious effect even if continued for an hour or two. The irregular pulse in mitral stenosis is benefited—it is a condition of Oxygen want—very like that occurring at high altitudes.—Leonard Hill, B.M.J. ii./09,1522.

It was concluded from a few experiments in running up and down a 40 ft. stair after forcibly breathing air for 3 minutes, and quietly breathing Oxygen respectively, that Hill's claims for Oxygen in diminishing distress caused by violent muscular exercise could be explained as a result of the deep breathing which is apt to occur in persons to whom Oxygen is given. Hill answered the contention by a number of facts, including trial runs by athletes under preliminary forced breathing of air and oxygen—results were in favour of latter.—B.M.J. ii./09,681.

Remarkable effects on runners.—B.M.J. ii./08,499.

Of great value in relieving fatigue in the case of Channel swimmer. Should be of value in treatment of people fat and scant of breath, and those who over-eat and take too little exercise, and in cases of emphysema and heart disease treated by gradual exercise.—B.M.J. ii./08,967.

Liquid Air.

Consists mainly of oxygen and nitrogen, and when freshly prepared is a nearly colourless liquid boiling at -190°C . As the more volatile nitrogen evaporates the temperature rises and the liquid assumes a bluish tinge—the colour of liquid oxygen. With the exception of oxygen, and chlorine which has a yellowish tinge, most gases are colourless in the liquid condition.

Moles, nevi and lupus erythematosus have been treated (the first with best success) in New York by careful applications on a mop at end of stick.—B.M.J. ii./08, 1904; P.J. ii./09,344.

Air Liquefying Apparatus (Hampson's Patent).

This apparatus depends upon a method by which a moderate amount of refrigeration, produced by the expansion of a gas, may be accumulated and intensified till it reaches the point at which the gas becomes liquid under

atmospheric pressure. The method consists in directing all the expanded gas, immediately after its expansion, over the coils which contain the compressed gas that is on its way to the expansion point. The cold developed by expansion in the first expanded gas is thus communicated to the on-coming compressed gas, which consequently expands from, and therefore to, a lower temperature than the preceding portion. It communicates in the same way its own intensified cold to the succeeding portion of compressed gas, which in its turn is made colder both before and after expansion than any that had gone before. This intensification of cooling goes on until the expansion temperature is far lower than it was at starting, and the effect is so powerful that even the small amount of cooling due to the free expansion of gas through a throttle-valve may be made to liquefy air without using other refrigerants.

The amount of refrigeration due to free expansion was ascertained by Joule and Thomson, and is in the first place proportional to the fall of pressure. Air at 0°C . is cooled 0.29 of a degree C . for every atmosphere of pressure-drop. This cooling, however, increases with the descent of the temperature from which expansion takes place, and the law is that it is inversely proportional to the square of the absolute temperature. Thus expansion of air from $4\frac{1}{2}$ atmospheres to 1, and from a temperature of 0°C ., i.e., 274° Absolute, gives about 1° of cooling in the air itself. But when the air expands from $\frac{2}{3}$ of that absolute temperature, i.e., from 91° absolute, the cooling for the same pressure drop is $\frac{2}{3}$ of 1° , or $2\frac{1}{3}^{\circ}$.

In the liquid state air occupies $\frac{1}{800}$ th part of its ordinary volume, or in other words if liquid air be vaporised and restored to normal temperature it will expand 800 times.

Vacuum Vessels (Thermo-Isolators)

Are necessary for the storage of liquid air and those gases which only liquefy at low temperatures.

Vacuum vessels are either cylindrical or globular in shape, and consist of one glass vessel enclosed within another. The space between these vessels is thoroughly exhausted and sealed under a high permanent vacuum. Heat radiates across the vacuous space very slowly, consequently liquid stored in a vacuum vessel is admirably insulated from the action of external heat and only vaporises slowly.

The efficiency of the vacuum vessel is increased by silvering as radiation from outside is thus partially reflected.

Liquid air evaporates from vacuum vessels at the rate of from 5% to 15% per 24 hours, according to the size of the vessel, the evaporation from small vessels being more rapid than from large—Brin's.

★**Thermos Flasks** are on the principle of vacuum vessels.

A charcoal vacuum is employed in the new metallic containers for liquid air.—Dewar, C.D. 1./06,909.

Use of liquid air in dermatology was demonstrated by the late R. Crocker. Although possessing the quality of intense cold it is difficult to control, being a liquid. Carbonic Acid Snow (*q.v.*) has advantage here.—L. ii./09, 1659.

Stopford Taylor and McKenna do not, however, experience difficulty. They apply it by means of a pad of cotton wool wrapped on end of a cane dipped into the liquid contained in a Dewar's flask—they find it superior to Carbonic Acid Snow.—L. ii./09, 1774.

Hydrogen Liquefying Apparatus (Morris W. Travers')

It has been found that hydrogen, when compressed at normal temperatures and allowed to expand in an apparatus like the Hampson Air Liquefier, does not become cooled, but on the contrary, slightly heated. When, however, its temperature is reduced to -80°C ., or lower, before it enters the regenerator coil, it becomes further cooled on free expansion, so that the principle of self-intensive cooling employed in Hampson's Air Liquefier can then be applied to the liquefaction of this gas.

(For further information on liquefaction of gases, see "The Experimental Study of Gases," by Prof. Morris W. Travers.)

PANCREAS.

In the pancreatic juice of man four distinct digestive ferments are believed to be contained, viz. :—

1. **Trypsin.**—A proteolytic ferment acting in an alkaline medium. (Converting proteids, albumen and fibrin, *e.g.* casein of milk, into peptones) but digests egg white very slowly. *See p. 516 et seq.*
2. **Amylopsin or Pancreatic Diastase.**—Converts starch into dextrin, maltose and dextrose.
3. **Steapsin.**—A lipolytic ferment (emulsifies fats).
4. **A Milk-curdling Ferment, Rennin**—converting casein into a form of peptone.

For invalids, aged persons, and those suffering from weak digestion, or those prostrated by fever or exhaustion, preparations of the pancreas of the pig (an omnivorous animal) may be employed, by means of which food may be partially or wholly digested previous to administration; their nutrition is thus maintained, and the stomach has time to regain its powers of digestion.

These preparations may also be given internally in cases of dyspepsia and defective nutrition.

Pancreatinum, U.S.

Dose.—2 to 4 grains (0.13 to 0.26 Gm.).

A cream-coloured amorphous powder, slowly soluble in water, and containing not more than 10% insoluble; insoluble in alcohol; consisting principally of trypsin, amylopsin, steapsin and myopsin, obtained usually from the hog. It digests albuminoids and converts, if of U.S. Standard, not less than 25 times its weight of starch into sugar in an alkaline medium. Assay process is provided.

Fr. Cx. states it loses its activity on warming solutions of it above 50°C. Its peptonising action is best in neutral or very slightly alkaline or very slightly acid solution. The Assay process provides for conversion of 12½ times its weight of dried fibrin.

Pancreatin Tablets, 2½ grains, with Sodium Bicarbonate, are prepared. One is sufficient to peptonise half a pint of milk.

Liquor Pancreatis, Pancreatic Solution (*Off.*).

Dose.—1 to 2 drachms (3.5 to 7 Cc.).

Fresh pancreas of the pig, freed from fat and external membrane, and divided by trituration with washed sand or pumice-stone, 1, Alcohol (20%) 4, Macerate for seven days and filter.

This solution contains the amylolytic, the proteolytic, and the milk peptonising properties of the pancreas.

The pancreas is sometimes called the 'sweetbread,' but the sweetbread known to cookery is the thymus gland of the sheep, and *not* the pancreas, which, being tough and stringy, is inferior in value to the sweetbread of the throat for cooking.—Ph.

Pancreatic Juice, obtained in its inactive form from the pancreatic duct, requires powerful proteolytic activity by mixing with it a soluble calcium salt and incubation.—B.M.J. II./66, 1787.

Test.—2 Cc. together with 0.2 Gm. of Sodium Bicarbonate and 20

Cc. of water added to 80 Cc. of Milk and the mixture kept at 113°F. 1 hour; coagulation should no longer occur on adding Nitric Acid.

Pancreatic infiltration cured by Pancreatic Extract.—L. ii./04,1694.

In certain forms of severe glycosuria depending on excessive activity of the liver.—Batty Shaw, 187.

Pancreatic Juice and Glycosuria.—Pancreatic juice, according to Bunge, is the digestive fluid *par excellence*. Many animals are void of a gastric digestion, but all have something corresponding to pancreatic juice. Dextrose, as far as experiments go, is the best tissue food. The internal secretion of the pancreas determines its utilization by the organism, though how is not exactly known. The pancreas is an important connecting link.—B.M.J. ii./08,584.

Ⓟ ***Trypsogen** is a proprietary preparation for the treatment of diabetes on these lines said to contain the enzymes of the Islands of Langerhans, tryptic and amylolytic ferments, also gold bromide $\frac{1}{100}$ grain and arsenic bromide $\frac{1}{200}$ grain.—See also N.N.F.

Severe glycosuria is in some way due to failure in the pancreatic functions, possibly of an internal secretion. This may come about in various ways,—(a) chyme entering duodenum, &c., may not be acid enough to change the prosecretin into secretin, (b) absence of secretin from the intestinal mucosa, (c) loss of function of cells producing internal secretion, *i.e.*, disease of the pancreas. Pancreatic Extract in Capsules insoluble in the stomach was tried, and when the acute symptoms subsided Secretin (in 1 grain Tablets) was given to try and stimulate the damaged pancreas.—L. i./09,609.

Glycerinum Pancreatis, *Martindale*, a digestive preparation made from the pig's fresh pancreas.

Dose.—1 to 2 drachms (3·5 to 7 Cc.) = $\frac{1}{4}$ to $\frac{1}{2}$ drachm of the above.

***Liquor Pancreaticus** (Benger's).

Dose.—1 to 2 drachms (3·5 to 7 Cc.) in water with meals to aid intestinal digestion, or with farinaceous gruel, when cool enough to sip. As an addition to nutritive enemata, a dessertspoonful should be added to beef tea or milk gruel just before its administration. Will not keep diluted, and presence of acidity or heating over 140° F. destroys the ferment.

N.F. gives the following:—Triturate Pancreatin (U.S.) 128 grains, with Sodium Bicarbonate 6 drachms, and Water 10 ounces, add Alcohol (U.S.) $\frac{1}{2}$ ounce, Compound Spirit of Cardamom N.F. $\frac{1}{2}$ ounce, and Talc 120 grains. Shake well and filter, adding Water to 12 ounces, then Glycerin 4 ounces.

Each drachm represents 1 grain of Pancreatin.

Spiritus Cardamomi Compositus, Compound Spirit of Cardamom, N.F. Dissolve Oils of Cardamom 4, Caraway 1·5, Cinnamon 1, in Alcohol (U.S.) 1000, add Glycerin 130 and finally Water to 2000.

Incompatibility.—All the liquid preparations of the combined ferments of the pancreas and the stomach are quite devoid of the ferments in question after two or three weeks. Pepsin in a slightly acid medium gradually destroys pancreatic ferments.—C.D. i./08,133.

The American Medical Association took this point up with the manufacturers of such liquid articles early in 1907. The Council on Pharmacy and Chemistry refuses to approve them.—Am. Jl. Ph., March '07,131.

Peptonised Milk (*v. also* Peptonising Powders, p. 515).

Mix two-thirds of a pint of fresh milk with one-third of a pint of water, and warm in a saucepan to a temperature of about 140° F. (or the

diluted milk may be divided into two equal portions, one of which may be heated to the boiling point and then added to the cold portion, the mixture will then be of the required temperature. Add two teaspoonfuls of *Liquor Pancreatis*, and half a level teaspoonful of sodium bicarbonate. Pour the mixture into a covered jug and place in a warm situation for ten to twenty minutes, then boil the product. It can then be used like ordinary milk. Gruel can be similarly treated. See also *Peptonoids of Beef for Enema*, pp. 527, 528.

In the place of the water half a pint of lime water may be used to the pint of milk. The preparation if desired for early use may be kept at 15° C. for three or four hours; need not necessarily be boiled.

For infant feeding, Fresh Cow's Milk $\frac{1}{2}$ pint, Malt Extract 1 teaspoonful. Pasteurise the milk in a bottle, and after cooling 10 minutes add the Malt Extract; boiled water or lime water may be used in customary manner as diluent. The casein is prevented from curdling and the caseinogen modified. Fine flocculi are produced in the stomach, easily acted on.—*L.i./o6*, 1013. Perhaps a little more malt would be better.—W.H.M.

Peptonised Beef Jelly (Benger).

A restorative extract of beef containing much of the fibrin converted into peptone or partially digested by pancreatic trypsin.

Chicken Jelly is also made.

Pancreatic Emulsion of Fat.

Prepared by mixing and pounding the pancreas of the pig with lard and water, straining, and exhausting the strained substance with ether. The ether forms a solution of pancreatised fat. From this the ether is distilled, and the fat mixed with a mixture of rectified spirit and water (1 to 3) and emulsified by agitation. Oil of cloves is added to flavour and preserve it.

Dose.—1 to 3 drachms, in a little milk or water, with a little spirit added, if liked, once or twice a day 1 or 2 hours after a meal. Given in consumption and other wasting diseases attended with loss of power to digest and assimilate food, especially where fats and cod-liver oil do not agree with the stomach.

Peptonising Powders.

Pancreatic enzymes mixed with sodium bicarbonate, in glass tubes. Place the powder into a clean quart bottle with $\frac{1}{4}$ -pint of cool water, add a pint of fresh milk, and shake. Place the bottle in warm water for ten minutes, then pour the milk into a saucepan and heat quickly to boiling and allow to cool sufficiently for use. If desired, smaller proportional quantities may be utilised.

Uses.—In gastric ulcer, intestinal catarrh, for infants' use generally—and in all forms of weakened digestive functions.

Peptonising Powder for humanising Milk. Martindale.

To peptonise milk and simultaneously to increase the Lactose content, lactose 400 grains containing a small proportion of Pancreatin and Sodium Bicarbonate may be added to $\frac{1}{2}$ pint each of milk and old water mixed and three to four table-spoonful of cream. Allow to stand at about 40° C. for about 15 minutes and boil or heat the mixture in such a manner that it shall take ten minutes to reach the boiling point. Milk so treated must be kept in a cool place. To be slightly warmed again in feeding. In some instances a further dilution, *e.g.*, milk 1 to water 2 may be necessary. The result very closely approximates 6.3% Lactose, *i.e.*, the usual content in human milk.

After severe hæmatemesis 15 to 20 ounces of Peptonised Milk as

enema is often necessary. Patients may not have food or water by the mouth—suppurative parotitis may develop in consequence. A rubber teat will promote flow of saliva to bathe the glands.—B.M.J. ii./09,1297.

Pankreon.—A proprietary preparation. Tablets $\frac{1}{2}$ grain each to be taken with meals. In marasmus with fatty diarrhoea.

Trypsin. *Dose.*—8 to 20 grains (0.52 to 1.3 Gm.).

Trypsin is stated to be produced simultaneously with Amylopsin, and from the same cells in the pancreas. This ferment is prepared commercially in the form of whitish powder, possessing an odour like pepsin. It changes proteids into peptones in alkaline media. It is inactive at 75° C. One part should peptonise about 100 of coagulated egg albumin in 1½ hours.

Soluble slightly in water, more so in glycerin.

It is administered to assist digestion in diabetes, and it is occasionally employed for peptonising milk. It may be given in keratin-coated pills. For cancer treatment, *v. infra*.

Commercially it always contains some Amylopsin—indeed for beneficial action the combination of Trypsin and Amylopsin seems essential.

Preparation. Precipitate an infusion or extract of the pancreas with a large volume of alcohol, dissolve in ice cold water and precipitate again with Absolute Alcohol. Digest the precipitate with Absolute Alcohol, then treat with water; the residue dissolves, consisting principally of Albumin, Trypsin, Tyrosine, and Leucoid (a proteid). Treat the solution with Acetic Acid until this amounts to 1%—this throws out the leucoid. Filter and render slightly alkaline with Sodium Hydroxide and concentrate at not exceeding 40° C. Filter out Tyrosine, which separates. Add Alcohol to the filtrate, which throws out the Trypsin (somewhat impure). It may be purified by repeated solution in water, dialysis, reprecipitation, &c.

Examination of Trypsin Preparations for Activity.—Trypsin acts in two stages—first, similar to Pepsin, converting proteids into proteoses and peptones, and secondly, breaking up these substances into further less complex bodies 'hexon bases.' It is important to have a **Standard Preparation** for hypodermic injection. As it is uncertain whether the first or the second fermentative phase is the more important consideration in this treatment a method of standardisation was evolved taking both the above-mentioned phases into account. For full details consult Ed. xiii., p. 580, or L. ii./07,1371.

Trypsin Treatment of Malignant Growths—

Normal tissues are resistant to its action, but its solvent power on cancerous growth can be demonstrated in a test tube. The use of Trypsin was stated to improve nutrition and to localise the growth.

Trypsin Injection produces anti-trypsin in excess of that present in the normal blood serum—this substance may be viewed as allied to the ferment-toxins produced by pathogenic organisms when in contact with organic tissues, which substance is chiefly concerned in the process of immunity. The ferments (*c.f.p.* 513) exist in a dormant form termed zymogens. They become 'active' when coming in contact with their specific 'exciters,' *e.g.*, the Hydrogen ions of Hydrochloric Acid in the gastric juice are thought to be 'exciters' of Pepsin-zymogen (shortened to pepsinogen). The name 'Secretin' (see Liquor Duodenalis) is applied to the result of the reaction between the 'Acid Chyme' from the stomach and the epithelial layer of the duodenum. It passes by the blood stream to the pancreas, where it excites the output of pancreatic juice.—Allen and Hanburys.

Internal doses of Trypsin are given before meals when the stomach is free from acid. Hydrochloric Acid would destroy it. The ferment will then be most likely to pass in an active state into the system.

Some of the earliest cases of cancer reported on were cases of cancer of the stomach in which, as is well known, Hydrochloric Acid is not produced by the stomach. The internal use of these ferments is subsidiary to the hypodermic treatment;

The following is a *résumé* of the treatment:—

Hypodermic Injection of Compound (i.e., with Amylopsin) Trypsin Solution.—The injection is made in sound tissue near the growth if possible, otherwise in flank or buttock. *To commence with, the dose is 15 minims, then 20 and 30 minims. At first one injection every alternate day, and later every day.*

Sterules, Hypodermic contain 30 minims of the Trypsin Solution, also (P) with Cocaine Hydrochloride $\frac{1}{10}$ grain.

*‘Holadin’ Capsules contain an extract of the entire pancreas, said to represent all the constituents both of the digestive and internal secretions.

Glycerinum Trypsini.—A concentrated (10%) Solution for dilution is supplied commercially. Five minims of 1 to 3% Solution, prepared by diluting this with water or Normal Saline, is injected. It is not possible to produce a Glycerole of the same strength from the powder usually supplied in commerce.

Pancreatin or Trypsin is given concurrently in increasing doses by the mouth, *e.g.*, as Glycerinum Pancreatis, *q.v.* or Liquor Trypsini in 1 to 2 drachm doses three times a day before meals, as accessory to the hypodermic injection treatment.

Cachets or Capsules of Trypsin 5 grains each, and with Ox Gall, 2 grains (which latter was said to strengthen the action of the Trypsin) are also prepared.

An Elixir Glandulæ Compositus (*v.* previous Edition p. 887) was used in conjunction.

Trypsin preparations used locally according to the situation of new growth. (a) Pigmentum Trypsini (*Syn.* LOTIO PANCREATIS, SURGICAL SOLVENT) for painting on ulcerated surfaces or used in poultices.

(b) Suppositorium Trypsini for use in carcinoma of the rectum.

(c) Trypsin Ovules with Theobroma basis for carcinoma uteri.

References to Trypsin in Therapeutics.

Mice with adeno-carcinoma treated with Trypsin. Theories of cancer;—either germinal nor somatic.—B.M.J. i./06,140,318.

Is incapable of curing mice inoculated with cancer, or of influencing the progressive growth of tumours. Imp. Cancer Research Fund.—B.M.J. ii./07,26.

The natural and comparative immunity of the duodenum and small intestine, together with the slower rate of growth in cancer of the large intestine, would appear in favour of treatment of inoperable cancer by preparations of the pancreas, bile salts, and intestinal gland extracts and ferments, alone or combined.—B.M.J. i./06,716.

Improvement under treatment.—B.M.J. i./06,240; i./07, 724; ii./07,9 (Bile Duct) 25; i. iii./07,319; B.M.J. i./08,80; M.P. Apl. 24/07,463.

Question of priority.—Board and Shaw Mackenzie. Consult Indexes.—B.M.J. i./08, and i./07. Against the ‘conquest’ with Trypsin.—B.M.J. i./08,36.

Bainbridge on results with Trypsin.—B.M.J. i./07,486,519.

Bainbridge in America reports on the use of Trypsin in cancer. The Clinical and Laboratory investigations in question extended over three years. For full summary of results with all the various preparations, see B.M.J. ii./09,220.

Leader on the work of these Investigations:

Diagnostic value of the Antitryptic Index damped by the fact that an increase in the power of the Serum to neutralise the activity of Trypsin

is not specific to cancer, but common to many infective diseases.' The New York investigation referred to above states that even the injection of the strongest solutions is not followed by toxic symptoms assignable to products of digestion of tissues. Amelioration of symptoms was as effectually obtained by sterilised distilled water. Trypsin does not cure cancer.—L. ii./09,1079.

Stricture of œsophagus treated with some success.—B.M.J. ii./08,1554.

Morton's results with 29 cases. Conclusions favourable (too lengthy to condense—this paper should be consulted by anyone seeking further information on the subject).—B.M.J. E.i./07,9.

Care in interpreting records necessary.—M.A. 1908,2,38.

Several cases treated with Trypsin Injection and Trypsin combined with Amylopsin. Results unfavourable.—L.ii./07,897.

'A stone rejected by the builder.'—B.M.J. i. 07,1446.

Sir Henry Morris came to adverse conclusion as to efficacy.—L. ii./08,997, 1232.

An investigation of the action of digestive ferments and tissue Extracts, hypodermically injected on malignant tumours in mice.

(1) Glycerin Extract of duodenal and intestinal mucosa.

(2) Glycerin Extract of liver, (3) Mixed Extract of intestinal mucosa and liver, and (4) Mixed Extract of intestinal mucosa, liver, and pancreas.

The results were not, as far as they went, condemnatory of the whole theory of intercellular ferment action.—Shaw Mackenzie, L. i./09,1596.

Injections seem to favour the healing of suppurating tuberculous wounds.—B.M.J.ii./08,522.

Detection of trypsin in the fæces to assist diagnosis of pancreatic disease. Rub up a small quantity of the fæces with Glycerin, place on a serum plate and incubate at 55° to 60° C. for 24 hours, and note occurrence of depression in the medium. The reaction is not due to Pepsin.

The amount of ferment was found to be distinctly greater in loose stools or diarrhœa, indicating that probably owing to the increased peristalsis the reabsorption or destruction of ferment is hindered and an increased quantity voided.—L. i./09,184.

PAPAIN.

Syn. PAPAYOTIN.

Dose.—1 to 8 grains (0·065 to 0·52 Gm.).

Whitish, amorphous powder, prepared from the juice of the Papaw, *Carica Papaya*. 75% should be dissolved by absolute alcohol.

Uses.—Is given as a digestive in chronic cases of indigestion and dyspepsia, with acid eructations and painful gastric fermentation, and should peptonise milk as quickly as pancreatin. It acts in acid, alkaline, or neutral media, has the property of digesting fibrin like pepsin (as much as 200 times its weight in some cases). Acts best in a slightly acid medium.—J.C.S.A. Apl.1906,328; L. i./06,1049.

Ulcers and fissures of the tongue painted with a solution of Papain 1 to 2 in 10 each of glycerin and water recommended.—L. ii./93,26.

Is a vermifuge destructive to ascarides and tœnia.

In inoperable cancer, injections 5 to 20 minims (according to size of nodule or tumour) of 1 in 5 Emulsion of Papain in distilled water. 20 minutes after local anæsthesia had been produced by $\frac{1}{2}$ grain Cocaine Hydrochloride. Satisfactory.—B.M.J., i./07,135; M.A. 1908,27.

Elixir Papain. *Martindale.*

Dose.—1 drachm (3·5 Cc.) with meals.

Glycerinum Papain: *Martindale.*

Dose.—1 drachm (3·5 Cc.) with meals as digestive.

Forms a useful mode of administration. Also as a pigment for chronic eczema and warts, and has been applied to diphtheritic exudation. A strong solution will remove some tattoo marks.

Tablets, 2 grains (0·13 Gm.). *Dose.*—1 or more.

Trochisci Papain ($\frac{1}{2}$ gr.)—With meals for dyspepsia.

Trochisci Papain ($\frac{1}{2}$ gr.) **et Cocainæ** ($\frac{1}{10}$ gr.) These, if slowly sucked, are useful for ulcers, warts or sores on tongue, &c.

Pulvis Papain Compositus. E.L. *Dose.*—5 grains. Papain 1, Sodium Carbonate 2, Sugar 2.

Liquor Papain et Iridin.

Dose.—2 to 4 drachms (7 to 15 Cc.). Papain 120 grains, Iridin 2 ounces, Glycerin 2 ounces, Sherry 5 ounces, Chloroform Water to 1 pint. Macerate 7 days and filter.

The above we found best of several formulæ in Ph. Form., 1908, p. 918.

PARAFFINA.

The Paraffins used in pharmacy are arranged in order of consistency, commencing with the Hard (*Off.*), then follow the Soft (*Off.*)—vaseline and similar bodies and unctuous compounds, then the vaseline oils (thick fluids), then the official Liquid Paraffin, and finally the light fractions known as Amyl Hydride, Petroleum Spirit, &c.

Paraffinum Durum, (*Off.*).—*Syn.* PARAFFIN WAX

A mixture of several of the harder members of the paraffin series of hydrocarbons $C_{20}H_{42}=280\cdot2$ (282·336 I. Wts.) to $C_{27}H_{56}=377\cdot57$ (380·448 I.Wts.); obtained by distilling shale, separation of the liquid oils by refrigeration, and purification of the solid product. Is colourless, semi-transparent, crystalline, inodorous, and tasteless, slightly greasy to the touch. Sp. Gr. 0·82 to 0·94. Insoluble in water, slightly soluble in absolute alcohol, soluble about 1 in 80 in ether. It melts at 130° to 135° F., and burns, but not without a wick, with a bright flame, leaving no residue. Hard paraffins are supplied with the following melting points:— 100° , 104° , 110° , 115° , 120° , 125° , 127° , 130° , 135° F. Recently also as high as 140° to 142° F. were on the market.

U.S. requires paraffin melting at $51\cdot6^{\circ}$ to $57\cdot20^{\circ}$ C. ($124\cdot88^{\circ}$ — $134\cdot96^{\circ}$ F.). Is tested for stearic acid with fuchsin.

Ceresin. A hard white paraffin prepared from ozokerite, or earth wax; has melting-point about 130° F. When artificially coloured to resemble yellow wax it is sold as **Yellow Ceresin**. * Ozokerit is a hard paraffin obtained from Galician deposits.

Paraffin Solid, Sterilised.

For subcutaneous injection in plastic operations. This is used to improve the size and shape of the nose, ear, &c., where abnormal. It has been tried also as a means of checking prolapsus ani and prolapsus uteri, and in ophthalmic surgery. A certain consistence and melting point are important. Stephen Paget advises a compound melting between 110° and 115° F. Solid paraffin of any desired melting-point (some authorities on the other hand advise 105° F. and the injection to be made at 120° F.) can be obtained in sterile bottles covered

with a 1 in 2,000 solution of Mercuric Chloride. A special rubber-covered syringe is used to prevent cooling during injection, which is made at the rate of 1 Cc. every 10 seconds. The paraffin shrinks a little under the skin as it cools.—Pr. lxx, 195.

The bottle is placed in hot water to melt the contents, then it and the syringe are placed in water about 5° warmer than the M. Pt. of the paraffin. The syringe is filled and the needle warmed in very hot water to obviate the paraffin solidifying; the injection should be deep and carried out quickly. If of melting point 108° to 110° the injected mass will not wander. It does not become absorbed.—L. ii./08, 738.

Further account of treatment of nasal deformities.—B.M.J. ii./08, 1102.

Pleural effusion. Injection not only free from danger, but beneficial in some cases.—B.M.J. ii./08, 1075.

Acute epiphysitis of the lower end of the femur treated. Cavity after operation washed with strong Formalin and filled with sterilised paraffin.—L. i./09, 913. After 2 years X-ray photographs showed that the cavity had almost disappeared.

A new syringe for.—B.M.J. ii./07, 90.

If properly carried out, swabbing cavities in bone with, firstly, pure Carbolic Acid, then with a mixture of Gelatin 1, Formalin 1, Water to 100, finally thoroughly drying with hot air, Paraffin M. Pt. 120° is found to work well—it is apparently slowly absorbed and replaced by new bone, and is better than **Moorhof's Mixture**, which consisted of Iodoform 60, Spermaceti 40, Sesame Oil 40.—L. i./08, 155.

Paraffinum Molle, (Off.).—Syn. PETROLATUM, U.S. and PETROLATUM ALBUM, U.S., PETROLEUM JELLY.

A white or yellow semi-solid mixture containing some of the softer or more fluid members of the paraffin series of hydrocarbons $C_{15}H_{32} = 210.65$ (212.256 I. Wts.) to $C_{20}H_{42} = 280.2$ (282.336 I. Wts.). Melts at 96° to 102° F., 35.5° to 38.9° C., or even somewhat higher (U.S. requires 45° to 48° C.); is usually obtained by purifying the less volatile portions of petroleum.

It is known in commerce by various fanciful names, e.g., *** Vaseline**. This if filtered through animal charcoal, becomes **Vaselinum Album**.

This is the **Vaseline Officinale** or **Pétroléine** of the Fr. Cx.—that which remains over after distilling American Petroleum at 360° C. and purifying 2 to 5% 'Paraffin' is directed to be added according to season or climate to improve its consistence.

Salvo Petrolia (white and yellow) is similar.

Soft paraffin is bland, inodorous, and tasteless. It is unchangeable—cannot oxidise or become rancid, and thus set up irritation. It is not affected by mineral acids or caustic alkali.

Huiles Lourdes de Pétrole. Fr. Cx.

Heavy Petroleum Oils,—products from American Petroleum. Distilling between 280° and 400° C. Sp.Gr. 0.880 to 0.905.

Soluble in alcohol slightly, freely in ether and chloroform, insoluble in water. When melted, it combines with oils, and many waxes, oleates, and oleic acid. It readily dissolves thymol, menthol, and salicylic acid; chrysarobin and phenol about 1 in 20; the alkaloids dissolve in it in about the following proportions:—atropine, 1 in 120; cocaine, 1 in 100; morphine, 1 in 200; quinine, 1 in 80; and veratrine, 1 in 80. The oleic acid solutions of these dissolve in it in all proportions.

Soft paraffin is not readily absorbed, but is emollient, protective and useful for surface action, e.g. for compounding with lead, mercury, zinc, and sulphur iodide.

A small quantity of wool fat added to soft or liquid paraffins enables the production of a stable Emulsion, *vide* **Vasenol**.

Ceratum Petrolei is a firmer basis and good protective.

Soft Paraffin (preferably white) 2 parts, Hard Paraffin (135° to 140°) 1 part. Melt and stir till cold in an evaporating dish.

Unguentum Paraffini, (*Off.*) is similar.

Hard Paraffin 3, Soft Paraffin 7. Prepared as above. (For white medicaments use white soft paraffin.) May be modified to meet the exigencies of climate and temperature (*Off.*).

A Hard Paraffin with somewhat lower melting point, *e.g.*, 115°—125°, would be better, but our experiments showed it is best to melt together and set aside to crystallise (or allowed to cool on the water bath) and then rub down again. A further suggestion is to modify the formula to Hard Paraffin 2, Soft Paraffin 6, Wool Fat 2.—C.D. i./06, 259. And another, to sieve such ointments.—C.D. i./06, 470.

Franklin suggested as alternative—

Soft White Paraffin 85, Pure Bleached Cerasin 15, or Soft White Paraffin 82, Paraffin Wax—M.Pt. 135° F.—8, Pure Bleached Cerasin 10. The latter is the whiter, but the first is the smoother. Good results were also obtained using 15% of Commercial Carnauba wax, but this was discarded as it is of uncertain composition.—L.ii./09, 315. P. J. ii./09, 130, 143. C.D. ii./09, 185.

'**Collapsubes**' of Vaseline with catheter and rectal attachments are suitable for uterine and rectal medication. The base may be medicated with antiseptics and astringents; for formulæ, *vide* Index.

Ceratum, U.S. White Petrolatum 20, White Wax 30, Benzoated Lard 50. Melted together and stirred until the cerate congeals. In hot seasons and warm latitudes, White Wax 5 may replace 5 of Benzoated Lard.

Dental Wax. Beeswax 6 ounces, Hard Paraffin 1 ounce; melt together, add $\frac{1}{2}$ ounce Alkanet and keep warm for two hours, then strain and add Tincture of Tolu 2 drachms, Otto of Rose 5 drops. Generally supplied in sheets $6\frac{1}{2}$ by $3\frac{1}{2}$ inches.

Dental Use.—The sheet is warmed over the flame and moulded carefully over the model. It is used for mechanical purposes prior to vulcanisation.

Vaseline Oil.—*Syn.* LIQUID VASELINE.

Under this name a semi-liquid mixture of paraffins of low melting-point is used as a vehicle for **Hypodermic Injections**. For the suspension of insoluble mercurial salts, such as calomel, salicylate, succinimide, thymol-acetate, and yellow oxide of mercury, 1, 5, or 10% mixtures being employed. **Oleum Petrolei Flavum** is a commercial article of similar consistence, but yellow in colour.

Vaselin Oil, 'Vaseline Liquide' Fr. Cx. is prepared from Caucasian Petroleum by purifying the fractions between 335° and 440° C. Sp. Gr. about 0.875 *i.e.* it approximates *Paraffinum Liquidum* (*Off.*) in character. It has to conform with a Sulphuric Acid Test. Employed in Huile Grise. *q.v.*

Emulsio Petrolei cum Hypophosphitibus. *Martindale*.

Dose.—1 to 4 drachms (3.5 to 15 Cc.).

Some experiments conducted by us in 1907, with a view to making a satisfactory 50% Emulsion, gave the following as the best of a number tried.—Rub Powdered Gum Acacia (good) 4 ounces with Liquid Paraffin 8 ounces, Soft White Paraffin 2 ounces, Cinnamon Oil 24 minims. Then add in 2 portions a solution of Sodium and Calcium Hypophosphites of each 192 grains, Saccharin Elixir 90 minims in Water 10 ounces.

One may also use equal parts of Liquid and Soft Paraffin if desired but the result is a thick emulsion.

Emulsio Petrolei Composita. *Gt. Orm. H.*

Liquid Paraffin 20 minims, Sodium Benzoate $1\frac{1}{2}$ grains, Calcium Hypophosphite $1\frac{1}{2}$ grains, Acacia 10 grains, Tragacanth $\frac{3}{4}$ grain, Essential Oil of Almonds $\frac{1}{8}$ minim, Chloroform Water to 1 drachm.

Petrolatum, U.S.

A yellow unctuous mass (mixture of the hydrocarbons, chiefly of the methane series) having a melting point of 113° to 118.4° F. and when liquefied and brought to temperature of 60° C. has Sp. Gr. 0.820 to 0.850. In addition there is Petrolatum Album U.S. which is purified.

Paraffinum Liquidum (*Off.*). — *Syn.* OLEUM PETROLEI. PETROLATUM LIQUIDUM, U.S., P. AUSTR. (Sp. Gr. 0.880.) Chrismaline, ★ Paroleine.

A clear oily liquid, obtained from petroleum after the more volatile portions have been removed by distillation. Sp. Gr. 0.885 to 0.890 (too high for spraying as also for 'Toilet Paraffin,' is preferred with gravity 0.865 to 0.870), boils not below 680° F. (360° C.). U.S. gives larger range of Sp. Gr.,—0.870 to 0.940° at 25° C.

It is used as a basis for laryngeal and nasal spray solutions or pigments, containing menthol (1 in 8 or more), cocaine (soluble only 1%) or other medicaments. *It should be particularly noted that both the alkaloidal bases and their salts are in general only very slightly soluble in any of these liquid paraffins.*

A little Oleic Acid in the case of the alkaloids assists solution.

In colitis in children paraffin is of benefit.—L.i./o6,94.

An excellent catheter lubricant. Undoubtedly inhibitor of microbial activity.—B.M.J. ii./o9,300.

It may be used in place of Cedar Wood Oil for lens immersion.—Rowntree.

Capsules (Gelatin) with pointed ends of **Sterile Liquid Paraffin** are made for lubricating catheters, &c.; they contain 30 minims.

Paraffin and Agar in constipation.—West Ldn. Med. Jl., Apl. 1906.

The various **Lubricating** and **Lighting Oils**, *e.g.* Kerosene-fractions between 120° and 133° C., and **Mineral Naphtha** (to be distinguished from Solvent Naphtha *q.v.*), are the next fractions, and are mentioned here to render the series more complete.

Huile de Pétrole, FR. Cx. has Sp. Gr. 0.800 distilling between 130° and 180° C. from American Petroleum. Flash point not lower than 35° .

Favus cured in less than a month by soaking with the Petroleum of commerce.—B.M.J. i./o9,1297.

Baillie (Automotor JI., May 23, '08) describes '**Petrol**' and **Petrol Tests** fully. Fractionation shows sophistication. A uniform B.Pt. and Sp. Gr. to the last residue is the ideal. A good petrol had Sp. Gr. 0.680 to the last 10%, which was 0.715. The B.Pt. of this was about 75° C.—all being over at 85° C. (the last 10%). '**Motor Spirit**' may have given fractions with larger ranges of Sp. Gr. and B. Pts.

Petroleum Benzine or **Benzoline** is the fraction between 60° and 90° C. This substance is used for cleaning purposes. It must be carefully distinguished from Benzene, the product obtained from Coal Tar, *q.v.* p. 246.

Petroleum Spirit. *Syn.* PETROLEUM ETHER (*Off.*) *used for heating cauteries.* Has Sp. Gr. 0.67 to 0.7, and distils over below 60° C. $C_5H_{12}=71.55$ (72.096 I. Wts.) principally. A further variety is are known as **Rhigolene** (boiling between 20° and 40° C.)

Benzinum U.S. is Petroleum Benzin—the distillate consisting of hydrocarbons chiefly of the Marsh Gas Series C_5H_{12} , C_6H_{14} and homologues, boiling at 45° to 60° C. **Benzinum Purificatum** U.S. is the

latter treated with potassium permanganate in acid, then in alkaline solution.

Benzine (preferably spelt *Benzin*) means *Petroleum Benzine*. There is no confusion in America.—C.D. ii./08,144. c.f. p. 246.

Æther Petrolei, P. Austr. has Sp. Gr. 0.64 to 0.67; Ph. Ned., and P. Helv. 0.65 to 0.67; *Petroleinum*, P. Belg. and P. Jap. have Sp. Gr. 0.64 to 0.67. Boils at 50° to 75° C. FR. CX. has with *Syn. Gazoline*, Sp. Gr. 0.65 to 0.67, and to distil over entirely below 85° C. *Ligroin* is a very similar product.

Pétrole léger. FR. CX. has Sp. Gr. about 0.6, and distils entirely below 50° C.

Amyl Hydride. *Syn.* PENTYL HYDRIDE; PENTYLENE; HYDRAMYL. Obtained by the fractional distillation of Petroleum Spirit. Sp. Gr. 0.625 to 0.649, boiling point about 86° F. (30° C.). It is very inflammable; applied locally, it is not absorbed, but rapidly freezes the part by evaporation.

Chemical examination of petroleums.—C.D. i./05,776.

Poisoning by Petroleum Benzin treated with Camphor injections and oxygen inhalation.—B.M.J. ii./09,5.

Oleogen contains Oleic Acid, Yellow Petroleum Oil, with a proportion of Ammonia. A clear yellow oily preparation. Sp. Gr. 0.91. It is miscible with Chloroform in all proportions. In this preparation the mixture of Oleic Acid and Petroleum Oil is not subjected to the action of Oxygen, and so differs from the patented *Vasogen*, v. below.

Oleogen Camphor. 20% Rubefacient.

Oleogen Guaiacol. Contains 20%. Antituberculous.

Oleogen Ichthyol. 10% Antiseptic used in skin diseases.

Oleogen Iodi. 5% and 10% Iodine. Antisyphilitic.

In tinnitus aurium should prove of value—a few drops to be rubbed extensively behind the ear night and morning.

Oleogen Menthol. 2% Rubefacient. Antineuralgic.

Oleogen Salicylicum. 10%.—Antirheumatic.

These (liquid) Oleogen compounds are special preparations useful for introducing the various medicaments mentioned into the skin by inunction. They are rapidly absorbed.

Vasenol. An emulsion of Soft Paraffin and Spermaceti, containing Soft Paraffin 28 ounces, Cetaceum $\frac{3}{4}$ -ounce, Water 8 ounces. Forms a useful ointment basis.—B.M.J. ii./04,1414; L. i./05,1396. Mixes with water forming a neutral emulsion. It is readily absorbed.

Vasogen.

'Oxygenated Petroleum' containing Ichthyol 10%, Iodine 6 and 10%, Sulphur 3% (Vasothion), and other substances for skin medication.

Mineral oils are treated with oxygen under pressure, alkalis added, and when necessary Oleic acid. Mineral oils Sp. Gr. 0.9 should be used. When vaseline oils are used the products are called *Vasolina Oxygenata-Vasogene*. Ceresin, paraffin and wax may be added.

When Vasogen is ordered the ointment base is intended. Vasogen compounds are in a fluid form, but vasogen ointment-base can, of course, be mixed with any drug by the dispenser.

★**Valsol** is a liquid preparation on similar lines.

Parogens (*Syn. Vasoliments*) are similar, and are made from a basis of Liquid Paraffin 40, Oleic Acid 40, Ammoniated Alcohol (5%) 20, shaken together to make a clear liquid. **Thick Parogen** is also used = Hard Paraffin 12, Liquid Paraffin 48, Oleic Acid 30, Ammoniated Alcohol (10% strength) 10. Ⓢ Parogen Chloroformi Camphorat. Camphor 7·5, Chloroform 5, Parogen 7·5; Creosote 5%; Empreumatic Oil of Cade 25%; Eucalyptol 20%; Guaiacol 20%; Ichthyol 10% Hydrargyri Mercury 40, Wool Fat 20, Thick Parogen 60; Iodine 10, Oleic Acid 40, Liquid Paraffin 40, Ammoniated Alcohol (10%); Iodine Diluted, 60% of the latter; Iodoform 1·5%; Iodoform Deodorised and Eucalyptol each 1·5%; Menthol 2%; Naphthol 10%; Tar 25%; Salicylic Acid 10%; Sulphur, *i.e.*, Sublimed Sulphur 3, Linseed Oil 37%; Sulphur Compound, of the last mentioned 10%, Oil of Cade 10%, Thymol 0·3%, Eucalyptol 3%, Oil of Turpentine 30%; Turpentine, Venice Turpentine factitious 20% are also made.—P.J.i./c6,618; L. i./o6,1853.

AUSTRALIAN FORMULARY obviates Alcoholic Ammonia by using Absolute Alcohol 20 in place of it in above formula and adding Strong Solution of Ammonia 3j.

Mix the paraffin and alcohol, add the ammonia, shake vigorously and add oleic acid, continuing the agitation for several minutes.

Lotio Paraffini Composita. Gt. Orm. H.

Soft Paraffin 3 ounces, Balsam of Peru 2 drachms, Mercuric Oleate 60 grains, Olive Oil 1½ ounces. To be applied with a stiff brush. For parasitic skin diseases.

PELLETIERINA.

$C_8H_{15}NO = 140\cdot10$ (141·13 I. Wts.).

Dose.—3 to 6 grains (0·2 to 0·4 Gm.).

An alkaloid, or mixture of alkaloids (*see* Tannate below obtained from pomegranate stem and root bark, *Punica Granatum* (both of which are official), ('Granatum' U.S.) (*Lythraceæ*), in minute shining white crystals. The alkaloids are at least four in number, their amount varies between 0·5 and 0·7%. In addition 20% Tannin.

Estimation (volumetric and gravimetric) of alkaloids in.—P.J. ii./o5,580.

Fluidextractum Granati, U.S.

Average dose.—30 minims (2 Cc.). 1=1. A glycono-hydro-alcoholic extractive.

Pelletierinæ Sulphas, Punicine Sulphate. (FR. CX.).

$(C_8H_{15}NO)_2H_2SO_4 = 377\cdot54$ (380·346 I. Wts.).

Dose.—5 to 8 grains (0·32 to 0·52 Gm.).

A brown syrupy liquid, freely soluble in water, sometimes as crystalline mass. As a remedy for tape-worm; 5 to 8 grains taken fasting, followed by a full dose of compound tincture of jalap; for 13 years, half the above dose, and for infants one-tenth.

FR. CX. provides complete method of manufacture from the pomegranate root bark. In the final stage of extraction the combined pelletierine and isopelletierine are present as sulphates in aqueous solution which on slow evaporation yield a 'crystalline residue' of the two salts. The mixture is called 'Pelletierine Sulphate' for short. The dose is usually 0·3 Gm. with 0·4 Gm. of Tannin and 2·5 Gm. of Syrup. Max. single dose is 0·4 Gm.

Pelletierinæ Tannas, U.S.

Dose.—5 to 8 grains (0·32 to 0·52 Gm.).

A greyish powder only slightly soluble in water, but soluble about 1 in 80 of alcohol 90%. In tapeworm is an efficient remedy. As a tœniacuge,

8 grains followed in 2 hours by an ounce of castor oil proved an effectual dose, causing neither colic nor headache.—L. ii. 94, 1273.

According to U.S. is soluble in Water 235, in 12·6 of Alcohol 90%, and in 300 of Ether at 25° C.

Tannate of pelletierine as an anthelmintic.—L. i./10, 386.

Pelletierinæ Hydrobromidum.

$C_3H_{15}NO, HBr = 220\cdot45$ (222·058 I. Wts.).

Dose.—5 to 8 grains (0·32 to 0·52 Gm.) is a brownish viscid liquid.

PEPSINUM (*Off.*) and U.S.

Dose.—5 to 10 grains (0·32 to 0·65 Gm.) either with or immediately before or after meals, in a pill or cachet. It is not unpalatable sprinkled on meat like pepper.

The gastric juice of man is believed to contain two distinct digestive ferments:—

- a. *Pepsin.* This changes proteids (fibrin, albumen, &c.) into peptones in an acid medium, 0·2% of Hydrochloric Acid being the most advantageous. To this the medicinal pepsins owe their activity.
- b. *Curdling ferment,* which curdles the casein of milk; this is very active in the stomach of the calf, and will permit of its being dried; it is contained in the preparations of rennet preserved with salt, known as:—

Essence of Rennet. *Syn.* *Liquor Seriparus, LIQUID RENNET*

Dissolve Sodium Chloride 40 in water 810, add Alcohol U.S. 190, and macerate Rennet (calf's stomach) 100 in the mixture for three days with frequent agitation then filter.—N.F. Ph. Form. gives three other formulæ—one with Glycerin and Boric Acid as preservatives—to be referred to.

A modified formula by Wyatt.—P.J. ii./08, 360.

Rennin. Rennet Ferment in powder form. One grain dissolved in about $\frac{1}{2}$ ounce of water will in an hour or two curdle a pint of milk under ordinary conditions. (To be kept at blood heat.)

Rennet Tablets are prepared and are of considerable convenience. One will curdle a quart of milk.

Pepsin (*Off.*) is a light yellowish brown or white powder, or in translucent grains or scales, prepared by drying under 100° F. the fresh mucous lining of the stomach of the pig, sheep, or calf. It has a faint, not disagreeable, odour, is moderately soluble in water and B.P. states soluble 1 in 100 of alcohol (90%); rubbed with water, it makes a glairy mixture. *Pepsina Porci* is generally preferred. Pepsin is supplied to dissolve 2,500, 3,000 (U.S.), and 5,000 times its weight of freshly coagulated and disintegrated white of egg.

The official test modified in several useful points, to overcome the difficulty of weighing 0·005 Gm. of pepsin. Triturating the white of egg so as to break it up as fine as possible and shake frequently every 15 minutes.—P.J. ii./04, 376.

Ph. Cx. requires that the Pepsin shall convert 25 times its weight of dried fibrin. Pepsin 0·1, Dilute Hydrochloric Acid 1·5, Water 58·5, Fibrin 2·5 for 6 hours at 50°. Test filtrate with Nitric Acid. Pepsin Amylacæe and Pepsin Lactosæe in dose 0·25 Gm. are to contain sufficient Pepsin to carry out the above test.

Assay of Pepsin by the Biuret reaction.—P.J. i./07, 198; C.D. i./07, 360.

Carmino-fibrin, prepared by washing blood fibrin with ammoniacal solution of carmine, is a dark coloured mass, easily crumbled, which yields no colour

to water or 0.1% Hydrochloric Acid until the fibrin contained in it has been dissolved by a ferment; hence its use as a simple quantitative test for pepsin by noting the time required to give a pink colour equal to that of a standard or control.

Incompatible with alkalis (instantly destroy it) alcohol, all tinctures, alkaline Bismuth Solutions and with Morphine (*cf.* p. 185). See also J. F. Tocher.—P.J. ii./06,88.

Ammonium Sulphate and Sodium Chloride are stated to inhibit the action of Pepsin as also Tannin, Alkaloids, Carbohydrates and Bile Juice.

The effect of various acids on the activity of Pepsin is in accord with their degree of dissociation, being a measure of the number of hydrogen ions present. Caffeine and Theobromine on the other hand increase the action of Pepsin.

Trypsin in neutral solution gradually destroys Pepsin. Sodium Chloride in more than a minute proportion is also stated to prevent its action.

Flavoring.—Syl Lavandulæ, Syl Coriandri, or as Elixir Pepticus. Soluble and Insoluble Pepsins (Commercial).

Insoluble Pepsins are of two kinds, one precipitated by salt, and one made directly from the selected membranes without digestion, but purified by washing in spirit. These require a small quantity of Hydrochloric Acid to effect solution in water.

Soluble Pepsin is made by self-digestion of the membranes and subsequent dialysis of the resulting Peptone, thus leaving the peptic power in a soluble and more isolated form. It is then dried on glass plates, being sold in scale or powder form.

In sprue and hill diarrhœa with good results.—B.M.J. ii./05,1519.

Glycerinum Pepsini (*Off.*).

Dose.—1 to 2 drachms (3.5 to 7 Cc.) in water.

Glycerin 525, Distilled Water 260, Hydrochloric Acid 10. Mix and add Pepsin 80. After a week decant or filter, and add Distilled Water *q.s.* to 875. (=Pepsin 1 in 12); is a very active solution.

It is better to dissolve the Pepsin in the water, add the glycerin in 3 or 4 lots, and finally the acid. Amount of pepsin should be less.—P.J. i./04,84. If made with good scale Pepsin keeps indefinitely.

Elixir Pepticus.

Dose.— $\frac{1}{2}$ ounce after each meal.

Glycerin of Pepsin 8, Dilute Hydrochloric Acid 1, Aromatic Syrup to 32.

Liquor Pepticus (Benger's).

Dose.—1 to 2 drachms (3.5 to 7 Cc.) in a wineglassful of water with meals. An active solution of the ferments in weak alcohol.

Liquor Pepsini et Caffeinæ. Martindale.

Dose.—2 to 4 drachms in water after meals.

The above dose contains 5 to 10 grains of Pepsin with 1 to 2 grains of Caffeine.

As a digestive and restorative. The presence of Caffeine is stated to increase the activity of Pepsin.

ⓅElixir Pepsini Bismuthi et Strychninæ.

- *Dose.*—1 drachm (=Pepsin $\frac{1}{2}$ grain, Bismuth and Sodium Tartrate 2 grains, Strychnine $\frac{1}{4}$ grain).

Dissolve Scale Pepsin 64 grains in Glycerin 1 ounce, Water 1 ounce, mixed. Dissolve separately Strychnine 2 grains in Tartaric Acid 2 grains, Water 3 ounces and add Glycerin 1 ounce. Then mix with Glycerole of Bismuth and Sodium Tartrate 2 ounces, and add Aromatic Elixir 8 ounces, and Caramel 4 drops. Finally, pour the Pepsin Solution first prepared into the other liquid.

To prepare the **Glycerole of Bismuth and Sodium Tartrate**, dissolve Bismuth Subnitrate 1,142 grains in Nitric Acid 19 drachms, previously diluted with Water 10 drachms. Then add in parts, Water 16 ounces. Add Tartaric Acid 860 grains, and then gradually Sodium Bicarbonate 917 grains. Dilute the Bismuth Tartrate formed with Water 32 ounces. Allow to deposit, and wash repeatedly until free from Nitric Acid. Mix Sodium Bicarbonate 977 grains with Water 5 ounces, and add cautiously Tartaric Acid 860 grains, warming slightly to dissolve. Dissolve the Bismuth precipitate in this Solution, add Glycerin 8 ounces. Evaporate or dilute with Water if necessary to 16 ounces. Each drachm contains 16 grains of Bismuth and Sodium Tartrate with excess of Sodium Tartrate.—Caspari. Looks better coloured pink.—W.H.M.

Pepsinum Saccharatum, U.S. (1890.)

Dose.—60 to 100 grains.

Pepsinum U.S. 1, Milk Sugar 9. Resembles that of P. Jap.

Pepsin with Diastase. *Dose.*—2 drachms to $\frac{1}{2}$ ounce.

Of agreeable flavour, containing both the albuminoid and starch-converting ferments.

*** Pegnine.** A lactose and rennet preparation.

Prevents the coagulation of milk without changing its taste, but cannot be held to be harmless towards an ulcerating surface.—B.M.J.E. ii./08,31.

Peptone.

A whitish powder, prepared from meat (the proteids and albuminoids), peptonised either by acidulation and heat under pressure, or by artificial digestion with pepsin or trypsin, and freed from saline matter. It is soluble in water, and is used for culture media, and as a bile test (*q.v.*).

Peptonised Beef.

A chocolate-coloured paste, having a bitter taste and the odour of extract of beef; prepared by artificially digesting beef by means of acidified fresh gastric juice and concentrating the solution. It is sometimes added to beef tea, but is too unpleasantly bitter to be readily taken by patients. It forms useful nutritive enemata and suppositories, *v. infra*.

Peptone F.E. is manufactured by digesting 1 kilo of beef with 10 litres of water (containing 4 Gm. of hydrochloric acid per litre) with pepsin 10 Gm. for 8 hours at 50° with frequent shaking. Termination of reaction shown by absence of precipitate with nitric acid on adding to a little of the filtered liquid. Evaporate 1 kilo yields 250 Gm. approximately.

Peptonised Beef Suppositories.

Contain 30 grains of the Peptonised Beef. As much as 2 ounces of proteids can be administered daily by this means.

The opinion has been expressed that albuminous material in the presence of salt is carried upwards by anti-peristalsis, but not when salt is absent. The point is, however, not yet settled with certainty. Fat, if used for rectal feeding, is best in the form of yolk of egg or milk. In the matter of carbohydrates grape sugar is useful. As to salts 1% sodium chloride is well taken up.—L. ii./06, 1265.

Enema Nutriens.

Yolks of two eggs, Pure Dextrose 30 Gm., Sodium Chloride 0.5 Gm., Pancreatised Milk to 300 Cc. To be slowly syphoned (not syringed) into the bowel by aid of a soft rubber catheter and small funnel. Observe large proportion of carbohydrates. Albuminoids only slightly absorbed by the rectum.—B.M.J. i./06, 634.

Enema Nutriens. St. M's H. has Pancreatic Solution 1 drachm Sodium Bicarbonate 10 grains, Yolk of 1 Egg, Beef Tea $1\frac{1}{2}$ ounces, Milk to 4 ounces.

Peptonoids of Beef (Gerrard).

Lean Beef, finely minced, 8 ounces, Pancreatin 60 grains, Sodium Bicarbonate 60 grains, Water 1 pint. Digest 3 hours at 130°F . with constant stirring; neutralise with hydrochloric acid, boil, strain and press. As enema 1 ounce with normal saline 3 ounces every 3 hours or *p.r.n.*

Beef Peptone with Malt.

Dose.—2 to 4 drachms. A palatable nutrient.

Tabellæ Pepsini. *Dose.*—1 or 2 with meals.

These have 3 grains of pepsin in each in combination with chocolate, they are portable and palatable.

Tabellæ Pepsini et Bismuthi. *Dose.*—1 or 2.

Have 3 grs. bismuth oxynitrate added to the above.

Tablets of Pepsin, compressed, 3 grains (0.2 Gm.).

Tabellæ Pepsini et Caffeinæ.

Contain 3 grains Pepsin with 2 grains Caffeine. *Dose.*—1 to 2 after a meal. Digestive and tonic.

Vinum Pepsinæ.

Dose.—1 to 2 drachms with meals.

U.C.H. has Pepsin 3, Diluted Hydrochloric Acid 3, Sherry 60, macerate 2 days and filter.

NOTE.—For sale without a Wine Licence in the United Kingdom, Pepsin Wines must contain 1 of Hydrochloric Acid (B.P.) in 80 of the total product.

* **Ingluvin.** *Dose.*—5 to 20 grains (0.32 to 1.3 Gm.) is a special Pepsin said to be prepared from the gizzard of the fowl; it has been chiefly used to allay the sickness of pregnancy.

PHOSPHORUS (*Off.*) U.S.

P = 30.8 (30.77 U.S. Wts.; 31.0 I. Wts.).

Dose.— $\frac{1}{100}$ to $\frac{1}{20}$ grain (0.00065 to 0.0032 Gm.). Fr. Cx. Max. single dose $\frac{1}{4}$ grain. Max. during 24 hours $\frac{1}{2}$ grain approx.

Manufacture.

Phosphorus is obtained by converting Calcium Phosphate into the soluble Superphosphate by heating with Sulphuric Acid; this is reduced to metaphosphate by heating with charcoal and finally by further heat is converted into normal Calcium Phosphate with evolution of vaporised Phosphorus.

A wax-like, semi-transparent, non-metallic, poisonous element melting at 110°F ., igniting at a slightly greater heat, and forming white fumes of phosphoric anhydride.

Antidotes.—The best is Oil of Turpentine, especially French variety (from *Pinus maritima*) 30 minims every half-hour; also Potassium Permanganate 1% Solution *per os*, Hydrogen Peroxide Solution, Magnesium Sulphate $\frac{1}{2}$ ounce. Copper Sulphate 3 grain doses, *see* List of Poisons.

Soluble about 1 in 320 of absolute alcohol, about 1 in 200 of ether, about 1 in 25 of chloroform, about 1 in 100 each of oleic acid, almond, olive, castor, theobroma oil, and suet; in half its weight of carbon bisulphide,

almost insoluble in water; combines chemically with oils of turpentine and peppermint, forming non-luminous and comparatively non-poisonous liquids. These and other essential oils, are incompatible with Phosphorus.

Uses.—Phosphorus as a nervine stimulant is given for nervous prostration, paralysis agitans, locomotor ataxy and impotence. It is most useful in neuralgia—especially in aged persons, in leucocythæmia, and in some skin diseases. In psoriasis, chronic eczema, and lichen it acts somewhat like its chemical ally, arsenic.

Cases of tubercular meningitis, osteomalacia, diabetes and lymphadenoma have improved under Phosphorus. In otosclerosis use satisfactory.

Phosphorus in comparatively small doses ($\frac{1}{2}$ grain) acts as an abortifacient, but even this small dose may cause serious poisoning symptoms. The smallest fatal dose is, however, $\frac{3}{4}$ grain. Jaundice after phosphorus poisoning has, however, not always a fatal significance.—B.M.J. ii./09, 1803.

In tinnitus prolonged use of Phosphorus advocated.—B.M.J. ii./09, 1131.

N.B.—Phosphorus preparations are to be kept cool and from the light and to be recently made.

Elixir Phosphori.

Add Compound Tincture of Phosphorus (v.p. 530) 1 drachm, to Glycerin 4 drachms. *Prepare freshly.*

Dose.—15 to 60 minims (0.9 to 3.5 Cc.) in water. Contains $\frac{1}{10}$ grain in one drachm. As a fluid form of Phosphorus this is palatable and is well tolerated.

Oleum Phosphoratum (Off.).

Dose.—1 to 5 minims (0.06 to 0.3 Cc.), on sugar or in perles.

Contains about 1% (by weight) of Phosphorus in prepared almond oil. That of P. Austr. contains only $\frac{1}{10}$ %.

Flavoring.—Emulsified and Gyl Rosæ added, taste is covered but more usually given in capsule.

FR. CX. has Phosphorus 1, dissolved in Almond Oil 95, and Ether 4 added—all by weight. Max. single dose $1\frac{1}{2}$ grains approximately.

Capsules contain 5 minims of the oil = $\frac{1}{10}$ grain of Phosphorus.

Perles of Phosphorated Oil.

These contain $\frac{1}{100}$ grain, $\frac{1}{50}$ grain, and $\frac{1}{25}$ grain.

Phosphorated Cod Liver Oil Capsules. **Dose.**—1 to 4.

Prepared by diluting Phosphorated Oil, B.P., with Cod Liver Oil. Contain one-half drachm, each equivalent to $\frac{1}{100}$ grain phosphorus.

Pilula Phosphori (Off.).

Dose.—1 to 2 grains (0.065 to 0.13 Gm.).

Pilula Phosphori (Martindale).

Dose.—1 to 3 grains (0.065 to 0.2 Gm.).

Phosphorus 1 and Oil of Theobroma q.s. to 100.

Heat the oil to 300° F. and sustain the heat for 5 minutes. Strain and weigh 99 into a wide-necked bottle with an indiarubber cork, and when cooled to 130° F. add the Phosphorus, cork and shake well till the fat begins to solidify. In rolling it into pills, divide into suitable lots, and beat each in a mortar to render it plastic before applying it to the machine,

then work off quickly and cover with sandarach solution. The mass contains 1% of Phosphorus in perfect solution. A few drops of chloroform added during manipulation checks oxidation. When Phosphorus is to be combined with other ingredients in a pill, the following is best used:—

Sevum Phosphoratum, 10%. (Martindale.)

Phosphorus 1, Pure Carbon Bisulphide 5. Dissolve and add Prepared Suet (prepared by melting and straining, *Off.* and U.S.) 9.

Add a little of the suet at first, mix quickly, add the remainder, mix thoroughly and allow the bisulphide to evaporate. May be used to make the following pills. They are perfectly stable as there is no interaction or decomposition.—B.M.J. i./02,578; P.J. i./02,224.

Pilula Phosphori ($\frac{1}{80}$ gr.) cum Ferro (3 grs.).

Phosphorated Suet 10 grains, Reduced Iron 150 grains, Compound Tragacanth Powder 10 grains, Chloroform 15 minims. Mix, and add quickly, Mucilage of Acacia *q.s.*

Divide into 50 pills (or into 750 pills if the quantities be taken in grammes). Cover with Sandarach Solution.

⑩ Pilula Phosphori ($\frac{1}{80}$ gr.) cum Ferro (3 grs.) et Nuce Vomica ($\frac{1}{8}$ gr.).

Make as last, with $\frac{1}{2}$ grain Nux Vomica Extract.

⑪ Pilula Phosphori ($\frac{1}{80}$ gr.) cum Nuce Vomica ($\frac{1}{8}$ gr.). Prepare as the last pills, replacing the reduced iron by one grain of milk sugar in each.

Pilula Phosphori ($\frac{1}{80}$ gr.) cum Quinina (1 gr.).

Phosphorated Suet 10 grains, Quinine (base) 38 grains (= 50 grs. Sulphate), Chloroform 20 minims. Mix quickly, and add Compound Tragacanth Powder 10 grains, Mucilage of Acacia *q.s.* Mix, and divide into 50 pills (or into 750 pills if the quantities be taken in grammes).

Pilula Phosphori ($\frac{1}{80}$ gr.) cum Quinina ($\frac{1}{2}$ gr.) et Ferro (3 gr.).

Make as last, using half the quantity of quinine there ordered, and adding 3 grains Reduced Iron to each pill.

⑫ Pilula Phosphori ($\frac{1}{80}$ gr.) cum Quinina ($\frac{1}{2}$ gr.), Ferro (3 grs.), et Strychnina ($\frac{1}{40}$ gr.).

⑬ Pilula Phosphori ($\frac{1}{80}$ gr.) cum Strychnina ($\frac{1}{40}$ gr.). Prepare as Pilula Phosphori cum Quinina, with Strychnine $1\frac{1}{4}$ grains *vice* Quinine 38 grains.

⑭ Pilula Phosphori ($\frac{1}{80}$ gr.) cum Strychnina ($\frac{1}{40}$ gr.) et Ferro (3 grs.).

Prepare as Pilula Phosphori cum Strychnina, adding 3 grains Reduced Iron to each pill.

Dose.—Any of the above pills are best taken directly after meals.

Tinctura Phosphori Composita. Adopted by B.P.C. Dose.—3 to 12 drops on sugar.

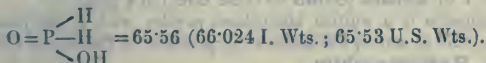
Phosphorus 1, Chloroform 85. Warm gently in a stoppered bottle till dissolved, and add the solution to Absolute Alcohol to 500. Shake well and keep in the dark. Contains 1 in 500. Becomes acid on keeping.

Zinci Phosphidum, $Zn_3P_2=256.33$ (258.11 I. Wts.);

Dose.— $\frac{1}{10}$ to $\frac{1}{2}$ grain (0.0032 to 0.02 Gm.) in Pill. Fr. Cx.—Max. single dose $\frac{1}{2}$ grain; Max. during 24 hours $\frac{1}{4}$ grain approx.

A grey crystalline powder. With acids yields phosphoretted hydrogen.

Acidum Hypophosphorosum, U.S.



Dose.—2 to 5 minims (0.12 to 0.3 Cc.).

A colourless liquid, strength 30%.

On heating, water evaporates and the acid decomposes at 130° to 140° C., forming hydrogen phosphide, which ignites, and phosphorous acid. The latter decomposes at 160° to 170° C. into hydrogen phosphide and phosphoric acid, finally the last portions of unoxidised phosphorus burn out at a higher temperature (U.S.).

Acidum Hypophosphorosum Dilutum, U.S.

Average dose.—8 minims.

Is 10% strength. Sp. Gr. 1.042 at 25° C. Made by diluting the above with twice its weight of water.

Uses.—Its Salts are mostly employed. It may be added to Syrup of Ferrous Iodide to preserve same.

Ammonii Hypophosphis. $OP \begin{array}{l} \diagup H \\ - H \\ \diagdown O.NH_4 \end{array} = 82.5$. (83.058 I. Wts.).

Dose.—1 to 6 grains (0.065 to 0.4 Gm.).

In white deliquescent tabular crystals, soluble 5 in 6 of water. Insoluble in alcohol. It has a nauseous saline taste. *Incompatible* like the Calcium Salt. Nervine tonic.

Calcii Hypophosphis (*Off.*) U.S.

$Ca PH_2O_2=168.83$ (170.122 I. Wts.; 168.86 U.S. Wts.).

Dose.—3 to 6 (or 10, B.P.) grains (0.2 to 0.65 Gm.).

White crystalline salt, with nauseous taste, soluble 1 in 7 of water. Prepared by heating phosphorus with milk of lime until phosphoretted hydrogen ceases to be given off, then filter and evaporate to crystallise or precipitate with alcohol. U. S. 1905 advises to limit lead content to 10 parts per million.

Incompatible with oxidising agents, and with Potassium Iodide.

Uses.—Nervine tonic and aphrodisiac. Checks night sweats of phthisis, and is used in acne.

In epilepsy has proved serviceable.—Pres. 1910, 4.

Mistura Calcii Hypophosphitis, St. M.'s. H.

Calcium Hypophosphite 5 grains, Saccharated Lime Solution 1 drachm, Peppermint Water to 1 ounce.

Syrupus Calcii Hypophosphitis, B.P.C.

Dose.—1 to 4 drachms (3.5 to 15 Cc.). Each drachm contains about 1 grain of the hypophosphite.

Calcium Hypophosphite 175, Distilled Water 45. Dissolve, filter, and add Sugar 80. Dissolve with a little heat, add Hypophosphorous Acid 0.25 and Distilled Water q.s. to 100.

Barii Hypophosphis.

$Ba(PH_2O_2)_2=265.52$ (267.402 I. Wts.).

Dose.— $\frac{1}{4}$ to 1 grain (0·016 to 0·065 Gm.).

White crystalline salt solution in $3\frac{1}{2}$ water. Prepared in manner analogous to the above and its properties are similar.

Ferri Hypophosphis, U.S.

$\text{Fe}(\text{PH}_2\text{O.O})_3 = 249\cdot28$ (250·898 I. Wts.; 249·09 U.S. Wts.). *Syn.*

FERRIC HYPOPHOSPHITE.

Dose.—1 to 5 grains (0·065 to 0·32 Gm.) in a pill.

In commerce is a whitish amorphous powder with a chalybeate taste, slightly soluble in water, but more so in presence of Potassium Citrate.

Ferrous Hypophosphite.

$\text{Fe}(\text{PH}_2\text{O.O})_2 + 6\text{H}_2\text{O} = 292\cdot0$ (293·978 I.Wts.).

Greenish Crystals; not permanent. Prepared by dissolving Iron in Hypophosphorous Acid or by double decomposition between Calcium Hypophosphite and Ferrous Sulphate. The resulting solution to crystallise must be evaporated *in vacuo*. Soluble about 1 in 8 of water when freshly prepared.

Liquor Ferri Hypophosphitis Fortis, B.P.C.

Dose.—10 to 30 minims.

Dilute 23 of Solution of Ammonia with equal volume of Distilled Water, gradually add Solution of Ferric Sulphate 14·2, previously diluted with an equal volume of water; wash the precipitate by decantation with Distilled Water until free from Sulphates, collect on calico, drain and transfer to a porcelain dish. Add Citric Acid 7·6 and water 20, heat on a water-bath, with occasional stirring until clear, and then add Sodium Hypophosphite 9·6, and continue heating with stirring about one minute, or till a clear greenish solution results. Add Sodium Citrate 6·6 filter, and pass sufficient Chloroform Water (1 in 200) through the filter to make volume up to 100.—P.J. 1./07, 102.

Liquor Hypophosphitum Compositus, B.P.C.

Syn. LIQUOR FERRI HYPOPHOSPHITIS COMPOSITUS.

Dose.— $\frac{1}{2}$ to 2 drachms.

Calcium Hypophosphite 3·5, Sodium Hypophosphite 3·5, Magnesium Hypophosphite 1·75, Strong Solution of Ferric Hypophosphite 30, Distilled Water *q.s.* to 100. Dissolve and mix. Each drachm contains about 2 grains each of the sodium and calcium hypophosphites, 1 grain magnesium hypophosphite, and $1\frac{1}{2}$ grains of ferric hypophosphite. Forms a much more useful 'chemical food' for children than Parrish's preparation.

⑩ **Pilula Ferri Hypophosphitis cum Strychnina.** Strychnine $\frac{1}{30}$ grain, Ferrous Hypophosphite 2 grains. To make one pill (or in grammes to make 15). *Dose.*—1 twice or thrice daily.

Magnesii Hypophosphis.— $\text{Mg}(\text{HPO}_2)_2 \cdot 6\text{H}_2\text{O} = 258\cdot58$ (260·432 I. Wts.). *Dose.*—3 to 10 grains (0·2 to 0·65 Gm.). White crystalline salt soluble in water, about 1 in $4\frac{1}{2}$.

Potassii Hypophosphis, U.S. $\text{O} = \text{P} \begin{array}{l} \nearrow \text{H} \\ \text{---} \text{H} \\ \searrow \text{OK} \end{array} = 103\cdot39$ (B.P. and

U.S. Wts.) (104·116 I.Wts.).

Dose.—1 to 6 grains (0·065 to 0·4 Gm.).

A deliquescent granular white powder, having a nauseous, bitter taste. Soluble 1 in 1 of water. Incompatible as the Calcium Salt.

Flavoring. Syl Aurantii Floris; Glyl Rosæ, Syrupus Aromaticus, Elixir Simplex.

Sodii Hypophosphis (Off). $\text{O} = \text{P} \begin{array}{l} \nearrow \text{H} \\ \text{---} \text{H} \\ \searrow \text{ONa} \end{array} = 87\cdot44$ (88·016 I. Wts.)

(+H₂O, U.S. = 105·29 U.S.Wts.).

Dose.—3 to 10 grains (0·2 to 0·65 Gm.).

A white granular deliquescent salt, with a bitter, nauseous taste. Soluble 1 in 0·63 of water.—P.J.i./02,552; and freely soluble in alcohol. With an equal quantity of Sodium Nitrate is explosive. See also Calcium Salt.

Uses. In phthisis, and as nutrient in wasting diseases generally.

Flavoring.—Syl Sassafras, Syl Lavandulæ, Syl Amygdalæ Amaræ; Syrupus Aromatics.

Ⓔ **Syrupus Hypophosphitum Compositus.** B.P.C. *Dose.*— $\frac{1}{2}$ to 2 drachms.

Mix Hypophosphites of Calcium 1·0, of Potassium and Manganese each 0·5, and of Quinine 0·25 with Chloroform Water 40. Add Strychnine base 0·012 previously dissolved in Hypophosphorous Acid 0·625. Mix and add Strong Solution of Ferric Hypophosphite (*antea*) 5, then add Sugar 70; dissolve without heat. Make up to 100 with Chloroform Water and strain through flannel. Contains $\frac{1}{100}$ grain Strychnine in 1 drachm (was $\frac{1}{100}$ grain).—P.J. i./07,102 modified.

It is well to supply this preparation in amber bottles.

In phthisis and like cases, hypophosphites raise the nervous power and improve condition of the secretions.

Ⓕ **Tablets of Compound Hypophosphites** each weighing 2 and 4 grains and equivalent to $\frac{1}{2}$ and 1 drachm of the above are prepared.

Ⓖ **Syrupus Hypophosphitum Compositus, U.S.**

Average dose.—2 drachms.

Ferric 2·25, and Manganese Hypophosphite 2·25, with Sodium Citrate 3·75 are first dissolved in Water 30, then Calcium 35, Potassium 17·5, and Sodium Hypophosphites 17·5 are dissolved in water 400, with Diluted Hypophosphorous Acid 5. Quinine (base) 1·1 and Strychnine (base) 0·115, with Hypophosphorous Acid 10 are then dissolved in water 30. Finally, Sugar 775 is dissolved in the mixed solutions and made up to 1,000 with water.

The addition of even 50 Cc. of Glycerin, or at any rate 100 Cc. in the litre improves keeping qualities.—Am. Jl. Ph. 1909,312.

We kept two samples under observation several months, one with, and one without Glycerin, and could observe no difference.

Ⓓ *** Fellows' Compound Syrup of Hypophosphites** is stated to contain in 100 Grs. Potassium, Manganese and Calcium Hypophosphites each 1·2 Gm., Iron Hypophosphite 1·4 Gm., Quinine Hypophosphite 1·0 Gm., Strychnine Hypophosphite 0·02 Gm.

Dose.—Medium Adult, 1 drachm, Children in proportion.

Ⓔ An American syrup sold as **Hematic Hypophosphites** is similar, (contains strychnine hypophosphite $\frac{1}{4}$ grain in 1 ounce.)

Ⓕ **Cloudy Compound Syrup of Hypophosphites** (with Nux Vomica).

Dose.—1 to 2 drachms. (3·5 to 7 Cc.)

Dissolve Manganese Sulphate 70 grains and Ferrous Sulphate 130 grains in hot water 2 ounces, with Hypophosphorous Acid (30%) 10 drops, filter, add Calcium Hypophosphite 150 grains dissolved in water 2 ounces. Bring to the boil, filter, wash precipitate with water to produce 5 ounces, add to Glycerin 4 ounces. Next dissolve Quinine base 120 grains in water 1 ounce with Hypophosphorous Acid *q.s.* add to the Glycerin Solution. Dissolve Calcium Hypophosphite 210 grains with Sodium and Potassium Hypophosphites, of each 4 drachms, in water 8 ounces, acidulating slightly with Hypophosphorous Acid. Filter if necessary, and add to the Glycerin Solution, then add Tincture of Nux Vomica 5 drachms, and water *q.s.* to 20 ounces. To make the Syrup dissolve Sugar 14 ounces in a mixture of 4 ounces of the above Liquor, and 4 ounces of water.—Ph. Form. 782.

Great care must be taken to distinguish these preparations which contain strychnine from the following, which contains none:—

Syrupus Hypophosphitum, U.S., has Hypophosphite of Calcium 45 of Potassium 15, of Sodium 15 with diluted Hypophosphorous Acid 2, Sugar 650, Tincture of Fresh Lemon Peel (U.S.) 5 (freshly grated Lemon Peel 1, Alcohol *q.s.* to 2), Water *q.s.* to 1,000. *Average dose.*—2 drachms.

Same remark as to addition of Glycerin is stated to apply here as under **Syrupus Hypophosphitum Compositus** above.—*Am. Jl. Ph.* 1909, 312.

Churchill's Hypophosphites.

Dr. J. F. Churchill discovered the therapeutic properties of the Hypophosphites, as proved by his communication to the Paris Academy of Medicine in 1857, and to the Academy of Sciences in 1858. In Havana in 1855 he first administered them, then unknown in medicine. He believed them to be specific for tubercular affections. We understand this contains no Strychnine, and that there are proprietary rights in Churchill's Syrup of Hypophosphites.—*Vide C.D. Feb. 6/09, 244, c.f. also Churchill's Inhalant, p. 564, an adjuvant in the treatment.*

Ferri Pyrophosphas Solubilis, U.S.

Contains ferric pyrophosphate corresponding to not less than 10% metallic iron. *Average dose.*—4 grains.

Ⓢ **Pulvis Hypophosphitum Compositus.** *Dose.*—1 to 4 grains (0.065 to 0.26 Gm.).

Calcium Hypophosphite 24, Sodium Hypophosphite 12, Manganese Hypophosphite 12, Quinine Hypophosphite 6, Strychnine Hydrochloride Trituration *q.v.* 3½, Iron Hypophosphite 12, Milk Sugar to 100. Two grains = 1 drachm of the B.P.C. Syrup = $\frac{1}{160}$ grain Strychnine Hydrochloride approx.

Ⓢ **Glycerol Hypophosphitum.** Glycerol of Hypophosphites.

Dose.—1 drachm (4 Cc.).

Dissolve Calcium Hypophosphite 160 grains, Manganese Hypophosphite 80 grains, Potassium Hypophosphite 160 grains, Quinine Hypophosphite 80 grains, Strychnine Hypophosphite 2½ grains in Distilled Water 3 ounces, and add Strong Solution of Ferric Hypophosphite (B.P.C.) 4 ounces, Hypophosphorous Acid 2 drachms, Glycerin to produce 20 ounces. Each drachm contains Strychnine Hypophosphite $\frac{1}{4}$ grain, and Quinine Hypophosphite $\frac{1}{2}$ grain.—*P.J. i./06, 385.*

Wheat-Phosphates, Saccharated, the soluble part of bran—the organic phosphates and cereatin (ferment of bran) combined with milk sugar—are specially useful in weakly and rickety children, and where digestion is impaired, seem to aid the assimilation of food and even of such medicines as iron.

Dose.—Half a teaspoonful (increased) 2 or 3 times a day, may be taken as sugar with food.

★ **Phytin.** A vegetable preparation (calcium and magnesium phosphates with oxymethylene diphosphoric acid), containing about 22.8% organic phosphorus.

A nervine tonic. Capsules 4 grains. Tablets 4 grains, Cachets 8 grains, and Phytin Liquid and Powder are supplied.

Dose.—Equivalent of 2 capsules twice daily or increased. Children less.

Quinine Phytin has 57% of Quinine, is a yellowish powder.

Dose.—Similar to the preceding.

PHYSOSTIGMATIS SEMINA.

Calabar Bean (Off.). U.S. *Syn.* ORDEAL BEANS, from West Africa.

Dose, in powder.—1 to 4 grains. *U.S. average dose* 1½ grains.

The poisonous properties of the ripe seed of *Physostigma venenosum*

(*Leguminosæ*) are chiefly due to Physostigmine, which is contained in the cotyledons only, the content being about 0.25%. In addition Eseridine and Eseramine are said to be constituents.

U.S. requires 0.15% Ether-soluble alkaloids.

Assay Method, U.S.—20 Gm. of the drug in No. 60 powder are shaken with Ether. Sodium Bicarbonate Solution is added, and the mixture shaken at intervals during four hours. Decant half the Ether originally taken and wash out with repeated quantities of Sulphuric Acid and Water. Shake out the combined acid liquids with Ether twice in the presence of sufficient Sodium Bicarbonate. Evaporate Ethereal Solution and dissolve the residue in a volume of $\frac{N}{10}$ Sulphuric Acid and a small quantity of Ether. Titrate the excess of acid with $\frac{N}{10}$ caustic potash, using Iodeosin as indicator. The factor 0.0273 is given as representing the amount in grammes of alkaloids (mostly physostigmine) required to neutralise 1 Cc. of $\frac{N}{10}$ Sulphuric Acid.

Cesar and Lorentz's method.—C.D. 1./08, 21, 22.

Antidotes.—Emetics, Atropine or Belladonna, Chloral, Strychnine, Tannin. Potassium Permanganate 10 grains in 1 pint of tepid water, by stomach tube, repeated in $\frac{1}{2}$ hour. Stimulants freely.—Murrell.

Uses of Physostigma.—Preparations of Physostigma and solutions of its alkaloid Physostigmine $\frac{1}{4}$ to 1%, applied topically to the eye, contract the pupil, and are antagonistic to atropine.

Traumatic tetanus has been well treated with extract $\frac{1}{8}$ grain every hour, then $\frac{1}{4}$ grain every 2 hours; or give physostigmine hypodermically, and increasing every hour, so as to paralyse little short of arresting the breathing. For chorea also it is given in smaller doses. In paralysis it arrests muscular wasting and improves muscular power. In hemiplegia or paraplegia, give doses of $\frac{1}{10}$ to $\frac{1}{10}$ grain of extract frequently.—R.

Ⓟ **Extractum Physostigmatis (Off.).**

Dose.— $\frac{1}{4}$ to 1 grain (0.016 to 0.065 Gm.).

An alcoholic extract containing three-fourths of its weight of milk sugar. Yield about 2 to 5%.

Alkaloidal content varies very considerably. U.S. (in powder form) standardises to contain 20% ether-soluble alkaloids. For outline of estimation process see above.

A Ⓟ powdered extract is supplied in commerce containing 5% Physostigmine.

Ⓟ **Tinctura Physostigmatis, B.P.C.**

Dose.—5 to 15 minims (0.3 to 0.9 Cc.).

Calabar Bean, in No. 40 powder, 1, Alcohol 90% *q.s.* to 5. (U.S. has 1 in 10 of Alcohol 94.9% vol.).

It is antagonistic to strychnine, but is *not* to be depended on as a remedy for poisoning by nux vomica or strychnine.

Ⓟ **Physostigmina. Syn. ESERINE.**

$C_{15}H_{21}N_3O_2 = 273.23$ (275.198 I. Wts.).

Dose.— $\frac{1}{1000}$ to $\frac{1}{100}$ grain (0.00065 to 0.0013 Gm.).

In colourless crystals, slightly soluble in water, freely in ether, soluble 1 in 180 of vaseline. Solution in castor oil, $\frac{1}{2}$ to 1% (bv weight) does not oxidise—turn pink—so readily as the solutions of the salts.

In glaucoma the above Alkaloidal Oil 2 to 4 grains per ounce, preferred to aqueous solution.—M.A. 1906, 227.

Eserine and Atropine may produce a condition of the lids resembling erysipelas.—B.M.J. 1/09, 1221.

Eserine Salts do not lose efficacy on keeping.—M., 1907.

Ⓢ **Isophysostigmine.**

An alkaloid very similar to and used like physostigmine, but said to be one-third stronger in effect and acts longer.

Ⓢ **Unguentum Physostigminæ, R.O.H.**

Physostigmine 0·25, Soft Paraffin 100; heat to dissolve.

Ⓢ **Physostigminæ Salicylas, U.S., P. AUSTR. FR. CX.**

$C_{15}H_{21}N_3O_2 \cdot C_6H_4(OH)COOH = 410\cdot24 (413\cdot246 \text{ I. Wts.}; 410\cdot21 \text{ U.S. Wts.})$. Dose.— $\frac{1}{80}$ to $\frac{1}{20}$ grain (0·0011 to 0·0032 Gm.).

In needle-shaped or columnar crystals. Soluble 1-in 140 of cold water; much used as a myotic in solution. Not so liable to turn pink as that of the sulphate. In glaucoma suited for prolonged use.—Oph., May 1905.

Ⓢ **Tablets, Hypodermic** $\frac{1}{800}$ grain.

To open the bowels in acute abdominal conditions $\frac{1}{100}$ grain hypodermically until 6 doses have been given (four hourly). This dose is safe—higher dose may act too severely and necessitate bismuth and opium to check the resulting diarrhœa. There is, however, variation in the way different patients are affected. If no action turpentine enema the following day. The muscular coat of the intestine is directly stimulated by Eserine.—L. ii/08,88.

Ⓢ **Physostigmine Hydrobromide** with same dose as the above is an amorphous hygroscopic soluble salt.

Ⓢ **Physostigminæ Sulphas, (Off.). P.G. U.S.**

$(C_{15}H_{21}N_3O_2)_2 H_2SO_4 = 643\cdot80 (648\cdot482 \text{ I. Wts.})$. (Off. + Aq.)

Dose.— $\frac{1}{80}$ to $\frac{1}{20}$ grain (0·001 to 0·0032 Gm.).

In yellowish granular crystals, deliquescent and soluble about 4 in 1 of water. Solution becomes pink, but does not lose much in efficacy.

In doses of $\frac{1}{100}$ grain (0·00065 Gm.) of value in tympanites as occurring in typhoid fever.—M. oi,150.

Ⓢ **Guttæ Physostigminæ, St. Th. H.**

Contain 0·5, or 1%. St. M.'s H. 0·5%.

Ⓢ ***Guttæ Physostigminæ cum Cocaina, R.O.H.**

Physostigmine Sulphate 0·25, and Cocaine Hydrochloride 1, Water to 100. Ⓢ St. M.'s H. 0·25, and 1·25 respectively in 100.

Ⓢ **Guttæ Physostigminæ et Quininæ. Liv'rp'l Eye and Ear Inf.**

Physostigmine Sulphate 1 grain, Quinine Sulphate (Bisulphate) 4 grains, Distilled Water 1 ounce.—B.M.J. i./04,452.

Ⓢ **Injectio Physostigminæ Sulphatis Hypodermica. 1% Dose.**—1 to 4 minims (0·06 to 0·24 Cc.).

Ⓢ **Lamellæ Physostigminæ (Sulphatis). (Off.)**

Each contains $\frac{1}{1000}$ grain (0·065 mgr.); also prepared containing $\frac{1}{250}$ grain and $\frac{1}{300}$ grain respectively, for ophthalmic use. Also Ⓢ $\frac{1}{1000}$ grain, combined with Cocaine $\frac{1}{200}$ grain.

The stronger forms of these lamels tend to become insoluble if kept long.

Ⓢ 'Sterules' of Physostigmine Sulphate Solution 4 grains to the ounce are prepared, also Ⓢ 'Sterules' of Physostigmine Sulphate 1 grain with Cocaine Hydrochloride 4 grains to the ounce.

Ⓢ **Unguentum Hydrargyri Oxidi Flavi cum Physostigmina, R.O.H.**

* This is of course open to discussion, c.f. Hypodermic Injection of Cocaine, Note.

Physostigmine 0.25, Soft Paraffin or Lanoline (anhydrous) 100; heat till dissolved, and add, when cold, Yellow Mercuric Oxide 1.

For corneal ulcers in scrofula, solution of 2 grains to an ounce may be dropped into the eye; also in mydriasis and glaucoma. In glaucoma Eserine is indicated, in iritis Atropine.—Pr. xxxi.321. Ocular pressure increased by its use.—L. ii./86,183.

Ⓐ ***Diabeteserine.**—Physostigmine with Trunecek's Serum (*q.v.*) in tablet form.

No. I. contain 0.0003 Gm. Eserine in each, with the salts of Trunecek's Serum.

No. II. contain in addition to the constituents of No. I. atropine 0.0005 Gm. each, for use in the severest forms of intestinal inaction and in obese diabetic patients. Both forms of Tablets weigh $7\frac{1}{2}$ grains (0.5 Gm.) each. Eserine is given in this way, with or without atropine, for diabetes, on the supposition that the disease is due to arteriosclerosis of the pancreas.

Maximum dose of either—6 tablets per diem.

Ⓐ PICROTOXINUM. (*Off.*).

$C_{45}H_{50}O_{19} = 887.67$ (894.4 I. Wts.), probably consisting of 2 molecules of Picrotoxinin $C_{15}H_{16}O_6 = 289.93$ (292.128 I. Wts.), with 1 molecule of Picrotoxin $C_{15}H_{18}O_7 = 307.81$ (310.144 I. Wts.). Picrotoxin is said to be comparatively inert.

Dose.— $\frac{1}{100}$ to $\frac{1}{25}$ grain (0.00065 to 0.0026 Gm.).

FR. CX. *Max. single dose.*— $\frac{1}{32}$ grain, max. during 24 hours $\frac{1}{10}$ grain approximately.

A neutral crystalline principle obtained from the fruits of *Anamirta paniculata* (*N.O. Menispermaceæ*)—or *Cocculus Indicus* (growing on the Malabar Coast); does not form salts. Nearly entirely soluble 1 in 330 of water, and 1 in 13 of alcohol 90%, and about 1 in 500 of fats; its taste is bitter.

FR. CX.—Contains the two principles above, the first melting at 201° C. and the other 249° C. The combined substance melts at about 200°. Levorotatory, $\alpha = -29.26$ at 16°C. (Absolute alcoholic solution of 4.1 Gm. in 100 Cc.)

Uses.—Gives good results in checking night-sweats (does not like Atropine cause dryness of throat), also employed in epilepsy and chronic alcoholism; overdoses cause stupor, delirium, and convulsions (by acting on the medulla).

The primary action of Picrotoxin is to increase the secretion of the mucous and perspiratory glands. Its action in checking night sweats is explained by Cushing as probably due to its increasing the respiration and thus preventing that stimulation of the nervous mechanism of perspiration which occurs through the partial asphyxia.—M. Arch, 1905, 308.

Antidotes.—Administer emetics, use the Stomach Tube, and then give Chloral and Potassium Bromide, then stimulants.

Ⓐ **Injectio Picrotoxini Hypodermica.**—1 in water 360. *Dose.*—3 to 6 minims (0.18 to 0.35 Cc.).

Ⓐ **Liquor Picrotoxini Aceticus.**

Picrotoxin 1, Glacial Acetic Acid 30. Dissolve and add Distilled Water to 250. Filter.

Dose.—2 to 12 minims (0.12 to 0.7 Cc.) in water. Is palatable and keeps in solution at all temperatures.

Ⓟ **Pilula Picrotoxini.**

Picrotoxin $\frac{1}{30}$, $\frac{1}{60}$, $\frac{1}{80}$, or $\frac{1}{100}$ grain. Forms a suitable dose for checking night-sweating of phthisis taken for 2 or 3 nights successively, it is slightly cumulative, may thus be temporarily stopped with effects persisting.

A pill of Picrotoxin $\frac{1}{60}$ grain, Atropine $\frac{1}{120}$ grain with Agaricin $\frac{1}{12}$ grain, is said to act even better.

Ⓟ **Unguentum Picrotoxini.** Picrotoxin 10 grains to Lanolin Ointment 1 ounce is used (on sound skin only) for parasitic skin affections or to kill lice; for this purpose also $\frac{1}{2}$ ounce of Tincture of Cocculus Indicus (1 in 5 Alcohol 60%) added to 4 ounces of water is dabbed on to the scalp; it must be washed off, however, after a few minutes.—M. Arch., 1905, 308.

In addition to the body Picrotoxin which occurs in the seed only, the tasteless alkaloid Menispermene has been found in the pericarp of the fruit.

“**Menispermene**,” an extractive substance (powdered) obtained from various species of *Menispermum*. *Dose*.—1 to 5 grains (0.065 to 0.32 Gm.).

A tonic laxative, diuretic, stimulant said to be of value in indigestion.

Beer and rum were impregnated with cocculus before the Food and Drugs Act came into force.—Pr. Feb./o9, 260.

PILULÆ.

One of the principal considerations in the production of a pill is the choice of the excipient, which must be compatible with the other ingredients. The mass should be hard enough to maintain the shape of the pill.

Glycerin as an excipient, if used at all, is best mixed with alcohol, and is unsuited for hygroscopic drugs, such as soft extracts, squills, aloes, &c. For pills intended to be varnished, use equal parts acacia and tragacanth, with syrup *q.s.* For hygroscopic drugs mucilage of acacia or syrup is preferred, and tragacanth in moderation is very useful as a ‘hardener.’ For insoluble metallic salts, glycerin of tragacanth (*q.v.*) may be employed, adding, if necessary, a small quantity of powdered acacia or althæa to give firmness.

Compound Decoction of Aloes is sometimes used as an excipient in Aloes Pills.

For Camphor a little Tragacanth or Soap and Castor Oil; if with Quinine, Tragacanth and Glucose Syrup, *q.s.*—P.J.i./o7, 804.

For such substances as Potassium Permanganate, Silver Nitrate, etc., an excipient of Calcined Kaolin 2, Calcined Anhydrous Sodium Sulphate 1, has been recommended with a little water added, the pills to be rolled out rapidly. In our hands this did not ‘bind’ well—a trace of mucilage improves.

Marshall, P.J. i./o8, 586, points out that the method depends upon the fact that 33°C. is the critical temperature for Crystalline Sodium Sulphate. Above that temperature the salt is anhydrous, and hence the water is free and the mixture a plastic mass. Below 33°C. the salt exists as $\text{Na}_2\text{SO}_4 \cdot 7\text{H}_2\text{O}$, hence when the temperature falls this hydrated salt crystallises out, and the pills rapidly become hard. *The pills should therefore be made at or slightly above 33°C. If this is done the mass will remain plastic as long as may be required.* If, on the other hand, owing to manipulation at a lower temperature the mass should become too hard and unworkable, it is only necessary to raise it to 33°C, and it will become as plastic as at first. Such pills should keep indefinitely at ordinary temperatures.—*c.f. also P.J., i./o8, 518.*

Unguentum Kaolini (*q.v.*) works better for larger quantities.

For Oils, soap is best used.

In the official Pill masses **Syrup of Glucose** (*Off.*) is employed; this

is prepared by heating Glucose (syrupy) 1, with Syrup 2 (by weight). *v. also* Glucantha. Disp. gives some other excipients.

As a means of rendering pills tasteless, silvering or gilding is giving place to covering them with solution of sandarach, gelatin, or pearl-coating them with French chalk and gum, or sugar-coating them.

Varnishing Pills.—The late W. Martindale suggested the use of a sandarach solution—1 part sandarach* in 1 part of absolute alcohol (= Pill Varnish). The pills should be free from powder, as every imperfection will show through the transparent coating. Having placed them in a covered pot, a few drops of the sandarach solution are added and diffused equally by a few circular movements of the pot. They are then poured out on a plate and detached from each other. Shortly afterwards they are moved carefully with a pointed glass rod dipped in alcohol. In about 30—60 minutes they will be dry.

In coating Pills with Gelatin, they should be free from powder, and not too dry. A solution is prepared by dissolving 1 part of gelatin in 4 parts of water, straining whilst hot through fine muslin, allowing to cool and re-heating to get rid of air bubbles. The pills are stuck on the points of fine needles and dipped into the solution, kept hot by a water bath; as they are taken out, each needle is slowly revolved to make the coating even on the pill, the reverse end of the needle is then stuck into a sheet of cork or pincushion, and the needles are left in this upright position till the pills are dry—in about $\frac{1}{2}$ hour.

On a large scale they are held in a frame by suction, and dipped $\frac{1}{2}$ at a time.

In pearl-coating, the Pills are first evenly covered with a mucilage of tragacanth 4 grains to 1 ounce with half a drachm of syrup added; they are then thrown into a covered pot having a concave bottom and containing some finely powdered French chalk; after gently rotating them in this for a few seconds they are turned into a third similar pot and rotated slowly; the excess of powder is then blown off, and they are finished by shaking round until even and polished.

The sugar-coating of Pills can only be done successfully in large quantities, and the pills must be hard and dry; they are placed in a hemispherical metallic pan kept warm, while making eccentric revolutions, and are alternately moistened with syrup, and dusted with finely-powdered sugar, till dry and uniformly covered.

Methods of Coating Pills, Capsules, Tablets, &c., to render them insoluble in the Gastric Juice and yet soluble in the Intestines.

Of the various substances which have from time to time been advocated for this purpose, Keratin seems to have been first advised by Unna, *vide* P.J. Nov. 29, 1884, p. 422.

He advocated this coating for Pills and Capsules of drugs which irritate the mucous membrane and the administration of which is liable to induce

* Resin from *Callitris quadrivalvis* (*Conifera*). *Alcohol Sandarachi*, R.D.H. For dental use. Sandarach 2, Alcohol (90%) 1. Sandarach—chemistry of; Various acids—Sandaracrosene and volatile oil found by Tschirch.—P.J. 1/07, 202.

vomiting, *e.g.*, Digitalis and Squills, Salicylic Acid, Iodide of Iron; also for substances which would neutralise or impair acidity of the stomach, *e.g.*, Lead Acetate, Silver Nitrate, and for substances intended to act solely on the intestines and for Anthelmintics.

There are several important provisos which must be taken into strict account to ensure anything approaching what is claimed for the coating. The pills must not contain moisture or vegetable powders. As a pill basis Kaolin with Suet is to be used. The pills are to be coated 3 to 5 times with the Keratin Solution and finally rolled in non-absorbent powder.

A coating of wax prior to the Keratin coating is sometimes employed.

Salol is occasionally used in the melted condition, or as Salol Varnish (*q.v.*).

Benzonaphthol Varnish.—Benzonaphthol 6, Tannigen 10, Salol 20, Alcohol 90% 30, Ether 100, has also been recommended. This is stated to produce a hard coating insoluble in acid but readily soluble in alkali. More easy to apply than melted Salol.—P.J.i./09,483.

Such coatings should also be applicable for Tablets.

In the case of Gelatin Capsules Keratin has been employed also treating the gelatin coating with Formalin as in "Glutoid" Capsules (*c.f.*, also Membroids).

Keratin Solution is supplied commercially usually in ammoniacal Solution. This must be concentrated to a thick mucilaginous condition before it can be used.

We have lately devoted a considerable amount of attention to the question of coating Pills, Capsules and Tablets so as to render them insoluble in the stomach and at the same time soluble in the alkaline intestinal juices, *i.e.*, on reaching the duodenum.

The prevalent idea is that Keratin coated pills are sometimes so thoroughly coated as to be insoluble altogether and that they are frequently passed per rectum. This, in our opinion, is seldom the case; such a result is more probably due to the hardness of the pill mass or hard compression of the Tablet than to the 'perfect' coating.

The following simple experiment convinced us of the uselessness through too ready solubility of the average Keratin coating for intestinal use.

Keratin coated Tablets of Purified Ox Bile 4 grains, obtained commercially, exposed to the action of Pepsin in 0.2% Hydrochloric Acid disintegrated completely in less than an hour. The coating commenced to dissolve almost immediately.

Control experiments showed that the coating was equally soluble in Pancreatin in dilute Sodium Bicarbonate Solution. (Note, the selection of Ox Bile was haphazard—it has nothing to do with the course of the experiment.)

Again, combined Keratin Coated and Sugar Coated Tablets of Ichthyol $2\frac{1}{2}$ grains disintegrated in a similar manner under the same conditions in about the same time.

Equally astonishing results were obtained with some other commercial Keratin coated preparations, *e.g.*, Pancreatin Pills.

In fact we are convinced that as usually employed Keratin is practically

useless for the purpose intended. (As early as 1884—*vide* P.J. Nov. 29, 84, 422—doubts were thrown on the utility of Keratin, but the coating has notwithstanding been used continuously ever since—in many cases probably in a most ineffectual form).

As Suet has been advised with good reason as an excipient for pills intended to dissolve only in the presence of alkali, it occurred to us to use good Commercial Stearic Acid. This is obtainable with Melting Points, 50°, 52.5°, and 55°C and higher. *c.f.* Acid Stearic. A high-melting acid would have advantage in being less likely to be damaged on passing through the stomach but we found that this when used as a coating is liable to show fissures in it. An acid melting at 50°C is better in this respect.

We coated the already Keratin Coated Tablets above mentioned with this acid, and treated them with digesting fluids. The results were:—

<i>Pepsin</i> (<i>Acid</i>).	<i>Pancreatin</i> (<i>Alkaline</i>).
Withstood 2 hours.	Coating completely broken away in 1 hour.

These coatings were applied by hand. On a larger scale and by attending to technical difficulties it is hoped to perfect the coating so as to render it capable of standing the acid for 4 hours and yet be easily soluble in the intestinal juice. As we found that Stearic Acid alone is not always successful we also experimented with a number of fats and waxes and mixtures of these with Stearic Acid in various proportions and arrived at a combination which promised extremely well, but further experiments are necessary before we can guarantee any coating absolutely. In any case a Stearic Acid coating on the lines we suggest will have a surer foundation than the Keratin method used hitherto:—

It is important to assist the method by avoiding substances incompatible with Hydrochloric Acid or with the coating and by using a due compression of the tablet or pill.

It is suggested that the name **Stearpills** (Martindale) should be used for Pills so coated, and that (★applied for) **Stearettes** (Martindale) should be employed for the Tablets.

Our experiments with Salol Coating and the Benzonaphthol Varnish were no more convincing than those with Keratin.

The following is a suggested list:—

Stearpills or Stearettes.

- Areca 2 to 5 grains.
- Carbolic Acid $\frac{1}{4}$ to 1 grain.
- Ipecacuanha $\frac{1}{4}$ to 2 grains.
- Menthol $\frac{1}{4}$ to 1 grain.
- Methylene Blue $\frac{1}{4}$ to 1 grain.
- Naphthol Bismuth 2 to 5 grains.
- Pancreatin 1 to 2 grains.
- Phenol Bismuth 2 to 5 grains.
- Potassium Iodide 5 grains.
- Quinine Aceto-Salicylate $\frac{1}{2}$ to 2 grains.

Stearpills or Stearettes—(continued).

Aceto-Salicylic Acid 2 to 5 grains.

Antipyrin 1 to 5 grains.

Quinine Salicylate $\frac{1}{2}$ to 2 grains.Quinine Sulphate $\frac{1}{2}$ to 3 grains.

Sodium Salicylate 2 to 5 grains.

Thymol $\frac{1}{2}$ to 1 grain.

Trilactine.

Formagules (Formalised Gelatin Capsules).

The next problem was to determine if possible the length of time necessary to treat gelatin with formalin to make an 'intestinal' Capsule.

A preliminary test was as follows :—

Capsules of Santal Oil and of Sodium Oleate were dipped in formalin for 10, 20, 40, and 80 minutes, and tested in acid and alkaline digesting fluids.

There was no immediate change in any except in the swelling of the coating, which was inversely proportional to the times of Formalising. Further experiments, including physiological tests, in which two individuals took '30 minute' Capsules of Methylene blue (in both cases undissolved), convinced us that anything beyond $\frac{1}{2}$ hour's treatment is too long. (Note, however, that on another occasion physiological test gave not so marked result, viz., ordinary Gelatin Capsules 5 minim size filled with $\frac{1}{2}$ grain Methylene Blue in vaselin basis and Formalised for $\frac{1}{2}$ hour gave blue color in the urine in 6 hours, as against non-Formalised,—blue colour in 4 hours, showing the great difficulty there is in generalising in experiments of this kind, but physiological tests with methylene blue in this way cannot be regarded as conclusive.

After 18 hours the '10 minute' Santal Capsules in Pepsin fluid were still intact though much distended. Some of the same capsules in the Pancreatic fluid had completely dissolved, but not before 4 hours had elapsed. The '10 minute' Sodium Oleate Capsules in Pepsin fluid in 18 hours were distended but intact, and indeed after 24 hours the same, but some of the same Capsules in Pancreatic fluid in 18 hours had broken up, but none before 4 hours had elapsed. Longer treatment than 10 minutes, therefore, seemed undesirable. We next tried 1, 3, or 5 minutes in Formalin. The following results were obtained in the case of the Santal Capsules :—

		<i>Pepsin Fluid.</i>	<i>Pancreatic Fluid.</i>
1 minute in Formalin		Coating had commenced	Coating as in Pepsin
Santal Capsules at $\frac{1}{2}$ hour		to disintegrate.	Fluid.
" " 1 hour		Almost dissolved.	Disintegrated.
" " 2 hours		Completely dissolved.	Almost completely dissolved.
<hr/>			
3 minutes in Formalin.		Coating had commenced	Coating intact but
Santal Capsules at $\frac{1}{2}$ hour		to disintegrate.	swollen.
" " 1 hour		Completely dissolved.	Still intact.
" " 2 hours		" "	" "
" " 3 hours		" "	Dissolved.

5 minutes in Formalin.		<i>Pepsin Fluid.</i>	<i>Pancreatic Fluid.</i>
Santal Capsules at	$\frac{1}{2}$ hour	Coating swollen.	Coating swollen.
" "	1 hour	Further swollen.	" "
" "	2 hours	" intact. " but still	Still intact."
" "	3 hours	Still intact.	Dissolving.
" "	4 hours	Dissolved.	Dissolved.

From the above results it was clear we were on the borderland, and that something between 5 and 10 minutes seems to be necessary, but

N.B.—All the above experiments were conducted *without shaking* the capsules in the fluids.

We therefore tried 5 and 8 minutes Formalin treatment *shaking* the Capsules frequently in the Digesting Fluids.

Results ;—

Santal Capsules.		Shaken.	
5 minutes in Formalin.		In Pepsin Fluid.	In Pancreatic Fluid.
$\frac{1}{2}$ hour	...	Coating Swollen.	Swollen but intact.
1 "	...	80% " dissolved.	" Dissolved.
2 "	...	ditto.	
3 "	...	All dissolved.	
4 "	...		
Santal Capsules.		Shaken.	
8 minutes in Formalin.		In Pepsin Fluid.	In Pancreatic Fluid.
$\frac{1}{2}$ hour	...	Swollen but intact.	Swollen but intact.
2 "	...	ditto	ditto
3 "	...	ditto	ditto
4 "	...	Still intact.	Still intact.

From these results 8 minutes would appear to be too long so far as the Alkaline Digestion is concerned, but the following rather remarkable results were obtained with Controls, using Acid and Sodium Bicarbonate in the same proportion as in the above Digesting Fluid, but without either Pepsin or Pancreatin :—

Santal Capsules		Shaken with Acid.	Shaken with Alkali.
8 minutes in Formalin.			
1 hour	...	Some of the Capsules dissolved.	Intact.
2 "	...	Same No. ditto.	25% of the Capsules dissolved.
3 "	...	" " ditto.	50% dissolved.
4 "	...	" " ditto.	ditto.

We were therefore inclined to the view that Formalised Gelatin is more soluble in Acid alone than in Pepsin and Acid, also more soluble in Alkali alone than in Pancreatin with Alkali. There may be reasons for this. The circumstance, however, does not concern us greatly.—We are dealing with digesting fluids.

We next repeated the '5 minute' treatment in Acid and Alkaline Digesting Fluids with shaking, also without shaking, and added to this series '6 minute' and '7 minute' both shaken in Acid and Alkaline Digesting Fluid, and obtained following results :—

Santal 10 minims.	Still. 5 min.	Shaken. 5 min.	Shaken. 6 min.	Shaken. 7 min.
Hours.	Coating	Coating	Coating	Coating
1 Pepsin Fluid..	Swollen but intact.	75% dissolved.	Dissolved.	Swollen, 25% dissolved.
Panc. Fluid ...	Ditto.	Swollen.	Swollen (leaky).	Swollen.

Santal 10 minims.		Still, 5 min.	Shaken, 5 min.	Shaken, 6 min.	Shaken, 7 min.
Hours.		Coating	Coating.	Coating	Coating.
2	Pepsin Fluid... Panc. Fluid ...	Ditto. Ditto.	Dissolved. 25% dissolved.	— 25% dissolved.	75% dissolved. Intact.
3	Pepsin Fluid... Panc. Fluid ...	Ditto. Ditto.	— No marked change.	— 50% dissolved.	All dissolved. 50% dissolved.
4	Pepsin Fluid... Panc. Fluid ...	Ditto. 25% dissolved.	— 75% dissolved.	— 75% dissolved.	— All dissolved.
5	Pepsin Fluid... Panc. Fluid ...	Intact. 50% dissolved.	— All dissolved.	— All dissolved.	— —
7	Pepsin Fluid... Panc. Fluid ...	Still intact. 75% dissolved.	— —	— —	— —

This led to the conclusion that the '7 minutes' were insufficient. At this juncture it occurred to us that our Pepsin Fluid might be too strong compared with our Pancreatin Fluid, we therefore tried the Pepsin Fluid (which in most of these experiments was composed of 2% Glycerole Pepsin—strength 8 gr. of P.B. Pepsin in 1 dr.—diluted with 0.2% Hydrochloric Acid) made 10 times as strong. We also compared the Pancreatin Fluid, which had the composition :—

Liquor Pancreatis, *Off.* 2% with 0.5% Sodium Bicarbonate in water—with a fluid 10 times as strong—results being, retaining the same strength for the acid and alkali, *viz.*, 0.2% and 0.5% respectively :—

'8 minute' Capsules ... No difference in the Pepsin Fluids in 7 hours between the ordinary and the 10 ×.
Ditto ... In Pancreatin difference noticeable in 3 hours.
'10 minute' Capsules ... No difference in the Pepsin Fluids in 7 hours between the ordinary and the 10 ×.
Ditto ... In Pancreatin difference noticeable in 2 hours.

This tends to show that our Pancreatic Fluid might have been stronger with advantage.

The next experiment was to simulate the procedure which goes on in the human system by placing the '10 minute' Capsules first in Pepsin Fluid for 2 and 4 hours (the 4 hours would be the more correct approximation) and then transferring them to Pancreatic Fluid. Results :—

	At 1 hour.	2 hours.
In Pepsin 2 hours, then in Pancreatin	= 16% dissolved.	All dissolved.
In Pepsin 4 hour, then in Pancreatin	= 33% dissolved.	All dissolved.

This indicates that a '10 minute' Capsule probably passes intact.

through the stomach and is digested in the intestines in a further 1 to 2 hours' time.

A further set of experiments showed that perfectly fresh capsules after 15 minutes in Formalin dried quickly on blotting paper, and placed in Pepsin Fluid withstood this 3 hours, and on placing in Pancreatin Fluid disintegrated in a further two hours. For fresh capsules intended to be administered at once 15 minutes may be necessary—it must be realised, however, that the hardening process continues when such capsules are kept. Ten minutes' treatment with Formalin in this case was insufficient to render the capsules capable of withstanding the Pepsin Fluid for two hours.

Machine-made or hand-made capsules.—The results, we found, were practically identical with either. We found, with regard to the Formalin continuing to harden the mass, though removed from the solution, that capsules treated 1 minute only with Formalin and allowed to stand 24 hours, withstood Pepsin Fluid for 4 hours. (*c.f. antea.*)

The following **Formagules** are suggested :—

Copaiba 5 to 10 minims.

Creosote $\frac{1}{2}$ to 2 minims.

Eucalyptol $\frac{1}{2}$ to 1 minim.

Guaiacol Carbonate 1 to 4 grains.

Ichthyol 1 to 5 grains.

Iodipin 10 minims.

Iodoform (as test).—See p. 399.

Male Fern Extract 10 minims.

Methyl Salicylate $\frac{1}{2}$ to 1 minim.

Ox Gall 5 to 10 minims.

Quassia Extract. See p. 721.

Salol 2 to 10 grains.

Santal Oil 5 to 10 minims and Compounds.

Formagules should be employed for substances which irritate gastric mucous membrane, neutralise acidity of stomach, or are to act on intestinal membrane without action on stomach, *e.g.*, to destroy worms.

The experimental data both with regard to the Keratin and Formalised Gelatin coating should be viewed in the light of the considerable difficulties surrounding the problems—difficulties both technical and physiological.

It is to be understood with regard to Formalised Gelatin that freshly made Capsules require longer treatment with formalin than a capsule which has been allowed to dry somewhat—also that the formula of the 'Capsule Mass,' the thickness of the coating, and other points must be taken into consideration. As these experiments extended over five months it is only fair to state that the same batch of capsules was not employed throughout, and as a rule they were partially dried, *i.e.*, from 'Stock.'

Our conclusion is that though there is some possibility of guaranteeing freshly made Formalised capsules, they cannot be relied on to dissolve in the intestines if kept for a length of time.

The matter is one which should most certainly be placed on a more satisfactory basis than it has been heretofore.

***Keratinum.**—*Dose.*—8 grains (0·5 Gm.). It was found that Keratin, in combining with the gelatinous constituents 'glutine' of connective tissue forms in the body a nutritive substance Administered for syphilitic chronic myelitis and for tabes dorsalis, and has, perhaps, the power of checking the proliferation of connective tissue, and thus to be capable of combating locomotor ataxy.—F.N.1908,149.

A revised list of pills in general request is contained in the index.

***Pulverette Powder Pills (Patent)** are of special manufacture. These have a thin coating easily crushed to allow the powder to escape.

Cachets of wafer paper are useful for enclosing nauseous medicines, drugs that do not yield all their activity to any solvent, and those whose suspension in fluids is difficult or inaccurate owing to non-diffusibility or decomposition, or whose taste is disagreeable, such as

Antifebrin, Antipyrin, Bismuth Carbonate, Cascara, Compound Ipecacuanha powder, Charcoal, Guaiacol Carbonate, Guaiacum and Sulphur, Ichthoforin, Ipecacuanha sine Emetina, Methylene Blue, Naphthalin, Naphthol, Pepsin, Phenacetin, Quinine Sulphate, Rhubarb, Saccharated Ferrous Carbonate, Salicin, Salol, Sodium Salicylate, Sulphonal, Tannalbin, Trional.

Empty Gelatin (Hard) Capsules (Planten's) are short tubes closed at one end, telescoping into one another, used for a similar purpose.

Soft Gelatin Capsules are useful for dispensing nauseating drugs, particularly oils, for list, *vide* Index.

Capsules are official in P. Austr. and Ph. Ned.

A pill, cachet, or, in fact, any medicine, should always be followed by a draught of water, to carry it quickly through the œsophagus.

PINUS.

Pinus Sylvestris. *Syn.* SCOTCH FIR OR PINE.

From the wood of this tree (principally in America, France, Russia and Germany) much of the oleo-resin, common turpentine, oil of turpentine, Gum Thus or American frankincense, resin or colophony and tar (*vide* Pix Liquida) are produced. From its leaves also are prepared an extract, volatile oil and wool. At certain establishments in Germany, the Pine Cure of rheumatism by baths, &c., is conducted.

Oleum Terebinthinæ. (*Off.*) Oil of Turpentine is sometimes called Camphine.

OLEUM TEREBINTHINÆ RECTIFICATUM. (*P. Off.*) Oil distilled from the Oleo-Resin Turpentine) obtained from *Pinus Sylvestris* and other species of *Pinus*, rectified by redistillation. Sp. Gr. 0·869 to 0·870. R.I. 1·465 to 1·480. Almost entirely distils between 160° and 180° C., leaving no appreciable residue.*

Oleum Terebinthinæ Æthereum, FR. Cx., is distilled from *P. Pinaster* in France. Sp. Gr. 0·864 at 15° C $\alpha_D = -40^\circ$, 32.

Laevo-Pinene or **Terebentene** of Berthelot is obtained by fractionation of French Oil of Turpentine as a colourless mobile liquid of characteristic odor. Sp. Gr. 0·8767 at 0°/0° and 0·8619 at 17°

Dextro-Pinene or **Australene**, the principal constituent of American Turpentine has the same Sp. Gr. and boiling point, etc., as the French. O.R. is stated to be + 2·15°.—Allen, Vol. II., Part III., p. 262.

Capsules of Oil of Turpentine, 5 and 10 minims each. *Dose.*—1 or more.

* Schimmel claims 0·860—0·871 @ 15° C. for Sp. Gr.—Am. Jl. Ph., June, 06,256.
Observed limits :—

	Sp. Gr.	Rotation.
American	0·865 to 0·868	+1° to 6°.
French	0·870 to 0·874	−31° to −35°.
Russian	0·855 to 0·974	+5° to +16°.—P.J. II./08,624.

Uses.—In enteric fever a 10 minim capsule every two or three hours, or as emulsion with Spirit of Chloroform and Spirit of Nitrous Ether with good results.—B.M.J. ii./04,1450.

Its use in typhoid questioned.—B.M.J. i./05,414.

Turpentine is sometimes useful in removing fecal masses,—to be given only when the kidneys are healthy.—2 to 4 drachms with an ounce of Castor Oil.—C.D. ii./07,371.

Rapidly recurrent hæmorrhagic effusion into pleural cavity promptly relieved by 10 minim doses where other means, including intra-pleural injection of Adrenalin had failed.—M.P. Mar. 13, 07, p. 281. Some credit due to blisters.

Large doses of the Oil (3 to 4 drachms or more) have been used with success as an anthelmintic.

To remove bile concretions valuable. A drachm injected through the cystic duct.—B.M.J. ii./08,1808.

Large dose, 2 drachms to $\frac{1}{2}$ ounce and more said to be non-irritant, as also 5 to 10 minim doses, but moderate doses 30 to 60 minims to be used with caution. Large doses act on bowel only and little absorbed into the circulation. Hæmostatic in hæmorrhagia purpura. For children of 10 to 12 as much as $\frac{1}{2}$ ounce given with equal quantity of Castor Oil.—B.M.J. i./09,1218.

Emulum Olei Terebinthinæ, U.S.

Average dose.—1 drachm (4 Cc.).

Emulsify Turpentine Oil 15, Almond Oil 5, Acacia 15, with water 30, add Syrup 25 in portions, and finally water to 100.

Another form:—Turpentine Oil and Quillaia Tincture, of each 20 minims, water to 1 ounce.—B.M.J. i./06,318,480.

Enema Olei Terebinthinæ, St. M.'s H.

Turpentine Oil $\frac{1}{2}$ ounce, Starch Mucilage to 10 ounces. L.H. has Turpentine $\frac{1}{2}$ to 2 drachms, Starch Enema to 1 pint.

Enemata of Turpentine Oil with soapy water of great value for flatulent distension of the colon.—B.M.J. ii./04,1452.

On diagnosis of appendicitis if considerable flatus an enema of Turpentine Oil is valuable. Some give a dose of Calomel, but the active peristalsis so set up may be harmful.—L. ii./08,1138.

To prevent further infection after operation for peritonitis, Enema of.—M.P. Feb. 13, 07,177.

Stokes' Liniment, N.F. Syn. LINIMENTUM ALBUM.

Turpentine Oil 100 Cc., yolk and white of one egg, Acetic Acid 20 Cc., Rose Water 85 Cc., Oil of Lemon 4 Cc.

The following is said to be an expeditious way of making this:—Shake the yolks of 5 eggs (or entire contents) with water 500 Cc., strain and add Turpentine Oil 500 Cc., then add Acetic Acid 100 Cc., and shake during a few days to produce a white creamy product.

Linimentum Terebinthinæ (Off.).

Oil of Turpentine 26, Camphor 2. Dissolve, and emulsify by adding gradually to Soft Soap 3, dissolved in Distilled Water 4. Then add Distilled Water *q.s.* to 40. U.S. has Resin Cerate, melted on water bath, 65, Oil of Turpentine 35.

Knight's method is satisfactory.—Mix Solution of Potash (*Off.*) 3 ounces, with water 3 ounces in a bottle, add Oleic Acid 7 drachms previously mixed with Oil of Turpentine 3 ounces, and mix gently. To this emulsion add Turpentine 10 ounces with Camphor 1 ounce dissolved in it, in portions of 1 ounce or more at a time. Finally water *q.s.* to 1 pint.

Desirability of adding water in portions.—P.J. ii./08,291. B.P. method cannot be improved on.—P.J. ii./08,315.

Linimentum Terebinthinæ Aceticum (Off.).

Oil of Turpentine 4, Glacial Acetic Acid 1. Liniment of Camphor 4.

Spiritus 'Antiparalyticus.'—Turpentine Oil 4, Oil of Amber 4, Camphorated Spirit 64, Solution of Ammonia, 28. Used as a liniment.

*"Sanitas" Fluid, the solution resulting from the action of water upon air-oxidised turpentine, containing as its active principles hydrogen peroxide, thymol, a

soluble camphor, and some camphoric acid. A household disinfectant and oxidiser. Non-poisonous, does not stain linen. Is used in midwifery. "Sanitas" Oil has Sp. Gr. 0.95. A strong oxidising agent. For inhalation in phthisis. Diluted with spirit used as spray in a room, or 1 in 8 to 20 of olive oil for skin affections.

* "Sanitas Bactox." A Disinfectant of the coal tar order for medical use, having a Carbo'ic Acid co-efficiency upwards of 20, (*B. typhosus* test).

* "Sanitas-Okol" disinfectant. When diluted is non-poisonous. Does not contain Carbolic Acid. Stated to have a co-efficient of 20 against the *B. typhosus* as compared with Phenol in absence of organic matter and 17.7 in presence of organic matter.—Klein. And 18.6 in the case of *B. Coli*, also 28.2 in case of *B. Diphtherie*.

Shake thoroughly before use. For general use dilute 1 to 500 or 1,000. For cuts and wounds 1 in 300, skin affections 1 in 150.

Extractum Pini Sylvestris. Fir-Wool Extract.

A thick brown liquid, readily soluble in water and having a faint pine odour; 2 to 4 ounces are added to a 30-gallon warm bath for rheumatism.

Oleum Pini Sylvestris. Fir-Wool Oil.

Distilled Pine Needle Oil. For rheumatism applied by rubbing, the affected part being afterwards covered with warmed wadding.

Vapor Olei Pini Sylvestris (B.P. 1885 and T.H.).

Fir-Wool Oil 40 minims, Light Magnesium Carbonate 20 grains, Water to 1 ounce. One drachm to a pint of water at 140° F. forms a mild stimulant inhalation in chronic laryngitis.

Oleum Pini, Oil of Pine (Off.).

Dose.— $\frac{1}{2}$ to 3 minims (0.03 to 0.18 Cc.).

The oil of the leaf of *Pinus Pumilio* (*Conifera*) possesses more agreeable odour and taste than the last. Is sold under the fancy names of *Pinol and *Pumiline, and is used for inhalations. Jujubes, pastilles, and soaps are also sold, medicated with the oil. About $\frac{4}{5}$ of Pine Oil is soluble 1 in 5 of Alcohol 90%.

OLEUM PINI (*P. Off.*).—Distilled from the fresh leaves of *Pinus siberica*. It is readily obtainable. Sp.Gr. 0.900 to 0.920; O.R., -32° to -42°; R.I. about 1.744. It should contain 30 to 40% of esters (calculated as bornyl acetate), as determined by saponification with alcoholic potash. *Note.*—It is suggested to substitute this oil for that of *Pinus Pumilio*.

Syrupus Pini Pumilionis. Martindale.

Dose.—1 drachm (3.5 Cc.).

Pine Oil 1 ounce, Alcohol 90% 5 ounces, Saffron Tincture 5 drachms, Glycerin 5 ounces, Syrup *q.s.* to 1 pint. Rub the Pine Oil with $\frac{1}{2}$ ounce of Light Magnesium Carbonate, then add the Alcohol, Glycerin and Syrup in parts; filter.

Ⓢ Linctus Pini, Terpin et Heroin.—Syn. ELIXIR OF PINE, TERPINE AND HEROIN. Martindale.

Dose.—1 drachm (3.5 Cc.). Contains $\frac{1}{8}$ grain Heroin Hydrochloride and $\frac{1}{4}$ grain of Terpene Hydrate.

Dissolve Terpene Hydrate 40 grains in the alcohol in above, and Heroin Hydrochloride $3\frac{1}{8}$ grains in the Syrup, and proceed in other respects as above.

Ⓢ The Ⓢ Bournemouth Formulary' has Heroin $\frac{1}{4}$ grain, Terpene Hydrate 8 grains, Alcohol, 90% 6 drachms, Syrup of Virginian Prune Bark, 3 drachms, Glycerin 3 drachms. *Dose.*— $\frac{1}{2}$ to 2 drachms.

Sugar crystallising out in the case of these preparations with variation in temperature is frequently a difficulty. The following by replacing glycerin for syrup may be a useful hint.

Terpin Hydrate 17·5, Tincture of Sweet Orange Peel 10, Solution of Saccharin 1, Alcohol 436. Glycerin to 1,000.

Elixir Pini Terpin Hydratis (Simplex).

Dose.—1 drachm (3·5 Cc.) diluted.

May be made on the lires of Linctus Pini Terpin et Heroin, omitting the last mentioned, for children's use. The difficulty in these preparations is the amount of alcohol necessary to dissolve the Terpene Hydrate.

In this connection **Elixir Terpini Aceticus** *Dose*.—1 drachm diluted = 2 grains Terpene hydrate, was advised by an American worker.—(vide P.J. ii./09,391):—

Dissolve Terpene hydrate (powdered) 256 grains in alcohol 8 ounces, to which acetic acid 80 minims has been previously added, by aid of heat, then add Tincture of Orange 2 ounces, and finally Aromatic Elixir to 16 ounces.

It is extraordinarily strong in spirit.

Terpinol has been suggested as a substitute for Terpin hydrate but from our experiments it will not dissolve even in the Elixir Simplex B.P.C., 1894, even in the proportion of 2 minims in the ounce, so the suggestion must be discarded. Furthermore we did not find that the flavour obtained by using terpinol in any way comparable with that produced by our formula for Linctus Pini Terpin et Heroin.

⊙ Pinheroin.

Dose.—1 drachm every 2 or 3 hours, if necessary.

Contains Heroin Hydrochloride $\frac{1}{10}$ grain, Terpene Hydrate 1 grain with Essence of Canadian Pine. A special preparation as a respiratory stimulant.

⊙Glycogelatin Pastils (*q.v.*) are prepared containing each $\frac{1}{2}$ minim of Pumilio Pine Oil with $\frac{1}{2}$ Terpene Hydrate, and $\frac{1}{4}$ grain Heroin Hydrochloride.

Artificial Venice Turpentine.—Mix Resin 17, Linseed Oil (boiled) 12, Oil of Turpentine 8, or dissolve Resin in Oil of Turpentine; is mostly employed in the Arts. The true article exudes from the branches of the larch, *Larix Europæa* (*Coniferae*). *c.f.* Allen, Vol. II., Part 3, 07, 197 for further details.

Larch bark is an astringent (owing to Tannin content) and diuretic.

Alcoolat de Floraventi. *Syn.* BALSAMUM FIORAVENTI, FR. Cx.

Venice Turpentine (Térébenthine de Méleze) 10, Elemi 2, Storax 2, Galbanum 2, Myrrh 2, Laurel Berries (Baies de Laurier) 2, Aloes 1, Galangal 1, Ginger 1, Zedoary 1, Ceylon Cinnamon (Cannelle de Ceylan) 1, Cloves (Girofles) 1, Raisins (Muscades) 1, Origanum Dictamnus flowers (Dictame de Crète) 1, Alcohol (80%) 60 Macerate 2 days *s.c.* and distil to obtain 50. It is used as an embrocation in rheumatism.

For alopecia, Liqueur Ammoniac 1, Baume Floraventi 15, Spirit of Camphor 15. Apply with friction after washing with black soap.—B.M.J.E. ii./09,24.

Balsamum Locatelli.—Venice Turpentine 18, Yellow Wax 12, Olive Oil 18, Balsam Peru 2, Dragon's Blood 1. For chilblains (even if broken).—Ph. Notes.

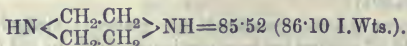
Dutch Drops, Haarlem Drops.—For lumbago and rheumatism. Usually a mixture of Oil of Turpentine, Guaiacum Tincture, and Spirit of Nitric Ether, with small portions of Oils of Clove and Amber.—B.M.J. ii./09,924.

Ph. Form. says,—Form now generally adopted in Denmark and Holland is:—Heat to 165°C. in an iron vessel, large enough to allow some frothing, Linseed Oil 4 and Sulphur 1, with stirring, until mixture drops off the stirrer with a glassy appearance. Remove from the fire and add 15 parts (by weight) of Oil of Turpentine, and agitate until solution is complete or nearly so, then filter. The liquid should be limpid and of a brownish-red colour.

Ⓐ **Hartmann's Wood Wool**, and **Wadding** consist of finely-comminuted pine wood, treated with sublimate; they are very absorbent, and are much used for dressing wounds, especially in the form of **Wood Wool Tissue**; and "towelettes" for ladies' use in menstruation are made also. **Accouchement sheets**, **gonorrhœa bags**, **vaccination pads** and **sponges**; **triangular pads** are also made (**bapkins**) for infants, as well as **Sheets** and **Mattresses** for use in diseases with infective discharges.

*PIPERAZIN. FR. Cx.

DIETHYLENE-DIAMINE.



Dose.—4 to 10 grains (0.26 to 0.65 Gm.), or 15 grains daily. Bayer says ordinary dose 15 to 30 grains.

Manufactured by the action of sodium glycol on ethylene-diamine hydrochloride; colourless alkaline deliquescent crystals of saline taste, soluble about 4 in 7 of water. Melts at 104° to 107° C., B. Pt. 145° C.

Flavoring.—Glyl Sassafras, Glyl Caryophylli; Syrupus Aurantii.

Uses.—Given internally for the uric acid diathesis, in gout and rheumatism, and urinary calculi. Said to prevent change from glycogen into sugar in diabetes.

Incompatible with alkaloidal salts, iron salts, quinine, sodium salicylate, spirit of nitrous ether.

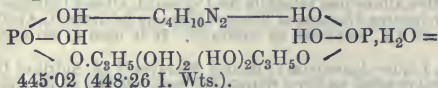
Effervescent Piperazin contains 5 grains in a drachm. *Dose.*—1 drachm (4 Gm.).

Effervescent Piperazin with Phenocoll.

Dose.—1 drachm (4 Gm.). Contains 5 grains of each in a drachm. A specific in painful rheumatic affections.

Tablets and '**Vescettes**' of **Piperazin**, 5 grains (0.32 Gm.) to be crushed and taken in a draught of warm water.

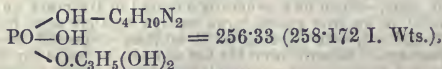
Glycero-Piperaz.—PIPERAZIN ACID GLYCEROPHOSPHATE.



Dose.—2 to 5 grains (0.13 to 0.32 Gm.).

A granular white salt, **soluble** in water, made by combining equivalent quantities of the base and acid.

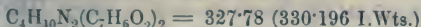
Piperazin Neutral Glycerophosphate.



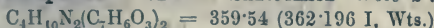
Similar in appearance to the above, melting at 155° C. Manufactured by

precipitating alcoholic solutions of equimolecular weights of the acid and the base.—P.J. i./05,693.

Benzo-Piperaz—PIPERAZIN BENZOATE—



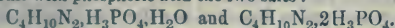
and **Salicyl-Piperaz**—PIPERAZIN SALICYLATE—*Dose* 2 to 5 grains—



are crystalline salts.—J.C.S.A. April, 1906,309.

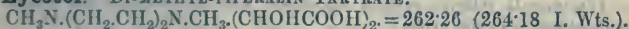
Piperazine Arsenates and Phosphates.

Piperazine forms with phosphoric acid the two salts :—



Of these, both are acid to phenolphthalein, and the first is alkaline and the second neutral to helianthin. The K salt, $C_4H_{10}N_2.KH_2PO_4$, is neutral to phenolphthalein and alkaline to helianthin. The two arsenates are similar in constitution to the phosphates, and show like behaviour with the indicators named. The salts of the type $C_4H_{10}N_2.H_3PO_4.H_2O$ may be regarded as analogous with disodium hydrogen phosphate or arsenate, and those of the type $C_4H_{10}N_2.2H_3PO_4$ may perhaps be regarded as salts of the acid, $2H_3PO_4$, mentioned by Giran, J.O.S.A. vol., ii., 686).—J.C.S.A. i./08,919.

***Lycetol**.—DI-METHYL-PIPERAZIN TARTRATE.



Dose.—15 to 30 grains (1 to 2 Gm.).

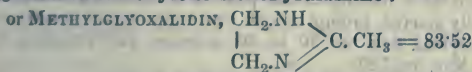
Causes increase of diuresis, and is stated to reduce Sp. Gr. of urine and to be useful in gout and rheumatism.—F.N. 1908,166.

Tablets 10 and 16 grains are made.

***Lysidine**.

Dose.—10 to 30 minims (0.6 to 1.8 Cc.).

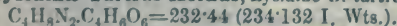
A 50% solution of Ethylene-Ethenyldiamine :



(84.084 I. Wts.) a mono-acidic base.

A colourless alkaline liquid, in acute gout and uric acid diathesis generally.

Lysidinæ Tartras Acidus, Lysidine Bi-tartrate.



Dose.—5 to 15 grains (0.32 to 1 Gm.).

In white crystalline powder, with a saline taste, non-deliquescent and readily soluble in water.

Sidonal, New. *Dose*.—30 grains (2.0 Gm.).

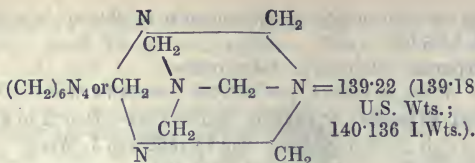
Said to be the anhydride of Quinic Acid (according to Zernick, Apoth. Zeitung 1906,463, approximately 75% Quinic Anhydride and 25% Quinic Acid). White crystalline powder, soluble about 1 in 2 of water, and about 1 in 11 of alcohol 90%. For gout. Tablets contain $7\frac{1}{2}$ grains.

Ichthyolidine. Piperazine Thiohydrocarburo sulphonate.

Dose. Up to 5 Gm. per diem has been given. 0.5 Gm. is suggested as initial dose.

Brownish powder containing 7% Piperazin as a uric acid solvent.—F.N. 1909.

Hexamethylenetetramine.—*Syns.* Hexamethylenamina, U.S., P.Jap., *Urotropine, Aminoform, Formin, *Cystamin, *Cystogen, *Metramine, Uritone, *Vesalvine, Naphthamine.



Dose.—5 to 15 grains (0.32 to 1 Gm.). in a large volume of water, or it may be carbonated water.

For children, 3 to 4 grains dissolved in water 4 to 5 times during the day.

Manufacture.—Method is given by Schmidt. *q.v.*

Flavoring.—It has only slight bitter taste. Syl Lavandulæ, Syl Rosæ; Syrupus Aurantii.

Colourless crystals, sublimable, prepared by combining Ammonia and Formaldehyde. **Soluble** 1 in 1 of water nearly, with alkaline reaction, in Alcohol 90% 1 in 8, almost insoluble in Ether. A valuable diuretic and solvent of Uric Acid concretions.

Uses.—It relieves cystitis associated with putrefaction and destroys typhoid bacilli in the urine.

The pyuria of tabes dorsalis, cholelithiasis and gonorrhœa (early stages) have been well treated.

In gonorrhœa give Hexamethylene-tetramine, Helmitol or Sodium Acid Phosphate.—L. i./08,24.

In gonorrhœa Urotropine, Salol, Camphoric Acid with Phenol-phthalein to counteract constipating action of Salol beneficial.—L. i./09,508.

All cases in which meningitis is a possible or threatened complication, or where actually started, prompt use of Urotropine by the mouth appears in the cerebro-spinal fluid in 30 to 60 minutes and exercises beneficial effect.—Pr. Nov. '09,720.

B. Coli thrive in Urotropinised urine!—Pr. 09,658.

Tablets, 3, 5 and 7½ grains, and Urotropine Effervescent Tablets 4 grains. Vesalvine Tablets 5 grains.

Vesalvine Effervescent, 5 grains in 1 drachm.

Cystogen is also supplied in effervescent form.

***Helmitol.** *Syn.* NEW UROTROPINE. **Dose.**—15 grains (1.0 Gm.) (to 30 grains in chronic cases.—W.W.W.). Max. daily dose 90 grains (6 Gm.).

$\text{C}_7\text{H}_6\text{O}_7(\text{CH}_2)_6\text{N}_4$ or $\text{C}_{13}\text{H}_{18}\text{O}_7\text{N}_4$ (M.Am.) = 339.75 (342.184 I. Wts.). A white powder, soluble about 1 in 7 of water and slightly soluble in alcohol 90%. Said to be the anhydro-methylene citrate of hexamethylenetetramine; given internally (as urinary antiseptic) liberates formaldehyde—for cystitis, urethritis, and gonorrhœa. Also for the strangury of prostatic enlargement.—W.W.W.

Incompatible with alkalis and their carbonates and hot water. It is stated to yield twice 'as much Formaldehyde in normal urine as Hexamethylenetetramine.

To prevent renal complications of scarlatina.—B.M.J.E. i./06,68. **Tablets** contain 5 grains (0.32 Gm.).

***Hetralin.** — *Syn.* DIOXYBENZOL - HEXAMETHYLENETETRAMINE.
 $C_6H_{12}N_4C_6H_6O_2 = 248.44$ (250.184 I. Wts). *Dose.*— $7\frac{1}{2}$ to 30 grains
 (0.5 to 2 Gm.).

In crystalline needles containing about 60% of hexamethylenetetramine. *Soluble* 1 in 10 of water, and about 1 in 20 of alcohol 90%. Is employed in urethral diseases and cystitis; it is a good urinary disinfectant.—L. i./06,985.

Tablets weigh $7\frac{1}{2}$ grains.—P.J. ii./03,764.

***Cystopurin.** *Syn.* Hexamethylenetetramine-Sodium Acetate,
 $(CH_2)_6N_4.2CH_3COONa + 6H_2O = 409.42$ (412.33 I. Wts.).

Dose.—30 grains (2 Gm.). A crystalline salt made by evaporating solutions of the components in the above proportion. In gonorrhœa.—F.N. i.908,64.

Result of analysis led Zernick to believe that it is a mixture of the two substances in approximate quantities.—B.M.J. i./08,1124.

Hexamethylenetetramine Triborate. *Syn.* ***BOROVERTIN.**
 $(CH_2)_6N_4.3HBO_2 = 270.05$ (272.16 I. Wts.).

Dose.—15 to 60 grains (1 to 4 Gm.) daily.

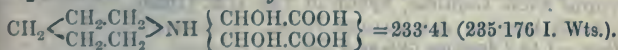
Stated to be prepared by combining 1 molecule Hexamethylenetetramine with 3 molecules of Boric Acid— $3H_2O$ are set free and the Boric Acid is converted into Metaboric Acid.

Crystalline powder containing about 50% Hexamethylenetetramine, readily soluble in water, taste bitter. Urinary antiseptic *e.g.*, in gonorrhœal cystitis, pyelitis, renal calculus and tuberculosis of the bladder and kidneys—not always successful.

Urodonal a preparation of Urotropine, Sidonal and Lysidine in granular form.

Dose.—3 teaspoonsful during the day. The three components are stated to be useful in removing acidity.

Piperidinæ Tartras. — *Syn.* PIPERIDINE ACID TARTRATE.



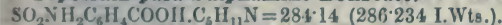
The tartrate of the base piperidine, which is made by reducing pyridin in alcoholic solution, with sodium amalgam or may be made from Piperine by distillation with Soda Lime or by boiling with Alcoholic Potash.

Dose.—15 grains (1 Gm.) three times a day. Colourless pleasant-tasting crystals, readily soluble in water. A powerful solvent of uric acid.

Effervescent Piperidine Tartrate.

Dose.—1 drachm or more; 5 grains in 1 drachm.

Piperidin-para-Sulphamine Benzoate.



Under the name of ***CALCUSOL**, a combination of this salt with potassium bicarbonate is supplied in effervescent form, 5 grains in 60 grains, for the uric acid diathesis and renal calculus. Tablets of this combined salt and potassium bicarbonate are supplied; also Tablets 5 grains of the piperidine salt alone.

PIX LIQUIDA.

Tar (Off.). U.S. Known in commerce as Stockholm Tar, obtained by the distillation of the wood of various species of *Pinus* (*Coniferae*).

Dose.—2 to 10 grains (0.13 to 0.65 Gm.) in a pill with lycopodium, or in perles (2½ grains each).

As a diuretic and in bronchial catarrh and winter cough, it is very useful, and has been given for gastro-intestinal catarrh. Soluble about 1 in 1 of alcohol 90%.

On account of their antiseptic properties, both Wood and Coal Tar and preparations of them have been used for surgical dressings. The former yields Creosote, *q.v.*

***Tenax**, a refined variety of oakum is prepared in 1-lb. packets for use as a surgical dressing.

Aqua Picis. Tar Water.—*Syn.* AQUA PICEA, EAU DE GOUDRON (FR. CX. 1884).

Tar 1, Sand 3. Mix and add Distilled Water 200. Macerate, with shaking, for 24 hours, filter. *Dose.*—5 to 10 ounces (140 to 280 Cc.).

Pix Burgundica, Burgundy pitch (*Off.*), the resinous exudation from *Picea excelsa* (*Coniferae*) melted and strained is employed in making **Emplastrum Picis** (*Off.*)

Oleum Picis Rectificatum, Light Oil of Tar.

Dose.—1 to 5 minims (0·06 to 0·3 Cc.).

Two distilled oils of Wood Tar are met with in commerce, one light, known also as Rectified Spirit of Tar Sp. Gr. about 0·9, sherry-coloured or reddish; deodoriser, and antiseptic. The other is a dense black oil.

Pilula Picis Liquidæ.

Dose.—3 to 6 grains (0·2 to 0·4 Gm.).

Tar 1, Soap 1, Compound Tragacanth Powder $\frac{1}{4}$, Licorice Powder $2\frac{3}{4}$. Useful for winter cough.

Syrupus Picis Liquidæ, Syrup of Tar, U.S. (1900).

South American. *Syn.* JARABE BREA.

Dose.—1 to 2 drachms (3·5 to 7 Cc.).

Tar 5, wash with water 100; treat residue with the Alcohol 50, add Magnesium Carbonate 10, and Sugar 50, triturate and add Water 400; stir 2 hours and filter. Dissolve Sugar 800 in the filtrate by gentle heat and make up to 1,000 with Water.—B.P.C. is similar. Taste may be covered equal quantity of syrup of wild cherry (*q.v.*); \mathcal{D}_{83} to \mathcal{D}_{10} grain of apomorphine hydrochloride may also be added to each dose. Useful in chronic bronchitis and winter cough.

\mathcal{D} **Syrupus Picis cum Codeina.** P. Helv. *q.v.*

Codeine 1, Sugar 505, Tar Water 324, Glycerin 150. Dilute Alcohol 20. *Dose.*— $\frac{1}{2}$ to 2 drachms (1·8 to 7 Cc.).

Unguentum Picis Liquidæ. Tar Ointment (*Off.*).

Tar 5, Yellow Beeswax 2. Useful in psoriasis.

Warm the tar to about the melting point of the wax, mix and stir. U.S. has Tar 50, Yellow Wax 15, Lard 35.

In chronic dry eczema with much lichenification of the skin, this Ointment thickly smeared on pieces of lint, and the whole tightly bandaged on to the part and left 24 to 48 hours. The resolution of the thickening and the healing often satisfactory.—B.M.J. i./09, 1342.

Oleum Cadinum. (*Off.*) U.S., P. Helv.—*Syn.* Juniper Tar Oil.

Oleum Juniperi Pyro-ligneum. Huile de Cade. By distillation of wood of *Juniperus Oxycedrus* and some other species (*Coniferae* or *Pinaceæ*).

This oil varies enormously. It is difficult to obtain an oil of gravity 0.990 (*Off.*) No tests given for other tar oils and tests proposed from time to time unsatisfactory.—Umney.—C.D. ii./09,580.

Method of Manufacture and Reactions, Y.B.P. 1907, 27.

Recommended in eczema and other skin affections, also for gout and rheumatism.

Unguentum Olei Cadini et Sulphuris.

Cade Oil 10, Sulphur 1, Vaseline 15, Lanolin 15.

Oleum Cadini Aceticum.

Acetic Acid 1, Cade Oil 10. This and the former are used for alopecia.—B.M.J.E. ii./09,24.

In psoriasis a drachm to the ounce of Olive Oil brushed in, then Boric Acid Powder freely dusted on.—L. i./09,968.

Oleum Juniperi Ligni.

A trade name for Fictitious Juniper Oil, supposed to be made from the wood but is generally a mixture of Juniper Berry Oil (*Off.*) q.v. and Turpentine.

Oleum Fagi Pyroligneum, Beech Tar.

On the Continent used as a source of creosote.

Linimentum Picis (Lassar).

Beech Tar 4, Birch Tar 3, Olive Oil 1, Alcohol (70%) 1.

Oleum Rusci Pyroligneum. Said to be obtained from Butcher's Broom. Is really identical with *Oleum Betulæ Pyroligneum*, Birch Tar.

A yellowish-brown oil from *Betula Alba* (L.) by distillation.

The above Oils are used instead of Tar. The odour of Russia leather is due to Birch Tar. They are all miscible with other fats, but do not blend perfectly with alcohol.

Oleum Betulæ, U.S., is obtained by maceration and distillation from *Betula Lenta* (*Betulacea*). Essentially equivalent to *Oleum Gaultheriæ*, q.v.

Usually estimates about 99% Methyl Salicylate.—P.J. ii./08,622.

Oleum Gaultheriæ (*P. Off.*) from *Gaultheria Procumbens*, and **Oleum Betulæ** (Oil of Sweet Birch) by distillation from the bark of *Betula Lenta* being practically identical, one monograph will suffice. *Characters and Tests*.—Colourless liquid with strong characteristic odour and pungent taste. Sp. Gr., 1.180 to 1.187; O.R., 02 to -1°; R.L., 1.537 to 1.539; Soluble 1 volume in 6 of 70% Alcohol at 25° C. Should contain at least 99% Methyl Salicylate determined by the saponification process, q.v.

Unguentum Olei Cadini. *Adopted by G.H.*

Melt Yellow Beeswax 1, add Huile de Cade 1, and stir till cold. Used in psoriasis and dry eczema. Lard may be used as a diluent if a weak ointment be required. L.H. has 1 drachm with soft paraffin to 1 ounce.

An ointment of Glycerin of Starch 100, Oil of Cade 100, Green Soap 5, also the Oil used in form of baths, has cured psoriasis.

Unguentum Rusci Compositum.—Beech Tar 30, Calamine 45, Resin Ointment 120, Zinc Ointment 120, Carmine Trituration 4, Liquid Paraffin 15.

Is suitable for chilblains, eczema, prurigo, and psoriasis, and for irritation due to piles.

* **Resinol Ointment and Soap.** Proprietary preparations for skin eruptions and inflammations.

PLUMBUM.

Pb=205·35 (207·1 I. Wts.).

Plumbi Acetas, (*Off.*) U.S. FR. CX. *Syn.* SUGAR OF LEAD
Saccharum Saturni, Ph. Ned.

Pb.(CH₃COO)₂, 3H₂O=376·15 (379·196 I. Wts.).

Dose.—1 to 5 grains (0·065 to 0·32 Gm.).

FR. CX. *Max. single dose* 1½ grains; max. during 24 hours 5 grains approximately.

Colourless crystals or masses (U.S. requires 99·5% pure) soluble in water 1 in less than 3; in Alcohol (90%) 1 in 30, in Glycerin 1 in 2.

(*See also* Glycerinum Plumbi Subacetatis and Liquor Plumbi Subacetatis Fortis and Dilutus.)

Incompatible with Carbonates, Soluble Chlorides, Sulphates, Tannates, Potassium Iodide and Opium preparations. The *Subacetate* is incompatible with Acacia Mucilage.

Uses.—Astringent, *e.g.*, in severe diarrhœa, and as a hæmostatic in gastric ulcer; is a powerful poison. Externally as lotion for eczema, leucorrhœa, gleet, pruritus and for bruises.

Antidotes.—Emetics or Stomach Tube, Magnesium or Sodium Sulphate followed by Stimulants.

Atropine in full doses relieves colic and keeps bowels open.—*C.f.* Edn. XII., p. 160.

Plumbic optical neuritis due to children poisoning themselves with lead paint. Treatment—Dilute Sulphuric Acid and Saline laxatives, hypodermic injections of Pilocarpine (the latter continued for six weeks), after the first few days Potassium Iodide, 5 grains thrice daily for a child of 8.—B.M.J. ii./o8, 1488.

Injectio Plumbi, R.F.H. Solution of Lead Subacetate 20 minims, Water to 1 ounce. In venereal diseases.

Lotio Plumbi Spirituosus. Lead Subacetate Solution 1, Glycerin 2, Alcohol (90%) 4, Rose Water to 32. Has given immediate relief in piles in many cases.

Plumbi Nitras, U.S.

Pb(NO₃)₂=(328·49 U.S. Wts.), (328·51 B.P. Wts.), (331·12 I. Wts.). Colourless or opaque crystals. Soluble in water about 1 in 2.

Plumbi Carbonas (*Off.*) CERUSSA, Ph. Ned. 2PbCO₃.Pb(OH)₂ = 768·91 (775·316 I. Wts.).

Heavy white insoluble powder, soluble in dilute Acetic and Nitric Acids. Used as dusting powder for burns. 1 to 10% ointment in skin diseases.

Electrolysis of lead water pipes, owing to leak of 1·8 volts in earthed returns of electric cable, resulting in contamination of the water.—B.M.J. i./o6, 139.

Lead poisoning amongst yarn workers.—B.M.J. i./o6, 310.

Unguentum Plumbi Carbonatis (*Off.*).

1 in 10 Paraffin Ointment, as a local sedative on bruised surfaces, burns and skin affections.

Pasta Plumbi cum Cupro.—(A) Lead Carbonate 8 ounces,

Mastich Varnish (*q.s.*) about 2 ounces, to make a thin paste. (B) Copper Sulphate, Zinc Sulphate and Lead Acetate of each 40 grains, rubbed together. Mix A and B and add Linseed Oil 1 ounce. This preparation has been used with great success in bad cases of erysipelas.—Ph. Notes.

Plumbi Iodidum (*Off.*) $PbI_2 = 457.15$ (460.94 I. Wts.).

Yellow crystalline powder. Used locally to reduce swellings. Only very slightly soluble in water.

Unguentum Plumbi Iodidi (*Off.*). 1 in 10 Paraffin Ointment.

In some forms of skin disease.

Plumbi Oxidum (*Off.*). *Syn.*—LITHARGE. $PbO = 221.23$ (223.1 I. Wts.).

Yellowish-red powder (Massicot) or scales. Used to prepare **Emplastrum Plumbi** (*Off.*) (*q.v.*).

Notes on litharge—an examination of a number of samples, also of plasters made with various Oils.—P.J. ii./08,349.

Minium, P. Belg., *Red Lead*, $Pb_3O_4 = 679.57$ (685.3 I. Wts.). Made by heating Massicot.

PODOPHYLLIN.

Syn. PODOPHYLLI RESINA (*Off.*). U.S.

Dose.— $\frac{1}{4}$ to 1 grain (0.016 to 0.065 Gm.) as a cholagogue and aperient pill or tablet. (Laxative $\frac{1}{10}$ grain; purgative $\frac{1}{4}$ grain, U.S.). *Fr. Cx.* *Max. single dose* $\frac{3}{4}$ grain. *Max.* during 24 hours 3 grains approx. It is slow in action—8 to 10 hours before producing evacuation.

The resin from the dried rhizome of *Podophyllum peltatum*—*Berberidaceae* (*Off.*, U.S.)—American Mandrake, or May apple, sometimes called Vegetable Mercury as it is a powerful biliary purgative. Yellowish powder, soluble in aqueous ammonia. Ash should not exceed 2%.

U.S. requires Podophyllin to be 99% soluble in alcohol, not less than 75% in ether, not less than 65% in chloroform, nor more than 25% soluble in water.

Alcohol, Solubility of (Conference Paper). Its insolubility increases with age. Some give as much as 10% insoluble. Insolubility should not exceed 2%.—P.J. ii./03,346.

Fluidextractum Podophylli, U.S. 1=1. *Average dose.*—8 minims.

Podophylli Indici Resina, I.C. *Add.* (*q.v.*) From *P. Emodi*. Is richer in Podophyllotoxin than that from *P. peltatum*.

Podophyllotoxin.

$C_{20}H_{15}O_9(O.CH_3)_3 + 2H_2O = 476.61$ (480.224 I. Wts.).

Is the principal constituent of Podophyllin. It is more certain in its action than Podophyllin and is given in dose of $\frac{1}{10}$ to $\frac{1}{4}$ grain, to children $\frac{1}{16}$ to $\frac{1}{8}$ grain. It is best administered by dissolving 1 grain in 2 drachms of 90% alcohol. *Dose.*—8 to 20 drops in a teaspoonful of syrup.

Ⓟ **Pilula Podophyllin Composita.**

Podophyllin $\frac{1}{4}$ grain, Barbados Aloes 1 grain, Capsicum $\frac{1}{4}$ grain, Green Extract of Belladonna $\frac{1}{4}$ grain, Excipient *q.s.* for one pill weighing 3 grains. One or two form a biliary aperient dose. Ⓟ *St. Th. H.* has Podophyllin grain, Calomel 1 grain, and Alcoholic Extract of Belladonna $\frac{1}{4}$ grain weighing 2 grains.

Pills supplied to the Italian Army for constipation are stated to contain Podophyllin 0.1 Gm., Aloes 0.06 Gm., Nux Vomica 0.005 Gm.

Ⓟ *Pilula Podophyllin et Quininæ.*

Quinine Sulphate 1 grain, Podophyllin $\frac{1}{2}$ grain, Milk Sugar $\frac{1}{2}$ grain, Green Extract of Belladonna $\frac{1}{8}$ grain, Extract of Socotrine Aloes 1 grain. To make one pill, or, if the quantities be taken in grammes, 15 pills, weighing 3 grains. They are useful 'dinner pills,' and must be taken *with* food.

Ⓟ *Dinner Tablets.*

These are similar to the above pills and weigh 3 grains. They are recommended not coated for prompt action.

Ⓟ *Pilulæ Podophylli, Belladonnæ et Capsici, U.S.*—100 pills contain Podophyllum Resin 1·6 Gm.; Extract of Belladonna leaves 0·8 Gm., Capsicum 3·2 Gm., Sugar of Milk 6·5 Gm., Acacia 1·6 Gm., Glycerin and Syrup *q.s.*

Tinctura Podophylli (Off.).

Twice the strength of that of B.P. 1885.

Podophyllin 1, Alcohol (90%) 30. Dissolve and filter. Might be 70% Alcohol.—P.J. ii./09, 142.

Dose.—5 to 15 minims (0·3 to 0·9 Cc.).

Flavoring. — Syl Lavandulæ (double dose), Syl Amygdalæ Amaræ; Syrupus Zingiberis, Elixir Saccharini.

In dose of 2 to 4 drops in tea or coffee, taken night and morning, is useful in sick-headache and biliousness, where the bowels and liver are sluggish in worried and overworked patients, and in chronic diarrhœa with cutting pains and high-coloured motions. Also relieves constipation with clay-coloured motions following diarrhœa of infants, 1 or 2 drops on sugar twice or three times a day.—R. Its taste must be covered with aromatics.

Since it affects the intestinal epithelium podophyllin acts well in removing ankylostoma and other intestinal worms.—B.M.J.E. i./04, 48.

Tinctura Podophyllin Ammoniata.

Podophyllin 1, Aromatic Spirit of Ammonia 50. Dissolve, and after standing, decant. Is miscible with water.

Dose.—10 to 20 minims (0·6 to 1·2 Cc.), diluted, as a purgative and cholagogue. The sal volatile acts as a corrective.

***Chologen Tablets** are said to contain mercury and podophyllin, and are recommended to dissolve gall stones and check cholelithiasis. Supplied in 3 strengths, to be taken three times during a year.

POTASSIUM.

K = 38·83 (39·10 I. Wts.).

Potassa Sulphurata (Off.). Liver of Sulphur. Deliquescent yellowish brown masses, smelling of sulphuretted hydrogen. Used in skin affections. *Balneum*, 2 ounces to 15 gallons.

Unguentum Potassæ Sulphuratæ. Liver of Sulphur 1, Sodium Carbonate 1, Lard 8. For Ringworm

Potassii Acetas (Off.), U.S. CH_3COOK = 97·41 (97·44 U.S. Wts.), (98·124 I. Wts.).

Dose.—10 to 60 grains (0·65 to 4·0 Gm.).

Deliquescent white crystals, masses or powder. Antilithic, diuretic and uric acid solvent. Soluble in Water 2 in 1. in Alcohol (90%) 1 in 2.

Flavoring.—Syl Pini, Syl Lavandulæ, Syrupus Aurantii (full dose).

The formula should officially be omitted. 10% of H_2O (dry at $110^\circ C$.) would be reasonable in next B.P.

To prevent puerperal eclampsia. Keeps the urine alkaline if given in sufficient dose, but will not cure the albuminuria; it does, however, prevent eclampsia.—B.M.J. ii./09,550.

Mistura Diuretica, St. M.'s H.

Potassium Acetate 20 grains, Spirit of Nitrous Ether $\frac{1}{2}$ drachm, Spirit of Juniper $\frac{1}{2}$ drachm, Tincture of Ginger 10 minims, Water to 1 ounce.

N. H. W. has Potassium Acetate 20 grains, Solution of Ammonium Acetate 2 drachms, Vinegar of Squill 20 minims, Infusion of Broom 2 drachms, Water to $\frac{1}{2}$ ounce.

Mistura Anti-Catarrhalis. BURNEY YEO.

Spirit of Nitrous Ether 1 drachm, Opium Tincture 10 minims, Ipecacuanha Wine 5 minims, Solution of Ammonium Acetate 3 drachms, Camphor Water to $1\frac{1}{2}$ ounces. To be taken at night. Assists action of skin and kidneys.—L. ii./08,1661.

Potassii Benzoas. $C_6H_5COOK.3H_2O = 212.6$ (214.188 I. Wts.).

Dose.—15 to 20 grains (1 to 1.3 Gm.). White crystalline powder. Soluble in water 1 in $1\frac{1}{2}$ and in alcohol (90%) 1 in 20. Uric acid solvent.

Flavoring.—Syl Aurantii Floris, Syl Vanillæ; Syrupus Aurantii

Potassii Bicarbonas (Off.) U.S. $KHCO_3 = 99.38$ (99.41 U.S. Wts.), (100.108 I. Wts.).

Dose.—5 to 30 grains (0.32 to 2.0 Gm.).

White powder or crystals soluble 1 in water 4. Insoluble in Alcohol (90%). Antacid, diuretic, and Uric Acid solvent. It is most valuable in acute rheumatism.

Flavoring.—Syl Cinnamomi, Syl Lavandulæ; Syrupus Aurantii, Syrupus Simplex.

Potassii Bichromas (Off.) U.S.

$K_2Cr_2O_7 = 292.3$ (292.28 U.S. Wts.), (294.2 I. Wts.).

Dose.— $\frac{1}{15}$ to $\frac{1}{4}$ grain (0.0065 to 0.013 Gm.), in pill with Kaolin Ointment or in Capsule has been used in dyspepsia and gastric ulcer.—Soluble 1 in 10 water.

Poisoning by.—L. ii./07,1758.

Cancer, number of cases successfully treated by 'Sublimated' *i.e.*, simply pure Potassium Bichromate Solution 10%. Injections 7-15 minims. Also local application of the solution,—B.M.J. i/09,589.

Rodent ulcer apparently cured in 3 months.—B.M.J. ii./09, 1225. Pres. 1910, p. 18.

Müller's Fluid.

Potassium Bichromate $2\frac{1}{2}$, Sodium Sulphate 1, Water 100. Is used in histology for hardening tissues.

Potassii Bromidum (Off.) $K Br = 118.18$ (119.02 I. Wts.).

Dose.—5 to 30 grains (0.32 to 2 Gm.).

Colourless or white crystals with saline taste. Soluble in water in 1 less than 2, and in about 200 of Alcohol 90%.

B.P. requires 98·9% pure. White Cross Congress suggested only 98%. Desirable to maintain purity.—C.D.ii./09,581.

DETERMINATION OF CHLORIDE IN.—In the Silver Nitrate titration method it is more accurate to add excess of silver nitrate and determine excess with standard sulphocyanide solution than to use potassium chromate. It is, however, better to oxidise the hydrobromic acid in acid solution with an oxidising agent, *e.g.*, ammonium persulphate or lead peroxide. The hydrochloric acid being unaffected by these can be titrated with silver nitrate solution. (Caspari, Meyer Bros. Drug, 1905, 249.)

Incompatible with Mineral Acids, Mercury and Silver Salts.

Flavoring.—Glyl Rosæ, Syl Vanilla; Syrupus Zingiberis, Extractum Glycyrrhizæ Liquidum.

Uses.—Hypnotic and sedative, and is given as a drink cure. Often given with other bromides, *c.f.* Sal Bromatum, and with Chloral Hydrate, Arsenic or Belladonna.

In puerperal eclampsia two doses respectively of Potassium Bromide 30 grains, with Belladonna Tincture 10 minims,—B.M.J. ii./08,600.

Potash Salts are usually regarded as depressent to all living tissues, especially the heart and circulation. Such is only the case when a certain concentration is reached. Given *per os* they are more rapidly excreted than absorbed, so that the concentration in the blood increases little. To produce depressent action it must be injected. Potassium Bromide may be taken as safely as Sodium Bromide.—Dixon.—B.M.J. ii./09,540. *vide* also C.D.ii./09,471, in which there appears difficulty in assimilation.

Epilepsy suggested to have its origin in some endogenous or exogenous flora in the intestinal tube. All the various drugs used have the power of retarding fermentation. It is a noticeable fact that many epileptic patients have foul breath before an attack, tongue is coated, and there may be stomatitis,—B.M.J. ii./09,1407.

Potassium Bromide with Nux Vomica will keep patient free from epileptic fits whilst treatment is persisted in.—L.i./10,355.

Tablets contain 5 and 10 grains.

To avoid the onset of Bromism give Fowler's Solution of Arsenic, and maintain the antiseptis of the bowels by purgatives, naphthol and salol.

For erections in gonorrhoea 15 to 35 grains with Lupulin 1 to 2 grains and Camphor 1 to 2 grains in waxpaper-covered powders two to four daily.—Pr. Apl. '09,543.

Ⓟ **Mistura Dysmenorrhœica, N.H.W.**

Potassium Bromide 15 grains, Tincture of Hyoscyamus $\frac{1}{2}$ drachm, Sal Volatile $\frac{1}{2}$ drachm, Spirit of Chloroform 10 minims, Water to $\frac{1}{4}$ ounce.

Elixir Quinque Bromidorum. Can. Form.

Potassium and Sodium Bromides of each 1,600 grains, Ammonium Bromide 960 grains, Calcium Bromide 480 grains, Lithium Bromide 160 grains, Tincture of Cannabis Indica 2 ounces, Aromatic Elixir, sufficient to make, 40 ounces. Dissolve the Bromides in the aromatic elixir, add the Tincture of Cannabis Indica, and filter if necessary. *One drachm contains 15 grains combined Bromides.*

Potassii Carbonas (Off.) U.S.

Syn. SALT OF TARTAR. $K_2CO_3 = 137\cdot21$ (137·27 U.S.; 138·2 I. Wts.). *Dose.*—5 to 20 grains (0·32 to 1·3 Gm.).

White deliquescent powder. Soluble in water 4 in 3, insoluble in alcohol 90%. Employed chiefly as lotion externally; internal properties similar to those of the Bicarbonate. Commercially contains about 16% H_2O .

Potassii Percarbonas. $K_2C_2O_6 \cdot H_2O = 214.64$ (216.216 I. Wts.). White crystals, soluble in water, giving off oxygen. Used chiefly as 'antihypo' in photography, also for decolourising instead of Sulphuric Acid in 'Ziehl-Neelsen's' method of staining *Bacillus Tuberculosis*, *q.v.*

Potassii Chloras (*Off.*) U.S.

$KClO_3 = 121.66$ (121.68 U.S. Wts.), (122.56 I. Wts.).

Dose.—5 to 15 grains (0.32 to 1 Gm.).

Manufactured by passing chlorine into water holding lime or magnesia in suspension, treating the clarified liquid with Potassium Chloride, and crystallising the resulting chlorate from the liquor. Colourless crystals with saline taste. *Soluble* in water 1 in 16.

Incompatible with Oxidisable substances, Ferrous Salts, Sugar, Nitrites, Calomel, Hypophosphites, Vegetable Powders, Potassium Iodide.

Uses.—Is antiseptic and a powerful oxidising agent. Is useful in stomatitis and in sore mouth arising from Mercurial treatment. Must not be given when the kidneys are diseased.

Sixteen grains produced methæmoglobinæmia and death (special idiosyncrasy).—L. i./06, 126.

Poisoning by 20 Gm. Transfusion of defibrinated human blood tried. Death.—L. ii./07, 1175.

Lozenges, Tablets, plain, and with Borax and Cocaine, are useful to allay irritation and improve the voice. Gargle, spray, mouth wash may be 2% strength. Chlorine Gargle is made from it, *q.v.*

Pulvis Potassii Chloratis Compositus, C.L.T.E.

Potassium Chlorate 1, Borax 1, Sodium Bicarbonate 1, Sugar 2. Forms the solids of

Collunarium Potassii Chloratis Compositum, C.L.T.E.

Directions.—One teaspoonful to be dissolved in a quarter pint ($\frac{1}{4}$ tumbler) of tepid water. Half of the solution to be injected with a syringe along the floor of each nostril night and morning. Afterwards blow the nose freely.

Chloratifice, a tooth paste, contains this Salt. For spongy guns and to prevent Tartar and act as a general antiseptic.

Potassii Chloridum. $KCl = 74.02$ (74.56 I. Wts.).

Has been advocated for use in place of table salt by gouty and rheumatic individuals, or a mixture of Potassium Chloride with Sodium Chloride is better to taste, or—

Pulvis Potassii et Sodii Chloridi Compositus.—*Oliver.* Potassium Chloride 16, Sodium Chloride 8, Lithium Benzoate 1. A half drachm measureful to be taken.

The late Sir W. Roberts advocated Potassium Chloride for increased arterial pressure. Oliver found a tendency to indulge more and more in the use of salt in advancing age (over 65). When Potassium is ingested in excess of Sodium, a loss of the latter takes place from the system.—L. i./07, 1348.

Potassii Citras (*Off.*).

$C_3H_5(OH)(COOK)_2 \cdot H_2O = 821.99$ (824.356 I. Wts.).

Dose.—10 to 40 grains (0.65 to 2.6 Gm.).

A white powder obtained by neutralising citric acid with potassium carbonate. It is produced commercially by a special process as a neutral,

non-deliquescent, crystalline powder. It has diaphoretic, diuretic, and febrifuge properties. Also for gout, and in enuresis where the urine is over-acid. U.S. requires 98·77% pure.

Flavoring.—Syl Anisi, Syl Sassafras; Elixir Saccharini, Syrupus Pruni Virginianæ.

'Vescettes' of Potassium Citrate, 15 grains.

To be crushed and taken in a draught of warm water.

① **Potassii Cyanidum.** KCN = 64·68 (65·11 I.Wts.) Fr. Cx.

Official as a test, in fused masses. No dose is mentioned, but $\frac{1}{4}$ to $\frac{1}{2}$ grain (0·0054 to 0·016 Gm.), of the crystallised salt may be given; a solution of one grain of the crystals in 23 minims of distilled water is equivalent in strength to Acidum Hydrocyanicum Dilutum (2%), in place of which it is sometimes used.

Fr. Cx. has *max. single dose* $\frac{1}{6}$ grain. Max. during 24 hours $\frac{5}{8}$ grain approximately.

Antidotes.—See Acid Hydrocyanic. Adrenalin Solution, (1-1000) 3 drachms (diluted) is stated to delay absorption.—B.M.J.E. ii./09,68.

① **TRADE VARIETIES.** In addition to the B.P. salt, (about 95%), pure are 'Gold Cyanide' 98 to 100%, really a double Cyanide of Potassium and Sodium, but, we understand, the B.P. article is also used for gold extraction.

Potassium Cyanide 30% strength, is supplied in sticks; this is 'silver cyanide,' *i.e.*, for the silver extraction process.

① **Syrupus Potassii Cyanidi cum Morphina.**

Dose.—1 drachm, thrice daily.

Potassium Cyanide 4, Morphine Sulphate 2, Syrup of Virginiian Prune to 3,000.

In bronchitis or phthisis with excessive cough.—H.

Potassii Ferrocyamidum, U.S.

$K_4Fe(CN)_6 \cdot 3H_2O = 419·66$ (B.P. and U.S. Wts.) (422·358 I. Wts.).
Dose.— $7\frac{1}{2}$ grains (0·5 Gm.).

Said to be physiologically almost without action.—P.J. ii./05,924.

Potassa Caustica, Potassii Hydroxidum, (Off.) U.S.
KOH = 55·71 (56·108 I.Wts.).

Manufactured by interaction of Potassium Carbonate and Calcium Hydroxide. White deliquescent sticks or cakes. **Soluble** in water 2 in 1, and in twice its weight of 90% alcohol.

Incompatibles.—Acids, metallic salts, alkaloidal salts and preparations.

Antidotes.—Any dilute vegetable acid, fixed oils, stimulants; not stomach pump or lavage.

Given in mixtures as **Liquor Potassæ (Off.)** (5·85%), well diluted; also used as a caustic.

Flavoring.—Syl. Menthæ Piperitæ, Syl. Amygdalæ Amaræ, Elixir Aurantii.

Alcoholic Potassium Hydroxide Solution for analytical work (Permanent),

Dissolve Potassium Hydroxide in required amount in its own weight of water and pour the solution when cold into Alcohol 95% about 900 Cc.

with constant shaking. Dilute with Alcohol to 1000 Cc., mix and set aside until the oily drops of 'Aldehyde resin' have separated. Decant twice.—J.C.S.A. ii./08,689.

Potassii Iodidum. (*Off.*). U.S. KI = 164.73 (166.02 I. Wts.). In white or colourless cubic crystals soluble in less than its own weight of water, and in 12 parts of Alcohol 90%. *Incompatible* in solutions with Spiritus Ætheris Nitrosi, Salts of Iron (except Ferri et Ammonii Citras and Liquor Ferri Acetatis), Salts of Bismuth, Lead and Mercury, with Liquor Strychninæ Hydrochloridi, with Quinine Sulphate and other alkaloidal salts, Silver Nitrate and Potassium Chlorate.

A Doctor prescribed a mixture of Potassium Iodide and Tincture of Perchloride of Iron hundreds of times and had never met with any difficulty.—C.D. i./10,67.

A slightly alkaline solution of Potassium Iodide keeps better than an acid one.

B.P. requires 98% pure, U.S. 99%, White Cross Congress suggested 97%. No necessity to reduce.—C.D. ii./09,581.

Flavoring.—Syl Lavandulæ, Gyl Menthæ Piperitæ, Syl Vanillæ Extractum Glycyrrhizæ Liquidum, Syrupus Zingiberis.

Uses.—In universal use in the later stages of syphilis, in arterio-sclerosis, and certain cases of gout and rheumatism.

Is specific for actinomycosis; very large doses are given, *e.g.*, 20 grains thrice daily.—B.M.J. iii./06,1128. L. ii./04,1225.

Obliterative arteritis, a case of, treated by Potassium Iodide and rest.—L. ii./09,1207.

Cutaneous actinomycosis treated by the **Thomassen's Potassium Iodide method**—10 grains thrice daily for the first week, 15 grains the second week and 20 grains the third week. The granulation immediately commenced to contract; subsequently 30—35 grains thrice daily, ultimately complete disappearance. For some weeks in succession as much as 320 grains daily. Earlier 30 exposures of "X" rays had been given.—B.M.J. ii./09,453.

Rheumatoid arthritis best treated by 10-grain doses thrice daily, with Guaiacol Carbonate.—Luff, *Pr.* July, 05.

In exophthalmic goitre Potassium Iodide is to be avoided. Iodine is being poured into the system in excessive quantities by thyroid secretion.—B.M.J. ii./05,1249.

It is conceivable that Iodides (shown to have no depressing effect on the heart or blood pressure) ultimately lower blood pressure by stimulating the thyroid to increased secretion.—L. ii./07,878.

Goitre and Iodine compounds. The best effects of Iodine on the thyroid are only obtained by doses much smaller than those usually employed.—B.M.J.E. ii./08,12.

Thyroid gland, enlargement of; rapid resolution under Potassium Iodide. Interesting in that Iodides often cause sudden enlargements of the thyroid gland. A case of, not goitre.—B.M.J. i./09,1064.

For asthma lessens the tendency to attacks.—M.A. 1906,132.

In arterio sclerosis the pressure is lowered.—B.M.J. i./06,319.

A patient stood an average of 37 grains per diem for 57 days.—B.M.J. i./07,1120.

In raised arterial tension where source of danger, 1 to 10 grains thrice daily continued for fortnightly periods with intervals of a week beneficial.—Brunton. L. ii./o8,1132; B.M.J. ii./o9,67.

In aneurism, pain and paroxysm frequently relieved by as much as 450 grains per diem.—B.M.J. i./o7,605.

In the knowledge of the writers a patient has taken for 12 months at a time 73 grains daily without unpleasant effect. When he begins taking it after an interval he has a peculiar throbbing near the ears.

Arterial thickening remarkably benefitted by Potassium Iodide and Bromide,—regularly for 4 months 4 grains of each thrice daily. Pain over the heart, originally complained of, disappeared.—B.M.J. ii./o8,1009.

In dry forms of disease of the middle ear.—B.M.J. ii./o4,1206,1209.

In tinnitus aurium associated especially with vertigo, due especially to labyrinthine disease, may well be used in large doses.—B.M.J. ii./o9,1131.

Most cases of auditory vertigo are amenable to a mixture of Iodide and Bromide of Potassium with Hydrobromic Acid.—L. i./10,355.

Secondary and tertiary syphilis of larynx and trachea treated by Potassium Iodide and Mercurials internally and by inunction.—B.M.J. i./o6,62.

Gumma (assumed) of the cerebellum treated by 10 grains doses thrice daily, increased to 25 grains with success.—B.M.J. ii./o9,793

Acute parotitis favourably treated by painting the swelling with Iodine and administering Potassium Iodide internally.—B.M.J. i./o6,81.

Tuberculous expectoration greatly assisted by.—B.M.J. i./o7,630.

Chronic ulcers believed to be, in the vast majority of cases, of gummatous origin, hence antisyphilitic treatment. Potassium Iodide 10 to 20 grains thrice daily, (freely diluted if not well borne) until the ulcers heal, and afterwards Mercury as a safeguard against reappearance. Quinine a useful adjunct to the Iodine. Occasionally intermit the Iodide:—L. ii./o9,1420.

Sterules, Hypodermic, of Potassium Iodide contain 5 grains. *Pilula Potassii Iodidi*.—Contains 1 grain or more.

Potassium Iodide 1 grain, Sodium Carbonate Exsiccated $\frac{1}{2}$ grain, with Tragacanth and Syrup. Tablets and Capsules contain 5 grains.

Ⓢ *Elixir Sex Iodidorum*. Can. Form.

Potassium and Sodium Iodide each 320 grains, Arsenic Iodide 2 grains, Mercuric Iodide 2 grains, Manganese Iodide 32 grains, Glycerin of Ferrous Iodide 30 minims, Sodium Hypophosphite a sufficient quantity, Aromatic Elixir, sufficient to make, 40 ounces Add the six Iodides to the Elixir, dissolve by agitation, and add sufficient Sodium Hypophosphite to decolorise the liquid. Filter. *Dose* (assumed).—1 to 2 drachms.

**Spirone Inhalant* (*Churchill's*).

Pharm. Form. says,—A solution of Potassium Iodide in a mixture of Acetone 1, Glycerin 2, and Water 13. The figures approximately represents the parts. The Iodide is in the proportion of about 8 grains to the ounce.

A special spray apparatus is provided.

We understand the rights in Churchill's Inhalant have been purchased. See also B.M.J. ii./o8,1904. 'Will be found useful in relieving certain symptoms common in consumption.' See also B.M.J. i./o9,196,512. (An adjuvant to Churchill's Hypophosphites, *q.v.*)

Linimentum Potassii Iodidi cum Sapone (*Off.*).

Mix fresh Curd Soap in fine shreds, 13½ with Water 67½, and Glycerin 6·75 in a

porcelain dish on a water bath. When dissolved, pour the liquid on to Potassium Iodide 10·125 in powder in a mortar. Triturate briskly until cold. Set aside 1 hour; and add Lemon Oil 0·844.

A soft jelly-form Liniment of Potassium Iodide and Soap may be produced with Soft Soap $\frac{1}{2}$, Potassium Iodide $1\frac{1}{2}$, Glycerin 1, Water 10. The following is somewhat stiffer: Soft Soap 1, Potassium Iodide $1\frac{1}{2}$, Glycerin 1, Water 10.—P.J. ii./04, 376.

Iodine-Water-Sterilising Tablets are prepared for destroying bacteria in water and for preparing antiseptic lotions. These have been used on water infected with *B. typhosus*. C.F. Antityphoid Tablets.

Potassii Nitras (*Off.*). U.S. $\text{KNO}_3 = 100\cdot41 (101\cdot11 \text{ I. Wts.}; 100\cdot43 \text{ U.S. Wts.})$. *Syn.* NITRE. *Dose.*—5 to 20 grains (0·32 to 1·3 Gm.).

Flavoring.—Syl Rosæ, Glyl Lavandulæ; Syrupus Tolutanus, Syrupus Zingiberis.

Fumus Potassii Nitratis (Nitrated Papers).

White blotting-paper, impregnated with 20% Nitre solution. To relieve asthma these are burnt and the fumes inhaled.

Asthmatic Pastilles are prepared in cones containing a mixture of chlorate and nitrate of potassium.

Pulvis Lobeliæ Compositus. ASTHMA POWDER.

Potassium Nitrate 240, Boiling Distilled Water 240. Dissolve and add to Lobelia (*v. p.* 713) in powder, Stramonium Leaves in powder, Black Tea in powder, 240 of each. Mix well, dry, and add Oil of Anise 1. The fumes of half a teaspoonful or more to be inhaled six or eight times a day, and the bedroom fumigated with same.

*Himrod's Cure, Bliss's Cure, and the Green Mountain Cure resemble the above.

Asthmatic Cigarettes contain a basis of Stramonium treated with Nitre.

Schulze's Maceration Mixture.

A mixture of Potassium Chlorate 10 (moistened with water) with Nitric Acid 40; or a Solution of 0·06 Potassium Chlorate in Water 100 Cc. and 1 Cc. of Nitric Acid. For separation of muscle fibre in animal, and ligneous tissue in vegetable histology.

Effervescent Potassic Aperient.

Dose.—One drachm in half a tumbler of warm water.

A preparation containing Potassium Sulphate (*Off.* and U.S.), $\text{K}_2\text{SO}_4 = 173\cdot00 (174\cdot27 \text{ I. Wts.})$, Magnesium Sulphate and Sodium Bicarbonate, with Citric and Tartaric Acids. Suggested as an alternative to Sodio-Magnesian Aperient (*q.v.*) also prepared with

Potassium Sulphocarbolate 10 grains in a *dose* (as above). Is useful where gastric and intestinal fetor are present.—Colin Campbell.

Potassii Metabisulphis. $\text{K}_2\text{SO}_3\cdot\text{SO}_2 = 220\cdot70 (222\cdot34 \text{ I. Wts.})$. Fr. Cx.

Anhydrous Crystals soluble in 2 parts of water. Treated with acid it liberates about 52 to 57% Sulphurous Anhydride. (Fr. Cx.).

Manufactured by passing Sulphurous Anhydride (SO_2) into Potassium Carbonate until saturated. The metabisulphite is then precipitated with Alcohol. This salt has a similar action to ordinary sulphite in preserving Pyrogallie Acid from oxidation and preventing the staining of gelatin films. It has the drawback, however, that on oxidation free Sulphuric Acid is produced, requiring an extra amount of alkali to neutralise it.—(P.J.F. 1904). The Sodium Salt has analogous composition.

Potassii Nitris. $\text{KNO}_2 = 84\cdot53 (85\cdot11 \text{ I. Wts.})$.

Dose.— $\frac{1}{4}$ to $1\frac{1}{2}$ grains (0·016 to 0·1 Gm.).

A crystalline deliquescent powder. It is a vaso-dilator, improves the cerebral circulation and is given for migraine, asthma and epilepsy.

Pulvis Potassii Nitritis Compositus.

Potassium Nitrite $\frac{1}{2}$ grain, Potassium Nitrate 18 grains, and Potassium Bicarbonate 25 grains; mix and dispense in parchment paper. This dose may be given every morning in a tumbler of water to reduce blood pressure; is diuretic. Has thus checked recurrent epistaxis. Should be tried for gout.—L. ii./02,331.

Pulvis Sodii Nitritis Compositus.

Sodium Nitrite $\frac{1}{2}$ to 2 grains, Potassium Nitrate 10 to 20 grains, and sometimes Potassium Bicarbonate 10 grains—this in a tumbler of water every morning—to reduce blood pressure. May be continued daily for a good many years.—Brunton L.ii./08, 1132. B.M.J. ii./09,66.

Potassii Phosphas, Di-potassic Hydrogen Phosphate.

$K_2HPO_4=172\cdot98$ (174·208 I. Wts.)

Dose.—1 to 10 grains (0·065 to 0·65 Gm.).

A deliquescent granular powder; is given as an alterative in phthisis and urinary affections.

Sal Polychrestum. Syn. Glaser's Salt.

Dose.—30 to 120 grains.

A mixture of Potassium Sulphite and Sulphate, has a sulphurous odour, has been given for dyspepsia and for chronic skin diseases.

Sal Enixum is Potassium Bisulphate. $KHSO_4=135\cdot17$ (136·178 I. Wts.).

***Potassii Sulphocyanas (Sulphocyanide). $KCNS=96\cdot5$ (97·18 I. Wts.). *Dose.*— $\frac{3}{4}$ to 3 grains (0·05 to 0·2 Gm.).**

Has been employed as antispasmodic and anodyne—in phthisical cough and catarrh, dyspnoea, and mania.—M. Am.

Potassii Tartras (Off.).—Normal or Neutral Potassium Tartrate. $(CHOH)_2COOK\cdot COOK, \frac{1}{2}H_2O.=233\cdot52$ (235·240 I. Wts.)

Dose.—30 to 240 grains (2 to 16 Gm.).

Crystalline powder with bitter taste. The formula should contain $\frac{1}{2}$ the quantity of water shewn.

Manufactured by neutralising Acid Potassium Tartrate with Potassium Carbonate.

Soluble.—About 5 in 3 of water. Has purgative and diuretic properties.

Potassii Tartras Acidus. (Off.) Potassii Bitartras, U.S. Syn.

PURIFIED CREAM OF TARTAR.

$(CHOH)_2COOH\cdot COOH=186\cdot75$ (188·14 I. Wts.).

Dose.—20 to 60 grains (1·3 to 4·0 Gm.).

The crude tartar deposited during the fermentation of wine—recrystallised. A white powder with acid taste soluble 1 in 200 of water. Diuretic and cathartic. Is employed in acute renal disease. Where the urine is thick and alkaline, this salt neutralises and produces normal appearance. B.P. requires 97·11 and U.S. requires 98·99% pure. It is used to prepare **Haustus Imperialis** K.C.H., **Imperial Drink**, which contains 1 in 160 of water, with Tartaric Acid 1, Sugar 16, and Lemon Oil 12 minims to the gallon.

*Not (M) or (P) but should certainly in our opinion be supplied with caution.

Potus Imperialis, G.N.C. Lemon Syrup $1\frac{1}{2}$ ounces Acid Tartrate of Potassium 1 drachm Water to 20 ounces.

Potassii Boro-Tartras. SOLUBLE CREAM OF TARTAR. P.G.

Dose.—20 to 40 grains (1·3 to 2·6 Gm.).

An amorphous white powder. Potassium Acid Tartrate 5, Borax 2. Dissolve with heat in water, *q.s.*, and evaporate to dryness.

FR. Cx.—Dissolve Potassium Bicarbonate 100 in Boiling Water 600 and add Tartaric Acid 75; add Boric Acid 50. When dissolved add Tartaric Acid 25. Filter, evaporate to a syrup, and dry at 40°C. May be scaled.

Soluble to extent of 1 in 1 of water.

Use.—Similar to that of Cream of Tartar.

PRUNI VIRGINIANÆ CORTEX (*Off.*).

Syn.—WILD CHERRY BARK, U.S.

The bark of *Prunus serotina* (*Rosaceæ*) contains amygdaline; on distillation with water it yields an essential oil rich in hydrocyanic acid; on moistening the bark with water, the odour of the latter is developed (*vide* also p.123). It possesses bitter tonic properties, with more or less sedative ones. The preparations in use—the tincture and syrup—are used to palliate the cough in phthisis, pertussis and bronchitis, in palpitation of the heart, and debility, particularly of the digestive organs.

Identification of various Spurious Cherry Barks. *P. Avium* is paler, taste bitter and astringent. Almond odor scarcely perceptible. *P. Pennsylvanica*, red brown, taste scarcely bitter. *P. Virginiana*. The bitter almond flavour is more perceptible than in any except *P. Serotina*. Holmes P.J.i./09, 112.

The bark yields 0·075% of its weight HCN.—B.C.D. i./09, 131.

Ⓐ **Syrupus Pruni Virginianæ** (*Off.*).

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Percolate Virginian Prune Bark, in No. 20 powder, 3 with Water to 9, dissolve Sugar 15 without heat. Add Glycerin 1·25, strain, and pour Water over strainer, *q.s.* to 20. U.S. has these quantities, excepting Sugar 14 and Glycerin 3.

Hallaway finds the B.P. method extracts 35%, Cline's 50%, Berluger's (with Glycerin) about 70% of the hydrocyanic acid. Glycerin extracts Tannin. The B.P. method is easy to work. Cline's process—which consists in macerating the bark 2 to 4 hours at 60°C., then percolating, adding Glycerin to the percolate and finally dissolving the sugar, is thought best. This reduces the Tannin content and increases the HCN, the enzyme being more active at the higher temperature, but even in the strongest syrup the HCN strength is only 0·008 per cent., or roughly 1/13, the strength of Cherry-Laurel Water.—P.J. ii./09, 798.

N.B.—Astringent Syrups used as vehicles for cough preparations would cause Codeine, Heroin, etc., to precipitate. Tannin should be limited in the bark by an official test if possible.—Umney, *ibid.*

Ⓐ **Syrupus Benzaldehydi Hydrocyanicus.**

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.). Saturate Distilled Water $10\frac{1}{2}$ with Benzaldehyde, dissolve Sugar 15 in the liquid, and add 0·01 per cent. of Hydrocyanic acid. Except for the colour, which could be adjusted, this preparation corresponds closely to the official Syrup of Virginian Prune.—Rutherford Hill.

It is recommended to modify the U.S. process by packing and macerating the moistened powder in a percolator 24 hours with water *q.s.* to suberge and to percolate until the receiver containing the Glycerin contains 60 Cc. liquid at least. U.S. has a considerable error here.—Am. Jl. Ph. July/09, 316.

Ⓟ Tinctura Pruni Virginianæ (Off.).

Dose.—30 to 60 minims (1·8 to 3·5 Cc.).

Virginian Prune Bark, in powder, 8; Distilled Water 15. Macerate 24 hours in a closed vessel, and add alcohol (90%) 25. Macerate 7 days more, express and filter.

PYRIDINA. FR. CX.

$C_5H_5N=78\cdot49$ (79·05 I. Wts.).

Dose.—5 to 10 minims (0·3 to 0·6 Cc.) daily, increased.

A colourless alkaline liquid with persistent odour, miscible with water and alcohol, boils at 243° F.; obtained from many organic substances by dry distillation; is contained in and combined with nicotine in tobacco smoke. Sp. Gr. 0·980.

Purified by shaking with moist magnesium hydrogen phosphate, and then dehydrating with caustic potash.

Uses.—It is probably the relieving agent of various cigarettes and powders smoked or burnt for asthma and whooping cough. A drachm of it is placed on a plate in a small room, in which the patient remains from 20 to 30 minutes three times a day. Is employed for making De-naturalised Alcohol in Germany.—See Alcohol.

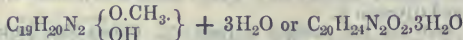
Pyridine is a very powerful cardiac depressant.

It is valuable in increasing tension of an eye in danger of destruction from infection. Some remarkable cures effected with it. Must be free from ammonia and amines.—J. Burdon Cooper.

For asthma allowed to evaporate in the room—a teaspoonful in a saucer.—M.P. July 28/09, 95.

QUININA.

FR. CX., P. SVEC., P. HUNG.



=375·48 (378·260 I. Wts.). Ph. Ned. is anhydrous.

Dose.—1 to 4 grains (0·065 to 0·26 Gm.) or more (if anhydrous, 3 parts equal approximately 4 of sulphate).

The most valued cinchona alkaloid, a bitter, white amorphous powder.

Soluble.—Very slightly in water, 1 in 40 of ether and about 1 in 1 of alcohol 90%, also in dilute acids, 1 in 3 of chloroform, and in aqueous ammonia. Antipyrin increases its solubility in water. Its solution in diluted sulphuric acid is fluorescent, lævogyrate, and gives, with chlorine water and ammonia afterwards added, a green colour due to Thalleioquin.

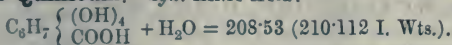
Quinine, is not so bitter as its salts, hence may well replace them.

For children, especially native infants, it is excellent for treatment of malaria. It is readily absorbed by the acid of the stomach, and medicinally quite as effective.—Jl. Trop. Med., Nov. 15, /09, 336.

It can be detected in the urine 10 minutes after taking.

Quinidine Sulphate. $(C_{20}H_{24}N_2O_2)_2 H_2SO_4 \cdot 2H_2O = 776\cdot78$ (782·542 Wts.) is the salt of another alkaloid, soluble 1 in 100.

Acidum Quinicum. *Syn.* KINIC ACID.



Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

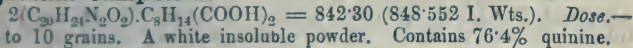
An acid contained in Cinchona, principally combined with the alkaloids and with calcium, forms white crystalline masses, soluble in water about 5 in 6, and in alcohol 90% 1 in 35. It is decomposed into hippuric acid in the system. In gout and rheumatism.

* **Urosin Tablets**, 8 grains, are a Quinic Acid and Lithium compound; one several times a day; for gout.

Ⓐ **Quininæ Arsenas.** $2(C_{20}H_{24}N_2O_2), H_3AsO_4 + 8H_2O = 927.74$ (934.536 I. Wts.). *Dose.*— $\frac{1}{8}$ to $\frac{1}{4}$ grain (0.008 to 0.032 Gm.) in a pill.

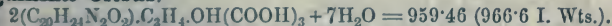
Small white crystals, sparingly soluble in water. It is an antiperiodic, given in chronic malarial fevers. Contains about 15.2 % of arsenic acid, and 69.4% of quinine.

Quininæ Camphoras.



to 10 grains. A white insoluble powder. Contains 76.4% quinine.

Quininæ Citras.



Dose.—1 to 5 grains (0.065 to 0.032 Gm.).

Soluble 1 in 900, has, therefore, little taste. Given suspended in mixture. Contains 67.1% Quinine.

Effervescent Quinine Citrate. *Dose.*—1 drachm.

Contains 1 grain in 1 drachm.

Ferri et Quininæ Citras (Off). Ferri et Quininæ Citras

Solubilis, U.S. P. Helv. and P. Svec. 10% Quinine.

Dose.—5 to 10 grains (0.32 to 0.65 Gm.) in solution, or in pills with simple syrup or mucilage of acacia (not in excess, as, unless made very hard, they lose shape). Alcohol 60% with Glycerin 5% is also a suitable excipient. Contains about 15% of quinine (U.S. 11.5%), is in greenish scales, deliquescent and very soluble in water. It has an agreeable bitter, chalybeate taste, and is largely employed as a general tonic.

U.S. has further, Ferri et Quininæ Citras, of reddish brown colour, slowly soluble in water.

Incompatible with Tannin and Alkalis, also with Phosphoric Acid (Ferrie Phosphate may be thrown out), unless considerably diluted prior to mixing.

Flavoring.—Glyl Vanillæ, Glyl Menthæ Piperitæ (bold dose); Syrupus Zingiberis.

Effervescent Citrate of Iron and Quinine.

Dose.—1 drachm (4 Gm.)=3 grains of the salt.

Tablets of Iron and Quinine Citrate, 3 grains.

Syrupus Ferri et Quininæ Citratis.

Dose.—1 drachm (3.5 Cc.). 1 in 20 of Orange Syrup.

Ⓐ **Ferri, Quininæ et Strychninæ Citras** (v.p. 653) contains 1% of Strychnine.

Quininæ Formas ("Neutral" in France).
$$C_{20}H_{24}N_2O_2 \cdot (H.COOH)_2 = 413.18 \text{ (416.244 I. Wts.)}$$

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

Long white needles containing 77.9% Quinine, M.Pt. 95° C.

Quininæ Formas ("Basic" in France). *Syn.* CHINOFORM, QUINOFORM. $C_{20}H_{24}N^+O_2.HCOOH = 367.51 \text{ (370.228 I. Wts.)}$.

Dose.—1 to 5 grains (0.065 to 0.32 Gm.). Subcutaneously 1 to 3 grains. (Stated not to be painful.)

Prepared by using a very small quantity of water, in which the Quinine is placed and the acid added. Crystals melting at 132°; levorotatory. Contains 87.5% Quinine. A general tonic. Suitable for hypodermic use.

Guttæ 1 in 50 have been employed satisfactorily in asthenopia.

Quininæ Hydrobromidum, U.S. FR. CX.—'Basic' Quinine Hydrobromide. P. HELV. Quinine Bromide,
$$C_{20}H_{24}N_2O_2.HBr + H_2O = 420.07 \text{ (423.156 I. Wts.)}$$

Dose.—1 to 5 grains (0.065 to 0.32 Gm.) or more.

White acicular crystals, soluble 1 in water 40. (P. Helv. 60.)

Contains 76.6% of Quinine. Quinine is given with an excess of hydrobromic acid to lessen the cinchonism sometimes caused by large doses. Is valuable in acute rheumatism. In malaria for oral administration, hypodermically or intravenously.

Tablets contain 3 and 5 grains, also 3 grains, with Phenacetin, 5 grains. Hypodermic Tablets of the Salt $\frac{1}{2}$ grain.

Tropical abscess, a case of, treated by aspirating and injecting into the cavity 1% solution of this Salt.—B.M.J. ii./o8, 1812.

Quininæ Hydrobromidum Acidum. (FR. CX.—'Neutral' Quinine Hydrobromide.)
$$C_{20}H_{24}N_2O_2 \cdot 2HBr + 3H_2O = 536.18 \text{ (540.126 I. Wts.)}$$

Dose.— $\frac{1}{2}$ to 2 grains (0.032 to 0.13 Gm.) hypodermically.

In yellowish rectangular prismatic crystals, or in powder. Contains 60% of Quinine. Soluble 1 in 7 of water, and is well adapted for hypodermic injection. It is entirely unirritating. The additional hydrobromic radical tends to prevent quinism.

Sterules, Hypodermic, contain 2 grains each.

Injectio Quininæ Hydrobromidi Acidi Hypodermica. 1 grain in 6 minims.

Dose.—3 to 12 minims (0.18 to 0.7 Cc.). Used where quinine cannot be borne by the stomach. Useful in malarial fever and subsequent rheumatism.

Quininæ Hydrochloridum (*Off.*) FR. CX. 'Basic,' U.S., P. HELV,

P. JAP., P. HUNG.

$$C_{20}H_{24}N_2O_2.HCl + 2H_2O = 393.79 \text{ (396.712 I. Wts.)}$$

Dose.—1 to 10 grains (0.065 to 0.65 Gm.).

In acicular crystals. Soluble 1 in 40 of water, 1 in 3 of 90% alcohol.

Quinine Hydrochloride 2 with Antipyrin 1 will dissolve in 4 of water.

Contains 81.7 % base against 73 $\frac{1}{2}$ % in the sulphate.

Uses and References—

Emulsion, 1 in 60 with cod liver oil, for dressing burns, chronic ulcers and intertrigo.—L. i./o2, 443.

It is sometimes better tolerated than the Sulphate.

In malaria various Quinine preparations discussed. Some stated to have produced black-water fever. Subcutaneous or intravenous injections useful where not tolerated by the mouth. **Giemsa's Injection** advocated:

Quinine Hydrochloride 10 Gm., Water 18 Cc., Ethyl-Urethane 5 Gm., Volume of product 30 Cc., so that 0.5 Gm. is contained in 1.5 Cc. of solution for injection.—B.M.J.E. ii./09/20.

For the paroxysmal headache or neuralgia so common after malaria the following mixture is recommended:—Quinine Hydrochloride 3 grains, Tincture of Cimicifuga 5 minims, Citrate of Caffein 2 grains, Spirits of Chloroform 10 minims, Compound Infusion of Orange to 1 ounce, twice daily.—Brooke, p. 284. *Vide* also Quinine Acid Hydrochloride.

As a fever prophylactic quinine hydrochloride 3 grains with phenacetin 5 grains is largely used in Portugal.—Ph. Notes.

In syphilis should be tried where Mercury fails. 10% solution used, giving in all $4\frac{1}{2}$ to $5\frac{1}{2}$ Gm. spread over 14 to 20 days.—B.M.J.E. ii./08,55.

Mistura Quininæ cum Ferro.

Dose.— $\frac{1}{2}$ ounce thrice daily in water 30 minutes after food.

Quinine Hydrochloride 30 grains, Tincture of Ferric Perchloride $\frac{1}{2}$ ounce, Glycerin 1 ounce, Water to 8 ounces.

Bad cases of secondary syphilis do well on this.—B.M.J. ii./09,120.

Soluté de Quinine pour injection hypodermique.—FR. Cx.

Quinine Acid Hydrochloride 3 Gm., Antipyrin 2 Gm., Water to 10 Cc. Special instructions as to sterilisation are provided, *q.v.*

For further information on this Hydrochloride vide p. 573.

Pessus Quininæ.—3 to 5 grains of Quinine Hydrochloride. A valuable remedy for leucorrhœa.—L.i./09,26.

Tablets, 1, 2, 3, 4, and 5 grains.

Tinctura Quininæ (Off.).

Dose.— $\frac{1}{2}$ to 1 drachm (1.8 to 3.5 Cc.).

Quinine Hydrochloride 1, Tincture of Fresh Orange 50. A very agreeable form of taking small doses of Quinine. Hydrochloride of Quinine is used in place of Sulphate, as first suggested by W. Whitfield, P.J., Vol. VIII., 440, and again by the late W. Martindale.—P.J. Vol. IX., 407.

Vinum Quininæ (Off.).

Dose.— $\frac{1}{2}$ to 1 ounce (15 to 30 Cc.).

Contains one grain of Quinine Hydrochloride dissolved in one ounce of Orange Wine.

To estimate approximately add dilute Sulphuric Acid $\frac{1}{2}$ drachm to Quinine Wine $\frac{1}{2}$ ounce, then Mayer's Reagent (*q.v.* p. 369) 2 drachms or *q.s.* Collect, wash and dry the precipitate, which should weigh $1\frac{1}{2}$ grains.—P.J. ii./05,901.

Quininæ Hydrochloridum Acidum. (Off.) FR. Cx. 'Neutral'

Quinine Hydrochloride. $C_{20}H_{21}N_2O_2 \cdot 2HCl = 394.22$ (397.148 I.Wts.).

Dose.—1 to 10 grains (0.065 to 0.65 Gm.), $\frac{1}{2}$ to 2 grains (0.032 to 0.13 Gm.) hypodermically.

In white or yellowish white crystalline crusts. Is claimed to be soluble 1 in 1 of water. Contains 81.6% of quinine. 1 grain in 6 minims is suitable for hypodermic injection, *e.g.*, in malaria, also internally, as prophylactic against.—The hydrochloric radicle is not as irritating as the sulphuric to the stomach.

N.B.—**FR. Cx.** adopts the Salt + $2\frac{1}{2}$ HO. Crystallised from alcohol more or less charged with water. The Salt contains alcohol and water of crystallisation. Left exposed to the air this loses its alcohol and the Salt changes into one with $2\frac{1}{2}$ molecules of water, becoming at the same time opaque.

Garsed found this salt anhydrous; does not contain the $3\text{H}_2\text{O}$ of the B.P.

Liver abscesses may be drained and irrigated with a solution of 3 to 5 grains to the ounce of water.—**B.M.J.** ii./08, 1248, 1251.

The best salt both for oral and intramuscular use. Give it when the sweating stage begins. *Dose* should never be less than 5 grains, or more than 30 grains per diem,—best given in three 2-hourly doses of 10 grains in the morning. If given intramuscularly 8 grains should be given each night.—**Sandwith, B.M.J.** ii./09, 1801.

MALARIA.—Benign tertian and quartan injections best treated by 5 grain doses in Chloroform Water 1 ounce twice daily for a week. When the fever is at an end the following pill thrice daily for fourteen days after food is useful: Iron Hypophosphite 2 grains, Quinine Bisulphate 1 grain, Arsenious Acid $\frac{1}{16}$ grain.

In the treatment of malignant infections 10 grains of Quinine should be given promptly, followed by 5 grains every 4 hours for a week, with their gradual reduction. If the patient be unconscious or comatose or has severe gastric symptoms, administer intravenously Quinine Acid Hydrochloride 15 grains, Sodium Chloride 1 grain, Distilled Water $2\frac{1}{2}$ ounces, or intramuscularly Quinine Acid Hydrochloride 15 grains, Distilled Water 1 drachm. Either of these two injections to be repeated several times if necessary.—**Brooke, p.** 281.

Sterules, Hypodermic, contain 2 grains each.

Tablets 1, and 5 grains. Tablets, Hypodermic, 1, 2, 3 grains.

Quininæ Hydrochloro-Sulphas.

$(\text{C}_{20}\text{H}_{24}\text{N}_2\text{O}_2)_2 \cdot \text{HCl} \cdot \text{H}_2\text{SO}_4 + 3\text{H}_2\text{O} = 830.85 (837.026 \text{ I. Wts.})$. *Dose.*—1 to 10 grains (0.065 to 0.65 Gm.).

In masses of small needles, or reduced to powder, containing 77.5% of alkaloid, soluble 1 in about 2 of water, and about 1 in 7 Alcohol 90%.

In cases of cancer of the uterus and of the breast it improved general condition of the patient.

Injectio Quininæ Hydrochloro-Sulphatis Hypodermica, 1 grain in 4 minims. *Dose.*—2 to 12 minims (0.12 to 0.7 Cc.).

Quininæ Hydrochloro-Carbamidum.—*Syn.* UREA-QUININE.

$\text{C}_{20}\text{H}_{24}\text{N}_2\text{O}_2 \cdot \text{HCl} \cdot \text{CO}(\text{NH}_2)_2 \cdot \text{HCl} + 5\text{H}_2\text{O} = 543.29 (547.28 \text{ I. Wts.})$.

Dose.—5 to 15 grains (0.32 to 1 Gm.).

In small prisms, soluble 1 in about 1 of water. Contains 59.2% Quinine. Used hypodermically in cholera, in 12 to 15-grain doses.

1% solution of quinine hydrochloro-carbamide (urea-quinine) has been found to act as a local anæsthetic, effect lasting from 4 to 7 hours; at the same time it acts as a hæmostatic. Particularly useful in operations on the oral region.—**Pres.** 1910, p. 19.

Quininæ Iodas, Quinine Acid Iodate.

$\text{C}_{20}\text{H}_{24}\text{N}_2\text{O}_2 \cdot 2(\text{HIO}_3) = 670.92 (676.068 \text{ I. Wts.})$.

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

In white needles, soluble 1 in about 250 of water. Contains 48% Quinine.

Quininæ Hydriodidum, Syn. QUININE IODIDE.

$\text{C}_{20}\text{H}_{24}\text{N}_2\text{O}_2 \cdot \text{HI} = 448.74 (452.14 \text{ I. Wts.})$.

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

Is in minute pale-primrose coloured crystals, slightly soluble in water. Contains 71.7% Quinine.

Quininæ Hydriodidum Acidum. *Syn.* QUININÆ IODIDUM ACIDUM.

$C_{20}H_{24}N_2O_2 \cdot 2HI, 5H_2O = 665.04$ (670.148 I. Wts.).

Dose.—1 to 4 grains (0.065 to 0.26 Gm.).

Is in golden crystals, soluble about 1 in 20 of water. Contains 48.4% Quinine. Must be kept from the light.

Quininæ Hypophosphis.

$C_{20}H_{24}N_2O_2, H_3PO_2 = 387.40$ (390.236 I. Wts.).

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

In crystals or powder. Slightly soluble in water, more soluble in alcohol 90%. Contains 83.1% quinine.

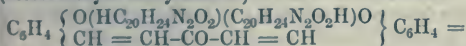
Quininæ Lactas, Quinine Lactate.

$C_{20}H_{24}N_2O_2 \cdot CH_3 \cdot CHOH \cdot COOH = 411.21$ (414.260 I. Wts.).

Dose.—1 to 5 grains (0.065 to 0.32 Gm.), or more.

A granular white powder, soluble 1 in 10 of water; said to be well tolerated. Contains 78.3% of quinine. Is very suitable for hypodermic injection. For gonorrhœa, 1% solution forms an excellent injection.

Quininæ Lygosinas. Lygosin - Quinine. *Dose.*—1 to 3 grains (0.065 to 0.2 Gm.). The Quinine Salt of a Coumaric Ketone (diortho-oxydi-benzylacetone).



907.79 (917.536 I. Wts.)

in red powder containing 70.7% quinine. Soluble in alcohol.

Gauze and wool are medicated with 5 and 10%. Is antibacteric and employed for ulcers.—Y.B.P. 1905,271.

Quininæ Nucleinas. *Dose.*—1 to 5 grains (0.065 to 0.32 Gm.).

Yellowish powder containing 60% quinine and 40% nucleinic acid. Insoluble in water. In syphilis maligna good results were obtained by intravenous injections of Quinine hydrochloride, also in gummatous ulcers due to old infection; but primary infection not so well treated by this method, attributable probably to want of antibodies, this again to absence of hyperleucocytosis. Hence Quinine Nucleinate was tried, Nucleinic Acid having marked power in increasing leucocytes. Employed as 5% suspension in Olive Oil. Intramuscular injections of 10 Cc. were used, assisted by intravenous injections of the hydrochloride. Over a period of 18 days patient received in this way $\frac{1}{2}$ ounce of Quinine hydrochloride and 45 grains of the nucleinate.

Merck suggests for the intravenous injection:—Quinine hydrochloride 3, Ethyl-Urethane 1.5, Water 3. This solution is effected in the cold, and may be sterilised. 2 Cc. contain 0.8 Gm. of Quinine hydrochloride, which forms the highest dose.—M. /o8,181.

See also Quinine Hydrochloride, and compare Quinine Urethane, p. 677.

Quininæ Phosphas.

$2[C_{20}H_{24}N_2O_2], H_3PO_4 + 8H_2O = 884.04$ (890.576 I. Wts.). Composition varies with manufacturers.

Dose.—1 to 6 grains (0.065 to 0.4 Gm.). Is in acicular crystals like the sulphate, but harder and denser. Contains 72.8% quinine. Soluble 1 in 420 of water.

Quininæ Salicylas.

$2C_{20}H_{24}N_2O_2 \cdot C_6H_4(OH)COOH + H_2O$ (U.S.) = 935.58 (935.54 U.S. Wts.) (942.536 I. Wts.).

Dose.—2 to 6 grains (0.13 to 0.4 Gm.).

White crystals, sparingly soluble in water, and soluble about 1 in 60 of alcohol 90%. *Incompatible* with mineral acids—salicylic acid may crystallise out. Contains 68.8% of quinine. Should be given suspended in water, or in cachets, or pills with syrup of glucose; recommended for diarrhœa and neuralgia, rheumatism and sciatica.

Effervescent Quinine Salicylate.

Dose.—1 drachm. Contains 1 grain in 1 drachm.

Tablets, 3 grains (0.2 Gm.). *Dose.*—1 to 2.

Capsules contain 5 grains (0.3 Gm.).

In dengue Quinine Salicylate 5 grains every four hours has proved useful.—Brooke, p. 170.

Quininæ Acetyl-Salicylas. *Syn.* ★'XAXAQUIN.'

$C_{20}H_{24}N_2O_2 \cdot CH_3 \cdot COOC_6H_4COOH = 500.55$ (504.276 I. Wts.).

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

Useful antipyretic and antiseptic compound. Contains 64.3% Quinine. Melting at 167°C. *Soluble* in Water 33, Alcohol 1 in 40, Chloroform 1 in 10. Immediately decomposed by Acids and Alkalis. Tablets 3 grains are prepared.

Quininæ Sulphas, Quinine Sulphate (Off). U.S. (Termed 'Basic Salt in Fr. Cx. and F.E.).

$[(C_{20}H_{24}N_2O_2)_2 \cdot H_2SO_4]_2 + 15H_2O = 1750.24$ (1763.38 I. Wts.).
 $(C_{20}H_{24}N_2O_2)_2 \cdot H_2SO_4 + 7H_2O$ (U.S.) = 866.15 (U.S. Wts.). FR. Cx. and P. Jap. give $8H_2O$.

The principal quinine salt, contains 73.5% of quinine.

Dose.—1 to 5 grains (0.065 to 0.32 Gm.), tonic; 5 to 15 grains (0.32 to 1 Gm.), antiperiodic.

White bitter crystals. *Soluble* 1 in 800 of cold water, 1 in about 100 of 90% alcohol, 1 in 40 of glycerin. It is rendered more soluble by the addition of Antipyrin.

Testing of.

The French Codex method of testing Quinine Sulphate is better than that given by other pharmacopœias, and a minimum of 6 Cc. of Ammonia when using the French test is best. Specially purified Quinine Sulphate requires 4.6 Cc. and P.G. requires 4 Cc. only—no commercial salt can satisfy this small amount. Inorganic salts, as impurities, affect the results obtained by the NH_3 test, so that it is valueless for ascertaining the purity of any salt of Quinine other than normal Sulphate. Since the usefulness of the Ammonia test is so limited the B.P. test for Cinchonine and Cinchonidine is to be preferred as it may be applied to any Quinine salt. The Ammonia test, however, is the only means of detecting Hydroquinine without having recourse to the actual isolation of this alkaloid.—P.J., ii./09, 600.

It is prescribed in pill, cachet, tablet or mixture—if in mixture 1 minim of Dilute Sulphuric Acid to the grain of salt will render more soluble with fluorescence. For pill 1 drop of strong Sulphuric Acid as excipient for 5 grains.

Incompatible with alkalis and alkaline carbonates, also incompatible with Liquor Ammonii Acetatis (unless distinctly acid in reaction), iodides, and astringent infusions containing tannin. The addition of a

small proportion of sodium hypophosphite may overcome the incompatibility with potassium iodide—*i.e.*, the formation of herapathite (quinine iododisulphate).—To prevent coagulation of the precipitate when prescribed with alkalis, mucilage of acacia should be ordered. With Phenol in a pill may liquefy.

Flavoring—Glyl Vanillæ, Glyl Menthae Piperitæ (bold doses); Syrupus Aurantii.

Uses.—For all forms of fevers, and as prophylactic; wards off remittent fever. For neuralgia and nervous headache; it combats whooping cough, influenza (Ammoniated Tincture) and hay fever; it increases uterine action, and is the most used tonic drug; antiseptic in typhoid, phthisis and pneumonia. If Quinine deafness occurs, or for large doses, hydrobromic acid should be used.

In labyrinthine disorders, it is very uncertain—often intensifying the symptoms.

May be administered by Iontophoresis, *q.v.*

Quinine affects metabolism. The total solids excreted by the urine may drop 40% within 24 hours after a single dose. It is eliminated unchanged by the kidneys.

Capasules contain 1, 2, 3, and 5 grains.

Locally applied, arrests suppurative process in hypopyon.—*L. i./92,15.*

Catarrh relieved by pills of Quinine, Atropine, and Arsenic (*q.v.*). These will frequently stop the development of a "cold."

For delay and hæmorrhage during labour, in place of ergot, 8 grains followed by 4 grains in an hour, and a third dose if necessary, where no obstruction.—*B.M.J. i./98,762.*

Corneal ulcers treated by 1% solution of sulphate with dilute sulphuric acid, *q.s.* *L. i./05,360*—the bisulphate would be preferable.

MALARIA treated by 4 doses of $7\frac{1}{2}$ grains at intervals of $\frac{1}{4}$ hour in the evening of every third day during the first fortnight of the fever; or for the pyrexia of malaria, large doses—15 to 20 grains, with 15 to 20 minims of Laudanum.—*B.M.J. ii./04,1451.* Malaria, results in.—*B.M.J.E. i./06,20.*

Klein discovered that quinine is excreted (and therefore presumably absorbed) more slowly when given hypodermically than when given *per os*. In malaria it is a good plan to give both *per os* and hypodermically simultaneously, so that if rejected by the stomach there will be no loss of time. Children bear quinine well. A child of ten will tolerate an adult dose, a child of five will take 5 grains twice daily, and a child of one year will take 3 grains twice daily without risk.

Quinine should be kept up in full doses for about a fortnight after the fever has ceased, and then continued in doses of 10 grains twice daily on two consecutive days in each week. If the drug is stopped even after two or three weeks of thorough treatment, relapses are the rule, and it is generally only after the occurrence of the relapse that the average hospital patient begins to take seriously the advice to continue the use of the quinine.—*I.M.G., Jan. 1907, p. 10 (et. seq.).*

As prophylactic to malaria. In taking Quinine as prophylactic to bear in mind that it destroys the parasite more surely at moment of sporulation—as a rule, *i.e.*, once in 48 hours; take 10 to 15 grains once every 8 days instead of small quantities daily.—*B.M.J. ii./05,1280.*

To be given a few hours before the paroxysm. It has little effect on the young endocarpuscular forms of the parasite.

In Blackwater fever give 15 grains on two successive days, at 10 days' interval.—*B.M.J.E. ii./04,83.*

Dysentery best treated by quinine and sulphuric acid.—*B.M.J. i./06,1326.*

In malaria the general opinion is that Quinine acts directly by killing the parasite.—*Hewlett, L. i./09,741.*

In malaria administer three or four hours before attack is anticipated.—*Lixon, Pr. Feb. '09,246.*

In puerperal sepsis 2 to 5 grains every 4 hours, or 10 grains twice daily in

form of suppository acts favorably on the nervous and general system.—B.M.J. ii./09,1038.

Prolapsus uteri treated by local injections of 40 to 80 minim doses of 1 to 5 Solution of Quinine Sulphate prepared by dissolving Quinine Sulphate 12 grains in 30 minims of dilute Sulphuric Acid, and 30 minims of distilled water. The object of the procedure is to produce effusion of lymph which will then form new connective tissue and thus strengthen the ligaments, the uterus being mainly held up by the connective tissues running from the side of the pelvis with the vessels to the side of the uterus. For details of procedure in the operation consult the writer of the communication.—Inglis Parson, Pr. March '09,358.

Syphilis has been treated by enormous doses of Quinine but results not so good as those with Mercury.—Pr. Feb. '09,247.

For pneumonia about the time of the crisis useful,—it is non-depressant and assists natural fall of pyrexia.—Pr. Apl./08,446.

Allen considers Quinine a useless drug theoretically for treatment of a common cold. It is only antiseptic in strength of at least 1 in 500 solution, and a few grains daily internally are not likely to reach the nasal mucus to disinfect it.—L. ii./08,1659.

Quinine may set up a form of dermatitis.—B.M.J. ii./09,17.

Collunarium Quininæ, Quinine Nasal Douche. Quinine Sulphate 1, Water 875.

Used in hay-fever. If a stronger solution be required the Acid Sulphate or Hydrochloride of Quinine should be used; excess of acid should be avoided.

Mistura Chlori cum Quinina (Burney Yeo).

To Potassium Chlorate, in powder, 30 grains, in a 12-ounce bottle, add Hydrochloric Acid 60 minims; cork and shake well to liberate chlorine; absorb this by gradually adding, and shaking after each addition, Distilled Water *q.s.* to 11 ounces; add Quinine Sulphate 24 grains (or 36 grains if ordered), Syrup of Orange 1 ounce. *Dose.*—1 ounce (30 Cc.) every 2, 3, or 4 hours for typhoid; it quickly cleanses the tongue.

Perles of Quinine Sulphate

Contain $1\frac{1}{2}$ grains (0.1 Gm.) in each.

Pilula Quininæ Sulphatis (*Off.*).

Dose.—2 to 8 grains (0.13 to 0.52 Gm.).

Quinine Sulphate 30, Tartaric Acid 1, triturate and add to Glycerin (by weight) 4, Tragacanth in powder 1, previously mixed. Pills of 1, 2, 3, 4 and 5 grains are prepared. Tablets, 1, 2, 3, 4 and 5 grains.

Ⓟ **Pilula Quininæ Hydrargyri et Opii.**

Quinine Sulphate $1\frac{1}{2}$ grains, Grey Powder 1 grain, Opium $\frac{1}{4}$ grain, Quassia Extract *q.s.* for one pill thrice daily after food.—B.M.J. i./09,1464.

Syphilis is treated beneficially with Quinine, especially when combined with Mercury.—Whitla, 4th. Edn. 1902, p. 918.

In syphilis Quinine is useful before or after a course of Mercurial treatment. Acts beneficially in any septicæmic state with fever, whether due to gonorrhœa, syphilis, or enteric. Quinine, Opium and Mercury are sheet anchors in treatment of early syphilis.—B.M.J. ii./09,78,504.

Ⓟ **Pilula Quininæ Ipecacuanhæ et Camphoræ.**

Dose.—One night and morning.

Quinine 2 grains, Ipecacuanha $\frac{1}{4}$ grain, Camphor $\frac{1}{4}$ grain, Liquid Carbolic Acid $\frac{1}{4}$ minim, have been advocated as preventive of plague. Nim fumigation (burning Azadirachta Indica) also suggested.—L. i./09,637.

① Pulvis Quininae Compositus.

Dose.—One powder.

Quinine Sulphate 5 grains, Phenacetin 5 grains, Arsenious Acid $\frac{1}{8}$ grain, Nux Vomica Extract $\frac{1}{4}$ grain, Milk Sugar (*q.s.*) to 12 grains. One powder (or cachet) every four hours till the fever breaks. We are informed that this forms an excellent fever remedy in Demerara.—Ph. Notes.

Tinctura Quininae Ammoniata (*Off.*).

Dose.— $\frac{1}{2}$ to 1 drachm (1·8 to 3·5 Cc.).

Quinine Sulphate 2, Alcohol (60%) 90; mix and add Solution of Ammonia 10. The Quinine precipitates on adding to water; a few grains of Tragacanth will suspend the precipitate; with syrup of orange it is palatable, and bears dilution better; it remains bright if mixed with aerated water. Should be kept in the dark, or it will become discoloured.

Capsules and Tablets of the above are prepared, each equivalent to 1 drachm.

Tablets Ammoniated Quinine Compound, each equivalent to Ammoniated Tincture of Quinine $\frac{1}{2}$ drachm, Capsicum $\frac{1}{10}$ grain, Camphor $\frac{1}{10}$ grain, Caffeine Citrate $\frac{1}{2}$ grain, Aloin $\frac{1}{10}$ grain. Serviceable in influenza.

② **Tablets, Quinine, Camphor, Morphine, and Atropine.**—Camphor $\frac{1}{2}$ grain, Quinine Sulphate $\frac{1}{2}$ grain, Morphine Sulphate $\frac{1}{4}$ grain, Atropine Sulphate $\frac{1}{1000}$ grain.

For common colds, especially where excessive running at eyes and nose.

③ Tinctura Antiperiodica. *Syn.* Warburg's Tincture.

Socotrine Aloes 240 grains, Rhubarb 80 grains, Angelica Fruit 80 grains, Elecampane Root 40 grains, Saffron 40 grains, Fennel Fruit 40 grains, Prepared Chalk 40 grains, Gentian 20 grains, Zedoary Root (*Curcuma Zerumbet*) 20 grains, Cubebs 20 grains, Myrrh 20 grains, White Agaric, in powder, 20 grains, Opium, in powder, 24 grains, Black Pepper 4 grains, Cinnamon 8 grains, Ginger 8 grains, Alcohol (60%) 1 pint. Macerate for 7 days, press and strain. Dissolve in the product:—Quinine Sulphate 160 grains, Camphor 20 grains. After 3 days filter, add Alcohol 60% *q.s.* to 1 pint.

As it is apt to purge as above prepared, the aloes may be omitted if so prescribed.

Dose.—1 to 4 drachms or more (3·5 to 15 Cc.).

Flavoring.—Glyl Coriandri (quadruple dose), Glyl Menthae Piperitæ (ditto); Extractum Glycyrrhizæ Liquidum.

Originally directed for Indian fever, ague, &c., half an ounce as a dose repeated in 2 or 3 hours; before giving the first dose the bowels should be freely opened, and no food recently taken. Between the two doses nothing should have been taken but a little brandy or beef-tea, and this only if the state of the patient required it.

In malaria.—M.P., Mar 13/07, p.281.

Effervescent Quinine Sulphate.—2 grains in drachm. *Dose.*—1 to 2 drachms. Is valuable in malaria—given as soon as fever shows itself.—B.M.J. ii./07, 1049.

Quininae Sulphas Acidus, Quininae Bisulphas, U.S., Ph. Ned.

Ph. Jap. P. Hung. Termed 'Neutral' in Fr. Cx. and F.E.

$C_{20}H_{21}N_2O_2 \cdot H_2SO_4 + 7H_2O = 544\cdot34$ (544·33 U.S.Wts.) (548·41 I.Wts.)

Dose.—1 to 10 grains (0·065 to 0·65 Gm.).

Usually masses of crystals; 59·1% of Quinine. Soluble 1 in 11 of cold water, and is therefore the most suitable salt for preparing eye lotions. Three grains to an ounce of water has a specific action on ophthalmic diphtheria. Malaria is well treated by injections of 4 grains daily for 5 days. Incompatible with Potassium Iodide.

Tablets, $\frac{1}{2}$, 1, 2, 3, 4 and 5 grains.

Tablets called **Livingstone Rousers**, contain Quinine Acid

Sulphate 1 grain, Jalap $1\frac{1}{2}$ grains, Calomel 1 grain and Rhubarb $1\frac{1}{2}$ grains; are given to check malarial poisoning.

In purulent ophthalmia, hypopyon and keratitis *Guttæ* containing 3 grains with 12 grains of boric acid per ounce useful.—Oph., May, 1906.

Quininæ Sulphocarbolas.

$C_{20}H_{24}N_2O_2 \cdot C_6H_4.OH.SO_3H = 494.64 (498.33 \text{ I. Wts.})$.

Dose.—1 to 6 grains (0.065 to 0.4 Gm.) in pill. An amorphous white powder, soluble 1 in 680 of water, 1 in 74 of 90% alcohol. Contains 65% Quinine.

Quininæ Tannas, Quinine Tannate, P.G., P. Jap. (30% Quinine)

P. Helv. (30—35%), P. Dan. (30—32%).

P. Austr. and P. Hung give method of making from the sulphate.

$C_{20}H_{24}N_2O_2 \cdot 3C_{14}H_{10}O_9 + 8H_2O(?)$ (Merck) = 1423.86 (1434.58 I. Wts.).

Dose.—1 to 4 grains (0.065 to 0.26 Gm.). An amorphous yellowish white powder, obtained by the decomposition of the sulphate with a solution of tannin, contains 22.6% of Quinine and is slightly soluble in water and about 1 in 3 alcohol 90%. Being almost tasteless, is recommended for children, to be given in milk.

Quinine Tannate varies in amount of constituents. It is often a compound of a quinine salt with Tannin. These pseudotannates vary greatly in their quinine content,—from 18 to 39%. P.J. ii./08, 164.

With 1 molecular proportion of Neutral Quinine Sulphate to a little more than 3 of Tannic Acid the precipitation is complete—Schmidt.

Tabellæ Quininæ Tannatis.

Contain 1 grain in a chocolate basis. This forms a well-disguised Quinine preparation, being well suited for administration to children when Quinine is required. H. recommends these for whooping cough. The Italian Government distribute these free to patients for administration to children as a prophylactic to malaria.

As a stimulant in entero-colitis in children.—B.M.J. ii./06, 931. With ergotin for sweating.—M.P. Feb. 20/07, 209.

Of 690 children treated prophylactically only 9 contracted malaria. To be tried in malaria with hæmoglobinuria.—B.M.J.E. ii./08, 79.

Quininæ Valerianas. 'BASIC' VALERIANATE FR. CX.

$C_{20}H_{24}N_2O_2 \cdot C_4H_9.COOH = 423.15 (426.292 \text{ I. Wts.})$.

Dose.—1 to 4 grains (0.065 to 0.26 Gm.).

White crystals, or powder with slight valerianic odour, contains 76% of Quinine, soluble 1 in 80 of cold water. FR.Cx. says 1 in 38.7 at 16°C. but we did not find this with the Commercial Salt examined.

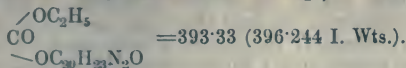
For nervous headache and hysteria. Pills containing 1 grain each of the Valerianates of Quinine, Iron, and Zinc, are efficient nerve tonics.

For treating paroxysmal sneezing, Tilley finds these useful.

Ⓢ Capsulæ Valerianatum Compositæ.

Dose.—One thrice daily. Valerianates of Quinine, Iron, and Zinc 1 grain each, Nux Vomica Extract $\frac{1}{4}$ grain, with or without Cascara Extract 1 grain. Taste and odor covered with Saccharin and Mint. Nerve Tonic.

Quinine Ethylcarbonate. P. Jap., P. Helv. *Syn.* *EUQUININE.



Dose.—3 to 15 grains (0.2 to 1 Gm.) in cachet.

Made by the action of ethyl chloro-carbonate on quinine, in white needle crystals, with little taste, sparingly soluble in water, more so by addition of dilute acid; easily soluble in alcohol. Intended to replace quinine. Tablets contain 8 grains.

***Aristochin.** *Syn.* ARISTOQUININE.

$\text{CO}(\text{C}_{20}\text{H}_{23}\text{N}_2\text{O}_2)_2 = \text{C}_{41}\text{H}_{46}\text{N}_4\text{O}_5 = 669.47 \text{ (674.408 I.Wts.)}$. The carbonic ester of quinine in white tasteless powder containing 96.1% of quinine. *Dose.*—1 to 10 grains (0.065 to 0.65 Gm.) according to age. Insoluble in water. Given for malaria, typhoid, influenza, and in small doses for pertussis.—B.M.J.E. ii./04.44.

Incompatible with Acids and Alkalis.

RADIOLOGY.

“**X**” Rays, discovered by **Roentgen** in 1895, are produced in a vacuum tube on the passage of an electrical discharge of high tension from a Ruhmkorff coil, at the point where the cathode rays (electrified particles emitted at a high velocity normally to the surface of the cathode) strike solid matter. In the old form of “X” ray tube this was the glass of the tube itself; in the new form (the invention of Jackson and others) the anti-cathode, which is also the anode and is usually of platinum, receives the rays from a concave cathode, which is of aluminium. They are focussed by its concave surface, and the “X” rays (ether vibrations or pulses) are propagated from the *front* of the platinum plate (which is set at an angle of 45° to the axis of the tube) in all directions into space at the velocity of light. They possess the power of exciting phosphorescence and fluorescence. In working from electric supply mains if current is not continuous, a high tension transformer is necessary, *e.g.* that of Gaiffe or Koch.

A large number of substances are almost *transparent* to the rays, *e.g.*, paper, leather, wood, soda-glass, mica, sulphur, indiarubber, cotton, wool and silk. Others, like bone and glass containing heavy metals, *e.g.*, lead, are *semi-opaque*. The metals are *opaque* in approximate proportion to their atomic weights—lead and platinum being almost entirely opaque, whilst aluminium is comparatively transparent. Iodine and Iodoform are very opaque.

Barium Platinocyanide screens are fluorescent to the rays and render the shadows of the opaque bodies visible. They are made by coating cardboard or other suitable material with a film of Barium Platinocyanide suspended in a solution of Celluloid in Amyl Acetate.

“X” ray tubes are often called “hard,” *i.e.*, those with high penetrative power in which the resistance is great—and “soft,” *i.e.*, with only slight penetrative power, hence producing a dull radiograph as the rays from it are stopped to the same extent both by flesh and bone. These

differences are principally due to the different exhaustion of the tube a very high exhaustion producing the hard effect, and one of only partial extent gives the soft or dull results; but the size of the electrode also affects the results, *e.g.*, a small cathode gives a high resistance and high penetration and a large one the opposite effects. Best contrasts are obtained with a tube of medium softness.

Tubes are now made so that they can be regulated to any degree of softness, and are also automatically self regulating, so that when the resistance becomes too great, an alternative spark gap comes into play which liberates gaseous matter and thereby softens the tube.

In bi-anodal tubes an additional electrode of aluminium is fitted behind and to one side of the anti-cathode and is connected with it outside the tube by a piece of wire; this permits the passage of much heavier discharges, and the tube works "steadier." The glass of the tube is of soda-glass, but special bulbs, in which lead-glass is employed, with the exception of a window which is of soda-glass, are used for the application of the rays in skin affections. These obviate the necessity of shielding the normal tissue from the action of the rays. Special shapes are also made for the application of the rays by introduction into the uterus.

The value of a tube depends on its solid construction and the definition of the radiograph produced at a distance of a foot. Exposures necessary with good photographic plates (special rapid plates are made for "X" ray work) have to be ascertained for the particular tube employed. It is stated that for the foot and ankle the exposure should be three times that necessary for the hand, and for the trunk ten times. The arms and leg below the knee require about four times that for the hand; the abdomen may require thirty times that necessary for the hand. Exposures rarely exceed 5 minutes.

Bismuth carbonate suspended in Mucilage (1 drachm in the ounce) is used for examining œsophagus and stomach. See p.p. 183, 186. It is also used for pathological work, *e.g.*, to inject veins,—to outline them prior to radiographing.

It is important to work with the tube completely enclosed excepting for a small aperture, so as to prevent blurring effect from secondary radiation from the glass of the tube. "X" ray plates also discussed.—Mackenzie Davidson, B.M.J. ii./07,632, *et seq.*

Pelvic measurements and difficulties in technique.—B.M.J. ii./07,636.

A new composition "X" ray shield introduced by Cox, which effectually shields the operator and the patient from the rays.—L. ii./06,670.

Glass Shields, containing a high percentage of lead, are employed at the London Hospital with a window opposite the anode through which the rays pass and have the advantage that the tube can be watched.

A new opaque shield suggested by Dr. Belot, of Paris, is made by Gaiffe; it has nozzles of different sizes and lengths.

The operator should at all times stand behind the plane of the anode.

Ionized air is believed to be injurious if breathed continuously; a large well-ventilated room should therefore be employed.—M.A. 1906,60.

The Teleradiography apparatus enables a radiograph to be made at metres with exposure of 1 second or less.—L. ii./08,554.

*DEVELOPER FOR PLATES (Thomas's):—

No. 1.—Hydroquinone 160 grains, Sodium Sulphite 2 ounces, Citric acid 60 grains, Potassium Bromide 40 grains, Distilled Water to 20 ounces.

No. 2.—Sodium Hydrate 160 grains, Water to 20 ounces.

This works satisfactorily. It does not stain the hands.

Equal quantities of these solutions are used for developing. Some employ the soda solution diluted so as to develop slowly, and thus produce better definition, but for routine work this improvement takes too long.

The following also gives good results:—

No. 1.—Metol 50 grains, Hydroquinone 150 grains, Citric Acid 20 grains, Sodium Sulphite 2 ounces, Water 20 ounces.

No. 2.—Caustic Soda 150 grains, Water 20 ounces.

Equal quantities of Nos. 1 and 2 being employed. Development is best conducted at 60° F.

"X" Ray plate, Wratten's new. Has a heavy metal in addition to the silver to give better definition.—B.M.J. ii./08, 85.

"X" Ray Diagnosis.—As an aid to, the "X" rays increase yearly importance particularly in diagnosing pulmonary tuberculosis (B.M.J. /05, 1681), pneumothorax, pleurisy, tubercle, aneurism, enlarged bronchial glands and for the detection of renal calculi.

Tubercular deposits can be demonstrated which have not been detected by ordinary means.

Some urinary calculi can be fairly easily detected but biliary calculi are transparent. For the first mentioned the patient is examined lying on his face on a table with transparent top, with a transparent air cushion under the abdomen; movements of respiration can thus be overcome. The better method of procedure is to allow the current to pass at maximum inspiration or maximum expiration.—M.A. 1906.

Mackenzie Davidson (B.M.J. i./98, 10) devised an apparatus for exact measurement and localisation of foreign bodies. Two exposures are made on the same plate, the tube being moved right and left of a zero point on a scale, without the patient moving. On developing the plate the negative shows two shadows of the foreign body. From these, measurements are taken by means of threads with a surface gauge; this gives the exact depth of the foreign body below the skin. Some prefer to work with photographic plates instead of one as mentioned. This method is also employed for the measurements of bones, displacements, and especially for vic measurements. The "cross-thread localiser" is also useful for detection, localisation and estimation of the size of foreign bodies in the eyeball orbit. A piece of metal, less than a millimetre in diameter, can be detected in the eye. The removal of pieces of steel can be brought about by means of the electro-magnet.

Help from "X" rays in diagnosis of malignant disease.—L. ii./07, 1244.

The stereoscope applied to skiagraphs gives the object in relief and shows the true relation of the parts. A tube with good definition and which will give of the shortest exposure is essential. The skiagraphs are taken from different points of view after displacing the tube about 6 centimetres. By this it is possible to combine stereoscopic pictures without the employment of a stereoscope.—B.M.J. i./98, 372, ii./98, 481, 1669; IX. Congrès Ophthologique Internationale d'Ophthalmologie, Utrecht, 14-18 August, 1899. Mackenzie Davidson's results with "X" ray stereographs of renal and

other cases. Uric acid and ammonium urate calculi are almost as transparent as flesh. Calcium oxalate, phosphate and even a cystic oxide calculus are fairly opaque to the rays. Importance of co-operation between surgeon and radiographer.—B.M.J. i./06,137.

A method of localization. Results approximate.—B.M.J. ii./07,1207.

A new localiser. A sterile needle can be introduced into the tissues in the direction of the object and can be left in.—B.M.J. ii./08,725.

System of Radiography necessary.—B.M.J. ii./07,638.

Renal Calculi diagnosed by radiography.—L. ii./06,1249, 1787; i./07,948.

Cystic and Xanthic Oxide Calculi diagnosed (Morris).—L. ii./06,141.

Urinary Calculus and its detection (Shenton).—L. ii./06,719. Hip joint examination (Shenton) Stereoscopic view advised by Mackenzie Davidson.—B.M.J. ii./07,636.

Phosphatic Calculi are said to give very dark shadows, while those of Calcium Oxalate give lighter. Those of Uric Acid only seen with difficulty.—L. ii./08,455.

Skull and brain radiographs enable diagnosis.—L. ii./06,1630.

Stricture of the œsophagus, as an aid to the diagnosis of. Observation made through the screen after the patient has swallowed a mouthful of **Bismuth Mucilage**. *Vide* p. 186.—L. ii./07,1144. Diagnosis of stomach and other diseases by "X" Rays.—L. ii./08,231; B.M.J. ii./09,37.

Toxic symptoms after taking large doses of the subnitrate sometimes occur—a nitrite might be formed.—M.A. 1908,11.

In diseases of chest, Walsham's book reviewed.—B.M.J. i./07,206.

Holzknrecht's work reviewed.—B.M.J. i./07,267.

"X" Ray Apparatus, Notes on.—P.J. i./05,817.

"X" rays distinguish real from apparent death. The abdominal organs are *visible* if life has ceased, but not if it exists.—B.M.J.E.ii./08,5.

In the diagnosis and treatment of fracture, radiography of great value.—L. i./09,1663.

Method of *radiographing joints*. Chronic arthritis in a deep-seated joint such as the hip may be demonstrated, and gouty and other chronic inflammations may be discovered. Sciatica is frequently a symptom only of disease of the hip joint. Systematic "X" ray examination in intractable cases of sciatica essential.—Pr. Apl.'08,476.

Treatment.

In the treatment of cancer—undoubted malignant tumours—there is a marvellous melting away under the application of the rays, but sufficient time has not yet elapsed to designate such cases as cured.—Coley.

In lupus and rodent ulcer, however, definite cures have been effected.

General Reviews of Treatment.

A review of usefulness of "X" rays to the general practitioner.—B.M.J. ii./07,652, *et seq.*

Deane Butcher's address, 'Future of Electricity in Medicine.'—L. ii./07,1363.

Treatment of lupus, rodent ulcer, and other skin affections with "X" rays and the Finsen Light and the two combined, with satisfactory results. The mode of action of "X" rays is not bactericidal. They appear to act by retarding osmosis and causing a slow degeneration of the cellular structure, probably due to leucocytosis. Lupus vulgaris, especially the ulcerative form (on ulcers the drying effect is most

marked), scrofuloderma, tuberculous osteitis, and tuberculous glands, rodent ulcers, epithelioma, keloid, sarcoma, lupus erythematosus, acne rosacea, actinomycosis, mycosis fungoides, Paget's disease, naevi, eczema, psoriasis, acne, favus, sycosis, ringworm, and hypertrichosis have been satisfactorily treated by "X" rays. The rays cause the absorption of œdema.—B.M.J. i./03,1304.

"X" rays have the action of an irritant. The nutrition of the patient is improved by them with a tonic and stimulating result. Of undoubted value in lupus and epithelioma. Has a pronounced effect on internal cancers. Of value after operation to prevent recurrence. Dermatitis within certain limits is desirable. A classification of diseases treated is given.—B.M.J. i./03,27. Pseudo-leukæmia well treated.—New York Medical Journal, April, 1903. Doubtful cures of carcinomata of the breast.—L. ii./03,126,130,271. Used to discover amount of pleural effusion.—L. i./04,568.

For résumé of results in cutaneous epithelioma, deeply-seated carcinoma, leukæmia see M.A. 1906,71; 1907,70; 1908,91.

Appears to have a rejuvenating effect on the hair.—B.M.J. ii./06,799.

Leucocythemia 200 cases.—B.M.J.E. i./06,55.

Phlebotomies appearing like shot shown by "X" rays.—B.M.J. i./07,1423; ii./07,1064.

Syphilitic adenitis, chronic cases, received great benefit.—B.M.J.E. i./07,23.

In leukæmia a great reduction in leucocytes is effected.—B.M.J.E. i./05,16,36,51; B.M.J. ii./06,75; B.M.J.E. ii./06,60; L. i./06,1261.

Leukæmia, Investigation on treatment of. In some forms advantageous (myeloid, chronic lymphatic). There was improved constitution of the blood, diminished size of swollen organs, increase in weight and delay in recurrence. Complete cure never effected.—L. i./09,507; two cases of leukæmia treated.—B.M.J. i./09,1299.

The "X" Ray treatment of leukæmia may do so much damage to the liver as to cause cirrhosis. A case of this kind has been reported. Cure of the leukæmia, but death after a year from cirrhosis and ascites.—B.M.J. i./09,1236.

Enlarged lymphatic glands amenable to treatment.—B.M.J. i./09,1299.

Pneumothorax treated by aspiration under "X" rays.—L. ii./07,1388.

Facial epileptiform neuralgia—good result after surgery had not aided.—L. i./06,175. Unresolved pneumonia, a great improvement in.—B.M.J.E. i./07,80.

Venereal sores treated. Results valuable. Method of application.—B.M.J. i./09,64.

Acne treated by "X" Rays. Application to the face is seldom done. In any case there is always reaction. Seborrhœic secretions reduced. Curative action cannot be definitely determined beforehand.—B.M.J.E. ii./09,15.

Graves' Disease. "X" Ray treatment sound pathologically. The disease being due to intoxication from excessive secretion of the internal secretion of the thyroid gland due again to hypertrophy and over activity of the gland, "X" rays may reduce same—leading to the balance between over activity and under activity.—Graves' Disease on the one hand, and myxœdema on the other.—B.M.J. i./09,1300.

All pathological cells are more ready to degenerate than normal cells.—B.M.J. i./10,133.

Gynæcology.—"X" ray treatment may be offered to a patient with contracted pelvis as a substitute for oöphorectomy, i.e., to produce atrophy of the ovaries. (Any tumours of the ovaries, e.g., early stages of proliferating cystoma might be beneficially treated by "X" rays.—B.M.J. ii./09,461.

Malignant Disease.—Of the breast, "X" rays in, and in tuberculosis (none to be given).—B.M.J.E. i./05,23.

Cancer, some good results.—L. ii./05,1318; L. i./07,211. "X" rays should be used rather than "nothing more be done."—L. ii./06,321.

Epithelioma, treatment of, a chronological Review.—L. ii./07,1437.

Carcinoid skin affections treated.—L. ii./06,1172.

Lymphadenoma, use of, but death from.—B.M.J. ii./07,1137. Lymphadenoma, marked improvement.—L. i./07,590.

In Paget's disease satisfactory, but amputation necessary later.—B.M.J. i./07,643.

Paraplegia following treatment of malignant tumours.—B.M.J.E. ii./07,9.

Sarcoma by "X" rays and operation—good result.—L. i./07,434. The mechanism of the therapeutics of the "X" rays rests on the induction of an auto-vaccination subsequent to the resolvent action of the rays on the neoplastic encapsulating tissues about tuberculous glands, thus rendering the vaccine accessible to the blood serum.—L. i./07,215.

Cancer treated with rays in combination with Sodium Coumarate and Sodium Cinnamate.—B.M.J., ii./08,1146.

In lymphadenoma, sometimes gives enormous improvement.—B.M.J., ii./09,1302.

Malignant neoplasm on pharyngeal wall close to the larynx treated by "X" rays. "X" rays only useful in a small number of laryngeal and faucial tumours.—B.M.J.E. i./09,79.

Sarcomata 35 cases and 304 deep-seated carcinomata treated with "X" rays with good result. In the sarcomata recoveries 50%. In cancer of the rectum good results from post operative treatment.—L. i./09,1265.

Malignant disease 31 cases treated. In some a certain definite value,—lives prolonged for some months.—B.M.J. ii./09,143.

For inoperable uterine cancer should be advised. Pain may be relieved at the first radiation. Discharge less foul, and hæmorrhage diminished.—B.M.J. ii./09,461.

The after treatment of cases in which malignant growths have been removed by surgical procedure is one of great importance.—B.M.J. i./10,434.

Rodent Ulcer—19 cases, and 8 cases of carcinoma cured.—B.M.J., ii./07,644.

Rodent ulcers readily respond to "X" ray treatment—in cases where the treatment has to be discontinued—in the second application Radium promotes healing better than a second application of "X" rays.—B.M.J. i./10,433.

Lupus—1,000 cases treated. Small superficial quiescent patches curable, Finsen's method of combination with "X" rays and caustics; this, however, is slow. Caustery or excision supplemented by Pyrogallol, Salicylic Acid, Silver Nitrate, and open-air treatment.—L. ii./04,1129.

Lupus became epitheliomatous under the rays.—L. ii./05,,1831; L. i./06,983.

Lupus treated, and by Finsen light.—M.P. 1904,140; B.M.J. ii./07,642.

In superficial tuberculosis, nearly 70% of cases of lupus cured. Tuberculous adenitis, 35% cured. In deep-seated tuberculosis, results not so good.—Proc. Phila. County Med. Soc., May, 1905.

Ganglia, tuberculous or not, disappear under "X" rays.—M.P., Sept. 15/09,298.

Lupus Vulgaris well treated by "X" rays. Some happy results after following "X" ray treatment by Finsen light.—B.M.J. i./10,433.

In Ocular Therapeutics.—For use in rodent ulcers and epithelioma of the eyelid, sarcomata, and other growths, trachoma, tuberculosis of the conjunctiva, spring catarrh, blasto-mycetes, and scleritis.—M.P., Aug. 1905.

"X" rays in ophthalmic surgery—localising foreign bodies, for rodent ulcer of the eyelids, for trachoma and pannus.—L. i./03,579.

Blepharitis practically cured.—L. i./07,1014.

Eyelid Everter. A useful form has been arranged suitable for application of "X" rays in trachoma.—L. ii./03,461.

Ringworm.—If extensive, the best treatment is the "X" rays, afterwards "finishing off" with Croton Oil.—MacLeod.

The hair is several months in growing. "X" rays reduce period of cure to 3 or 4 weeks.—L. ii./06,256.

The tube should be of low vacuum, *i.e.*, "soft," because the rays are less penetrating and more easily absorbed.—B.M.J.E. i./05,8.

Treatment at Guy's. 20-minute applications; apparent somnolent effect of the rays on some children. Danger of treatment real but remote.—B.M.J. i./06,256.

Two or three exposures of 15 to 20 minutes.—L. ii./06,877.

In favus satisfactory (with Copper Oleate).—L. i./07,511.

Sabouraud in a lecture on the treatment, describing the apparatus employed, including use of necessary localisers to obviate going over the part twice, states that the distance employed is 15 Cm., the intensity of the source of radiation to be determined by a chromo-radiometer.

MacLeod on "X" ray treatment of ringworm. Single dosage method harmless, Severe dermatitis followed by permanent baldness is the result of over exposure.—L. i./09,1373. Leader on MacLeod's paper.—L. i./09,1400.

Depilation is the most satisfactory method of treatment. In a large majority of cases it is necessary to irradiate the whole scalp. This by 10 or 12 exposures necessitates upwards of four hours. By the author's method of dividing the scalp into rectangular areas, and irradiating each (surrounded by a lead foil sheet) in succession, the time is reduced to 2½ to 3 hours.—L. i./09,1378.

Supposed risks attending "X" ray treatment of ringworm. Brain injuries with ordinary care impossible.—B.M.J. ii./09,321,454; i./10,434.

Out of 270 cases all but 5 were due to *M. Andouini*. In 3 of the 5 *Megalosporon Endothrix*, and the remaining 2 to *Tricophyton ectothrix*. The skin in the case of *Megalosporon Endothrix* responded differently to "X" rays, becoming swollen and oedematous,—apparently a bad condition of kerion was produced,—in such there is risk of burning and producing permanent baldness. The two cases of *Tricophyton* cleared up after 4 or 5 weeks without any expilation.—M. Dobson. B.M.J. ii./09, 455.

Lancet Commission on "X" rays. Exceedingly satisfactory results obtained. Favus has been practically eradicated from public elementary schools. A similar process may eradicate the closely allied tinea of the scalp. Suggestion that the rays may injure the brain deemed "simply ridiculous." Some parents will not allow children to be treated.—L. i./10, 52.

"X" rays have no bactericidal power. They merely cause a rapid and complete epilation of all the hairs. The essential is the accurate adjustment of the dose. The results obtained have been most encouraging.—Annus Medicus, L. ii./09, 1887.—The parasite and its spores come out with the hair root.—B.M.J. i./10, 434.

Measles.—Singular coincidence of the rash appearing on the areas rendered temporarily bald in course of treatment.—B.M.J. i./07, 1298.

Exophthalmic Goitre.—Some cases greatly benefited. Further trial recommended.—B.M.J. ii./05, 1249. One case cured.—B.M.J.E. i./06, 12.

Eczema and psoriasis treated.—B.M.J.E. i./05, 40.

Acne, severe case cured.—L. i./06, 908.

Urticaria Pigmentosa.—Three exposures at intervals of one week without any visible reaction for six months afterwards. Factitious Urticaria and turgescence of the old lesions on irritation ceased, and no new lesions appeared. Recurrence after a few months—treatment again with "X" rays proved satisfactory.—B.M.J. i./07, 1301.

"X" rays have almost revolutionised the study of dermatology. Many cases of eczema and hypertrichosis improve under treatment.—B.M.J. i./10, 433.

"X" ray treatment in nervous itching of the skin.—B.M.J.E., i./10, 24.

Sabouraud's Pastelles consist of Bristol paper coated with an emulsion of barium platinocyanide in amyl acetate collodion. The alteration in colour caused in these pastelles at half distance, i.e., $7\frac{1}{2}$ Cm., is observed and forms the basis of the dosage. The hair depilates in 15 days. Dilute alcoholic iodine solution is used concurrently as pigment. The head remains bald for two months. The exposure must not be too strong or the growth of hair will be endangered. The cure is possible in six weeks.—L. i./06, 1700.

Dosage.—The quantity of rays that have passed is measured by Holz-knecht's Chromo-Radiometer, consisting of a scale of 12 divisions or units "H" established by Pastelles, which change colour under increased radiation. The ideal method of estimation has not yet been hit upon. There are further the radio chronometer of Benoist, the quantinometer of Kienbock and the method of Milton Franklin by measuring the ionisation of the air produced by the radiation from the "X" rays.

Dosage to be standardised by Holz-knecht's scale of Pastelles. — L.i./05, 1715; or by those of Sabouraud.—B.M.J.i./06, 359.

Methods of estimating dosage. Sequira reviews.—B.M.J.ii./07, 639.

With the aid of a 1 Cc. pipette and a bulb blown on the end of it, and two platinum terminals passing through the bulb ("about the size of a pigeon's egg"), containing water, it was found that with this instrument 'In series,' when a bubble in the tube arranged as indicator had reached $11\frac{1}{2}$ divisions, the part being treated (e.g., child's scalp) at a distance of 15 Cm. from the source of "X" rays had received a standard dose, as indicated by tint of a Sabouraud Pastille, and epilation would follow with this amount. Supposing this has taken 12 minutes at 15 Cm. it will be effected in 3 minutes at $7\frac{1}{2}$ Cm. (Intensity varies inversely as the square of the distance), so that by placing the scalp at $7\frac{1}{2}$ Cm., from the source of radiation and collection of 3 divisions of gas the same result will be achieved.—L.ii./07, 84.

Measurement of Current through "X" ray tube.—A milli-ampère-meter can be used to measure the current passing through the "X" ray tube, the production of rays bearing a close relationship to the current so measured.

Photographs taken with different currents through "X" ray tubes are identical when the times of exposure are so adjusted that the figures obtained by multiplying currents by time are equal—*milliampère seconds*.

To measure the effective current through a tube the currents in the wrong direction are to be eliminated, *e.g.* by aid of the Villard valve-tube. This is arranged in series with the "X" ray tube. Its rectifying action is remarkably complete.

The usual current through an "X" tube" ranges between 0.2 and 1.0 milliampère. A current between 0.5 and 1.0 is sufficient for good average work.—Lewis Jones.

Dangerous and Untoward Effects to Operators and Patients.

Methods of protection.—B.M.J. i./07,15; B.M.J.E. i./07,8.

Gloves for workers are made by precipitating Bismuth Oxychloride on to thick leather gloves.—B.M.J. ii./07,184.

Plasticine as a protective.—L.i./07,119.

Pathological effects of the Rays, experiments on animals, and discussion.—B.M.J.ii./06,1818.

The spermatozoa of "X" ray workers have been found to become diminished. Action on the fœtus in utero fatal.—M.A. 1906,59.

Retards date of parturition and serious injury on the progeny.—L.i./07,197.

Doubtful if any action on the ovaries of a woman.—L.ii./06,689; L.i./07,1753 (Editorial opinion).

Fertilizing power of spermatozoa of toad injured by.—B.M.J.ii./06,1702.

"X" ray Dermatitis.—Dangerous results to hands may follow long exposure, relieved by application of Salicylic Acid, Menthol, Cocaine and Lanolin. Hall Edwards. B.M.J.ii./04,995. Sandpaper for and excision of warts satisfactory.—B.M.J.ii./06,695.

Dr. Hall Edwards' distressing results. Uses poultices with lead and opium and cuts warts off afterwards.—B.M.J.ii./06,806. Since invalided and pensioned. See also B.M.J.ii./08,726.—Hall Edwards on dermatitis and prevention.

Warty growths well treated by Iodol.—B.M.J.ii./06,1215.

Ulceration of the skin after diagnostic use of Rays.—L.i./07,981. Prostration, fever, anorexia and nausea after mild exposure in treatment.—B.M.J.E.ii./07,56.

Treatment in Graves' disease showed that if pressed too fast dermatitis likely to be produced. A filter of 4 to 6 layers of note paper used with success. Morton has employed pads of lint soaked in Sodium Tungstate Solution.—B.M.J. i./09,1300. The lint is soaked and dried.—B.M.J.i./10,433.

"X" Ray carcinoma. Experimental enquiry on animals into conditions preceding onset.—L.i./09,821.

Squamous cell carcinoma of hand caused by "X" rays.—Lazarus Barlow, B.M.J.i./09,1465.

Congress, International (Fourth) of Electrology and Radiology.—L.ii./08,1837; B.M.J.ii./08,1625.

An "X" ray Congress proposed at University College, London.—L.i./09,781.

[Iontophoresis.—The introduction into the skin of various medicaments in ionic form, *v. p.* 413 *et seq.*]

Static Electricity, Uses of.

In relief of pain in neuritis, lumbago, and other myalgias, and in synovitis. It is effective from its first application. Details of method of treatment are provided.—B.M.J. ii/09,459.

High Frequency Current.

D'Arsonval first described the method of applying electric currents of high frequency. The various methods of treatment, *e.g.*, by auto-condensation, high tension, effleuvation fully described—the paper should be consulted.—L. ii/09,12.

This consists of a condenser discharge through a coil of high self-induction, the resulting discharge being of very high rate of oscillation and of high voltage.

The essential parts of a high-frequency apparatus—Condenser, Spark Gap, Solenoid and Resonator and notes on the working.—B.M.J. ii/09,923. *Vide* also Crookes' High Frequency Currents, 1907 (Baillière) and Duddell, Pres. Address. Roentgen Society.—B.M.J., December, '07.

The principle of the apparatus required is comparatively simple, *i.e.*, to charge Leyden Jars whose outer coatings are connected by a helix of wire or solenoid. The inner coatings of the jars terminate in knobs whose distance apart can be adjusted to suit the sparking distance of the charging electromotive force. The jars when charged to a sufficiently high potential (from a Wimshurst machine or from an induction coil of large size or through a high potential transformer, from the alternate current supply mains) discharge in an oscillatory manner across the air gap and through the solenoid connecting the outer coatings and the latter becomes the seat of electro-magnetic induction effects, comparable to those of the primary circuit of an induction coil, so that a derived circuit formed by wires leading from the two ends of the helix yield a current, as do the wires of the primary current of a coil—the apparatus is in short a modified induction coil.—Lewis Jones.

The high frequency apparatus illustrates well the inertia of electrons. The H.F. current prefers to "jump" an air gap rather than traverse a spiral rod of copper, and will cause a high-resistance incandescent lamp to light up which is short circuited by a top bar of copper.—Na., Jan. 06,285.

High blood pressure satisfactorily reduced by high frequency current.—B.M.J. ii/09,67,79.

In pruritus and eczema, good results. Effects partly due to the ozone produced.—B.M.J.E. i./03,24. In nerve diseases.—L. i./03,734. In trachoma.—L. i./03,237.

Warty growths on the face, treated by 34 exposures of 5 minutes' duration, disappeared.—L. i./03,105.

Prostatic congestion satisfactorily treated by rectal use of High Frequency current. Urotropine simultaneously useful.—L. i./07,1013.

These waves modify the sensibility amounting almost to an anaesthesia. Their use is, practically speaking, painless. Pruritus, psoriasis, eczema, alopecia, zona, acne, impetigo, and lupus erythematosus have been treated with good results.—M.A. 1904,65.

Curative results in lupus vulgaris, acne rosacea, and nevus, with disintegration of growths.—B.M.J.E. i./04,39. General tonic to the system. Relief of neuralgia, ataxia, neurasthenia.—L. i./04,725.

Lupus, ulcerated condition stimulated to heal by the *effleur*.—B.M.J. i./04,983. In alopecia areata, and acne vulgaris, excellent results.—M.A. 1906,79.

Causes a rise in surface temperature of the body.—B.M.J. i./06,923.

Foulerton expresses opinion on the action of high frequency on bacteria, the effects, *e.g.*, on lupus are due to the action of the nitrous and nitric acid formed in the air by the high frequency discharges.—L. i./06,1384.

In angina, more especially "angina minor" the H.F. current, as a new remedy, has yielded good results.—Clifford Allbutt.—B.M.J. i./09,1127.

Nævi,—The only class benefited is that comprising port-wine stain *i.e.*, H.F. current is only applicable where the growth only involves the superficial layers of the skin. The minimum distance of the electrode from the skin should be $\frac{1}{4}$ inch,—this is the least likely to be followed by keloid changes in the scar,—general anæsthetic necessary. Refrigeration, *q.v.* preferred.—L. i./09,1658.

High Frequency cytotoxicity and **fulguration** of cancer. Riviere of Paris states that H.F. currents have a selective, destructive and specific action on cancer cells, and is of opinion that the method is the only rational one for inoperable tumours. Surgical treatment of large malignant tumours. should be completed by H.F. "Scintillation." M.P. Jan. 9, /09,577.

Lupus erythematosus a case cured with a small high-frequency glass electrode with small sparks.—B.M.J. i./10,434.

Cancer treated by fulgurations (electric sparks) applications lasting a few minutes only each time. Tension estimated at about 250,000 to 300,000 volts, the current itself being weak. Sarcoma more likely to be affected favorably than carcinoma. A powerful method of disorganising cancer tissue.

Fulguration causes much pain. Deep anæsthesia is necessary, *e.g.*, Morphine, Scopolamine and Chloroform, *not* Ether. The treatment is also valuable in tuberculous ulcerations and in lupus.—B.M.J. ii./08,426; B.M.J.E. ii./08,59.

The fulguration method is not selective,—has tendency to excite septic reaction. Does not diminish percentage of recurrences.—B.M.J.E. ii./09,6.

"No medical man can be fully equipped for the treatment of disease without an electrical installation of some sort."—L. i./10,347.

Fluorescent light, produced by painting the skin with an Eosin Solution 0.01 to 0.1% strength, and exposing the patient to sun or arc light. Nine cases of rodent ulcer and epithelioma treated. Heat is excluded by Calcium Sulphate and Picric Acid.—B.M.J.E. i./05,20.

Radiant Heat.

This treatment consists in employing the heat and light produced by a number of ordinary incandescent electric lamps within a shade or case, or specially covered bed of reflecting material.

Special arrangements are made for each limb, joint or part of the body. The dry hot air produces a local hyperæmia and so relieves painful joints, chronic rheumatism and rheumatoid arthritis. Machtzum also combines steam and light action to produce hyperæmia.

Finsen Lamp.

The concentrated light produced by this lamp is violet and ultra-violet. It is produced by an arc lamp in which the heat rays are cut off. Finsen's original lamp has been improved, and is known as the "Finsen-Reyn" lamp. It is portable, suitable for one patient at a time, and Finsen acknowledges its efficacy.—L.i./03,449.

Injectations of fluorescent substances, *e.g.*, *Æsculin* 5 minims of a 5% solution immediately beneath the skin to be treated (*v. p.* 689) are sometimes used as adjuvants.—L. ii./05,1769.

Erythrosin (an aniline dye)—the Sodium Salt of Tetra-iodofluorescein (iodo-eosin).—Solution 0.2%, injected prior to light treatment causes reaction but pain.—B.M.J. ii./04, 933.

Exposure is never less than 1 hour. If the lupus be ulcerative the case is first treated with "X" rays until it dries up before using the light. If the lupus be thick and warty, creosote and salicylic acid plaster is first employed to reduce. The opsonic index in obstinate cases is taken at the London Hospital, and, if low, Tuberculin is injected until it reaches 1.4 or 1.5. This is said to accelerate the treatment.—M.A. 1906, 71.

A new form of lamp—small, automatic, working direct from the electric supply main.—L.i./03, 531.

Lupus is undoubtedly best treated by Finsen Light. Cheaper than "X" rays—treatment in Vienna.—B.M.J. ii./06, 52.

Finsen recorded 800 cases of lupus treated in various parts of the body.

The rays obtained from carbon electrodes are more effective than those given off by iron ones. The current used in the lamp has a strength of 40 to 80 amperes and an E.M.F. of from 45 to 50 volts. Rock crystal lenses are employed which allow of the complete passage of the ultra-violet light.—Finsen Light Institute at Copenhagen, L. ii./03, 957.

Ozæna treated with good results by modified Finsen method. Cocaine and Adrenalin used to produce anæmia of the tissue, the fetor disappeared and the power of smell returned.—B.M.J.E. i./04, 52. Improvements in methods enable effects to be produced in 100 hours which previously took 600 hours.—B.M.J.E. i./07, 88.

The diseases in which light treatment of value are defined. The list had become exaggerated after Finsen's success.—B.M.J.E. i./07, 90.

Ultra Violet Rays have been used in lupus with good results. A sun lens is used, and a "compressor" in which plain or coloured water circulates.—I.M.G. Oct. 1904, 366.

The rays from a quartz-mercury lamp (rich in chemically active ultra-violet light) colour manganese glass violet within 12 hours. It is suggested that the mixture of Ferric and Manganous Silicate become changed into Ferrous and Manganic Silicate.—C.D.i./05, 756; L. i./05, 512.

On a new method of producing ultra-violet rays by low tension high frequency currents.—L. i./06, 587.

Mercury Vapour Lamps, violet and ultra-violet rays from, have considerable germicidal effect on an organism like *B. prodigiosus*.—Hewlett, L. i./09, 743.

Milk can be sterilised by this means.—L. i./09, 798.

Syphilis treated by ultra-violet light (**Uviol Light**) syphlides of the skin especially on parts generally covered by the clothing, respond very quickly to the rays.—L. i./08, 1039.

Blue Light. Redard's method of producing anæsthesia; dental extractions under.—B.M.J. i./05, 1200, 1404.

Violet Light has been employed. Cure of a case of chronic synovitis with effusion. Exposure of 25 minutes a day for 5 weeks.—Med. Woch., Sept. 2, 1902.

Finsen also employed **Red Light** for preventing the pitting of small-pox.

The treatment must be carried out before the period of suppuration. The patients are confined to rooms from which the chemical rays of daylight are excluded. Finsen's last article.—L. ii./04, 1272; further note on, L. ii./04, 1490.

Record of 18 cases of small-pox treated by the Red Light in this country with good results.—L. i./04, 646.

Reflected Sunlight.

Sorgo, of Vienna, has treated laryngeal tuberculosis by the sun's rays reflected from a laryngoscopic mirror with success, but failed with syphilitic laryngitis.

The sun by its ultra-violet rays forms Ozone.—L. ii./05, 1933.

Lupus vulgaris well treated by direct sun's rays at Helouan, in Egypt.—B.M.J. ii./03, 1258.

B. typhosus is rapidly killed by sunlight. In an experiment in India 240,000 organisms were reduced to nil in 2 hours.—R. T. Hewlett, L. i./09, 742.

RADIUM.

Ra = 226.4 (I. Wts.).

This element is obtained from Pitchblende residues—Pitchblende found in Joachimsthal in Austria, Cornwall, and other parts, being the chief source of Uranium* for use in the arts.

The Austrian Government having prohibited the export of Pitchblende, a certain amount of the Cornish mineral has been worked up in Germany. At the time of writing the element is in a fair way of being produced in this country. Sir William Ramsay has devised a method of extraction which has special features in the way of time-saving. Radium is also present in the minerals Clèveite, Chalcocite, and others. So far it has always been found in company with Uranium compounds. **Radium Bromide** ($\text{RaBr}_2 = 386.24$ I. Wts.) in the pure condition is the salt mostly used,—the element in the free (basic) condition rapidly oxidises. This salt occurs in hard, yellowish, crystalline particles, and is best kept in hermetically-sealed containers so as to exclude moisture, for reason explained later. Other Salts are **Radium Carbonate**, **Chloride**, **Nitrate** and **Sulphate**. The Carbonate, by its insolubility, suggests itself for coating Applicators for therapeutic use. It has furthermore the advantage of the comparatively light weight of the CO_3 radicle as compared with Br. It is handy also in that it can rapidly be converted into any other salt if required.

Becquerel in 1896 commenced the experiments which led up to M. and Mme. Curie's discovery of Radium by finding accidentally the radio-activity of Uranium-Potassium Sulphate. It was thought that possibly "X" rays always accompanied fluorescence, as they seemed to result from the fluorescence of the glass in the old form of "X" ray tube.

A photographic plate, however, in Becquerel's hands was affected by the Uranium compound through a sheet of copper in the dark without any previous "lighting" being necessary to produce fluorescence. This result had, in fact, nothing to do with fluorescence; it was a general property of Uranium compounds, *i.e.*, their radio-activity, whether fluorescent or not. Whilst Uranium will fog a photographic plate in some hours, Radium will produce a like effect in a few s-conds. The radio-active energy of Radium may be taken to be about 2 million times that of Uranium. Radio-activity, it is now generally agreed, is the result of an atomic disintegration.

M. and Mme. Curie's concluded that there must be present in Pitchblende an element many times more radio-active than Uranium. On analysing Pitchblende it was found that the acid group precipitate (containing Bismuth with Polonium) had considerable, but the alkaline earth group (containing Radium) the greatest activity.

Giesel obtains about 0.25 Gm. of pure Radium Bromide from the ton of Pitchblende residues. This approximates statements one finds elsewhere to

* An account entitled "Chemical investigations of Uranium, a newly discovered metallic substance," by Prof. Klaproth, will be found in the "British Critic," May to August, 1793.

the effect that Pitchblende contains 1 of Radium in 5 million parts or an ounce in 150 tons. For method of extraction *see* Edn. XII., p. 612, or consult general text books on the subject.

Characters of Radium.

The atomic weight of the element was found by Madame Curie to be 225 (taking Cl as 35.4 and Ag 107.8). Thorpe's determination of atomic weight shows 226.7. Purification of Radium Chloride for the purpose. Radium Bromide loses Bromine.—J.R.S. July /08, 120.

It should, therefore, be placed below Barium in the Mendeléeff series, and on the same line as Thorium and Uranium. (*vide* Periodic Table). These three radio-active elements have the highest atomic weights. Radium is divalent. Its spectrum was found to be characteristic, resembling those of the alkaline earths.

The element is assumed to contain normal atoms and these in succession become the radio-active ones in minute proportion which are disintegrating. (See 'Atomic Disintegration' later.) A freshly-prepared Radium Salt has its energy stored up and reaches its highest power in three weeks or so, which it maintains apparently indefinitely. The element and its disintegration products emit rays which are described later (*c.f.* graphic representation, p. 593).

A Barium-Platino-cyanide screen is lit up by the rays through varying thicknesses of metal according to the purity of the Radium and the amount used. The early experimenters soon found that the rays will burn the skin if kept in close proximity for a length of time.

Radium decomposes water into hydrogen and oxygen (Giesel), Hydrogen being 5.1% in excess.—P.J. /07, 591. Oxygen is converted into ozone (Demarçay). It turns glass in its proximity to a violet colour (this by some claimed to be due to a deposition of metallic ions). Mercury is converted into the yellow oxide.

Electrical Properties of Radium.

The rays emitted by a highly active preparation discharge a charged gold-leaf electroscope even through an inch or more of iron or zinc—5 milligrammes will do this at a distance of a few yards.

This occurs whether the charge on the leaves be + or -. All the three types of radiation from the Radium have the effect of ionising air in the electroscope breaking the molecules into constituent atoms, each of which is electrically charged + or -. These charged atoms collide with the charged gold leaves, and such as are of opposite sign to the charge on the leaves neutralise a corresponding amount of electricity on the leaves. —B.M.J. i/09, 1465.

One three thousand millionth of a grain of Radium is easily recognisable by an electroscope.—Soddy.

Radium Bromide has an odour of ozone, but its solution has not.—Proc. Chem. Soc., Vol. 23, No. 328, 1907.

Tests for Purity.

In examining Radium, a glance at its luminosity in the dark is no criterion whatever as to the value of a sample, as within certain limits contamination with Barium will render it more brilliant.

Pure Radium Bromide should light up a screen through several copper coins.

It should make Willemite fluoresce. Good Radium Bromide will discharge an electroscope with ease, and these simple tests (which can be made at the time of purchase) are a safeguard for the investor.

Glew's instrument (P.J. i./04,440; ii./04,254) for estimation of activity is simple and reliable. It consists of an electroscope with ground glass. A positive charge is accorded the leaf by the aid of a camel's hair brush. The time this charge will remain (usually a day or two) is noted. Markings are made on the ground glass at certain intervals, and on bringing a known weight of pure Radium Bromide, preferably in a metal box, to within a distance of a yard, the time taken for the leaves to fall is observed. Then if a pure sample causes the drop in sixty seconds it follows that the same weight of another specimen doing the same work in 120 seconds is only 50% pure, and so on.

In this method the β - and γ -rays are not measured directly (the α -rays do not come in at all, as they do not penetrate the metal box). The ionisation of the air produced by this 1% of the total radiation is measured.

The need for a satisfactory Standard for Radium and other radio-active substances has been discussed at the Roentgen Society. Up to the present the Uranium Unit of Madame Curie has been customary. The Interim Report of the Standards Committee of the Roentgen Society has been issued. The recommendation is to take the γ radiation (emitted by radium 'C') which is practically constant and homogeneous as a basis and to filter it out by means of lead 1 Cm. thick. Temperature and pressure cause no variation in this. 1 Mgr. of pure Radium Bromide to be the standard—and the ionisation produced by the γ radiation as above isolated to be Unit. Feebler standards say equal to $\frac{1}{10}$, $\frac{1}{100}$ and $\frac{1}{1000}$ Mgr. or less could be set up by means of solutions for the comparative work by the Emanation Methods.

Rutherford suggests it may be useful to express the intensity by the average penetrating power of the rays,—e.g., the thickness of some definite metal to reduce the ionisation to $\frac{1}{2}$ value.

Soddy points out necessity for a fused dry Radium Salt—there is the possible escape of emanation from the hydrated salt, reducing its γ -ray activity. Solutions can not be sealed up owing to generation of hydrogen and oxygen.

Philips said the possible absorption of γ radiation by Radium itself in thin layer need not be taken into account.

Glew wishes the kind of metal plates between which the Radium is placed to be defined as the Secondary Radiation from different metals varies. He suggested also a Uranium Glass standard as being of a more definite character.—*Vide* J.R.S., April and July, 1906, and Feb., 1908.

C.E.S. Phillips, Pres. Address Röntgen Society, 1910, deals fully with the matter (see J.R.S., January, 1910). He states it is unsatisfactory to say that a salt contains so much pure RaBr_2 —it may be in reality Chloride. What is required is to know the Actual Radium content, regarding the other constituent as impurity. The Standards belonging to the Röntgen Society have been accepted by the National Physical Laboratory.

Atomic Disintegration.

The changes of a radio-active element are usually successive, so to speak, in cascade. Soddy draws as analogy the waterfall which, instead of plunging direct into the lake, may cascade in a series of leaps from pool to pool, so Radium passes in its change through a long series of intermediate bodies.

The process of Atomic Disintegration is summed up by Soddy in this manner:—"Any one radio-element like Radium considered any instant among its hosts of atoms, most of which are destined to last for hundreds, some for thousands of years, a comparatively very small proportion fly apart every second expelling α particles and becoming emanation atoms. Next second a fresh set disintegrates and so on, α particles being expelled, and yet so small a fraction of the whole changing that the main part of the Radium remains unchanged even after hundreds of years."

In the case of the emanation atoms a much larger fraction change per second, producing more α particles and the 'active deposit.' (The 'Emanation' will be considered in more detail later.)

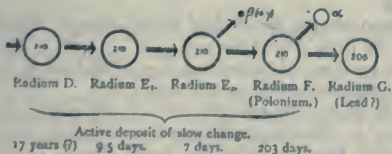
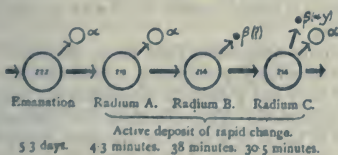
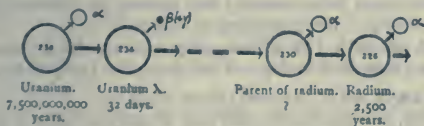
The 'Radio Active Constant' λ represents the fraction of the total of an element changing per second. For the Emanation $\lambda = \frac{1}{500,000}$.

The Average Period of Life of an atom, *i.e.*, the time in seconds it exists on the average before its time comes to disintegrate, is the reciprocal $1/\lambda$. In the case of Radium Emanation the average life is obviously 500,000 seconds, or 5.3 days.

The period of Average Life of Radium according to Rutherford is 2,550 years. In other words $\frac{1}{2550}$ part of a given mass of Radium changes annually.

The genetic relation between Uranium and Radium has been established. There is always a definite proportion of Radium to Uranium present in Uranium minerals,—for every 1 part of Radium there always exist 3,000,000 parts of Uranium. $1/\lambda$ for Uranium is 7,500,000,000 years. The average life is always 1.45 times the time τ required for radio-active change to $\frac{1}{2}$ value. Thus the $\frac{1}{2}$ value of Radium is about 1750 years and $1750 \times 1.45 = 2537.5$, *i.e.*, approximately the average life of Radium again. For the emanation the average life = $3.7 \text{ days} \times 1.45 = 5.3 \text{ days}$.

It is believed that 1 atom of a radio-active body expels 1 α particle only at each disintegration.



DISINTEGRATION OF URANIUM (F. Soddy, "Interpretation of Radium")
The above (Prof. Rutherford's Diagram, to whom we are indebted for permission to use it) represents graphically the disintegration of Uranium as at present viewed by physicists. (According to latest views Radium E₁ may be omitted.) Lead has been viewed as the end product,—as will be seen there are at least 8 changes between Radium and 'Lead,' and at each there is an outburst of energy. (*c.f* also *p.* 596.)

Pitchblende invariably contains this element.

J. J. Thomson speaking at the British Association Meeting, 1909, said,—

When the atoms pass from one state to another they give out large stores of energy, thus their descendants do not inherit the whole of their wealth of stored-up energy, the estate becomes less and less wealthy with each generation. The . . . expectation of life of an atom does not diminish as the atom gets older. . . . The atoms when they are first produced, have not all the same strength of constitution, some are more robust than others. Now if when the atoms are first produced there are some which will live for one year, some for ten, some for a thousand, and so on; and if lives of all durations, from nothing to infinity, are present in such proportion that the number of atoms which will live longer than a certain number of years decrease in a constant proportion for each additional year of life, we can easily prove that the expectation of life of an atom will be the same whatever its age may be. On this view the different atoms of a radio-active substance are not, in all respects, identical.

The production of Radium in Solutions of Uranium has been determined by Soddy. 0.255 Gm. in 3.53 years produced 4×10^{-11} Gm.—the production varied proportionately to the square of the time.—B.M.J. i./09, 1251.

Experiments showed that the growth of Radium was not direct from pure Uranium, the preparations under observation will in course of years begin to grow Radium. Intermediate substances of long period of life have to be formed. One of such has been isolated in America by Boltwood (Ionium). This would have been better named 'Sub-radium' to indicate its position in the change,—Soddy, "Interpretation of Radium."

Uranium of the earth 100 million years ago was hardly more than 1% greater in mass than it is to-day.—Prof. Joly, Na. 10/9/08, 457.

Radium rays are of (at least) three kinds:—

The α rays, non-penetrating and only slightly deviable in a strong magnetic field, deviation about $\frac{1}{1000}$ part of that of the β particle,—the direction being counter-clockwise in comparison with the β clockwise.

The β rays, more penetrating than the α , deviable.

The γ rays, exceedingly penetrating, non-deviable.

When speaking of β and γ Radium rays what are really intended are the β and γ rays of Radium C. The emanation like Radium itself gives only α rays. The whole of the β rays result in the later changes of the 'active deposit.'—Soddy,—(vide diagram of Disintegration *antea*.)

The α Rays.

These are demonstrated by Crookes' Spinthariscopes, (*σπινθαρίς*, a scintillation). Also by Glew's Scintilloscope.

Ninety-nine per cent. of the total energy of Radium is due to the α rays, the β and γ being responsible for the remainder.

The α rays from Radium are complex,—4 different types. Each with a definite 'range' or distance it will travel in any absorbing medium. The most penetrating type according to Bragg travels in air at atmospheric pressure and ordinary temperature 71 mm. (just under 3 inches) and no more. This fact is made use of in a most convincing lecture experiment in which bare Radium Bromide is placed in the centre of a flask coated inside with Sidot's Blende (crystalline Zinc Sulphide), there is no marked effect until the air is rarified by means of a pump,—at the first stroke of which the Blende begins to glow.—F. Soddy.

These rays constitute + charged atoms travelling at 12,000 miles a second. Crystalline Zinc Sulphide is very markedly sensitive to the α rays though

much less to the β . Barium Platino-Cyanide and Willemite, on the contrary, are more affected by the β than the α rays. The mass of the α particle is about four times that of the Hydrogen atom and is enormous in comparison with that of the particles composing the β rays. *It is in fact pretty conclusively proved that the α particle is a Helium atom (r. p. 595.) This accounts for the feeble penetrative power of the former.

The α rays are absorbed by a few inches (about 3) of air, also by glass, and largely by mica, or a thin sheet of aluminium, or indeed a 'sheet of note paper.' Glass, however, can be blown so thin as to allow radiation to pass. Cf. Helium.

The α rays from Radium possess at least 10 times as much energy as the β and γ rays together. They are readily distinguishable in penetrating power from the α rays from Uranium, and the latter again from those of Thorium.

The β and γ rays from Radium (themselves complex) are different from those of Uranium or Thorium. The differences between the α rays as a class are comparatively small,—the most penetrating α ray being not much more than twice as penetrating as the least penetrating (α ray).

The 'law of density' governs the penetration of metals and other substances by these rays, the absorption being proportional to the density. Tin, however, is an exception both for the α and β rays; for the α it is about the same as aluminium, and for the β it is about three times as opaque as its density would indicate.

The question as to mass, or volume, of the preparation comes into consideration in the case of the α rays,—the more the surface is spread out the less absorption there is of α radiation by the substance itself. The α rays from 1 mgr. of Radium produce more electrical effect than the β and γ rays from 30 mgr., e.g., in discharging a silk tassel. What actually becomes of the α particle is still uncertain. Rutherford has shown that at the point where it is no longer detectable it is still travelling at 5,000 miles a second. Beyond this fluorescent and electrical actions all cease simultaneously. It follows that α particles expelled at a velocity below 5,000 miles per second cannot be detected, doubtless there are such changes akin to radioactivity which may be proceeding without our knowledge.

All α particles have the same mass and differ only in the initial velocity of expulsion whether expelled from Radium emanation, uranium, thorium, or any other bodies which expel them.

Rutherford has succeeded in detecting Helium outside a sealed thin glass vessel containing Radium in vacuo—the glass being thin enough to allow the α particle to pass—this being a further point towards proof that the α particle is an atom of Helium. He has also counted the number of α particles expelled from a given quantity of Radium every second. A milligram emits 136 millions per second.—Soddy.

Polonium, another radio-active element discovered by Mme. Curie in Pitchblende, gives off the α rays almost exclusively.

Using a preparation of Polonium small enough it is possible to reduce the impacts

* If not a Helium atom the α particle at least becomes one after the velocity with which it is expelled is lost and it is brought to comparative rest.—Soddy, B.M.J. i./cg, 726.

of the α particles to 1 or 2 per second. A preparation mounted on a copper plate 2 mm. in diameter emitted 1,800 α particles per second.—J.R.S. July/08.126.

Polonium is identical with Radium F. It has a half value of about 140 days.

Since the radium and polonium (radium F) in a mineral are in radio-active equilibrium, the same number of α particles are expelled from each per second. Since polonium's half value is 140 days and radium's half value is 2,000 years, the former breaks up 5,000 times faster than the latter. Therefore in a given mineral, polonium and radium are present in a ratio of 1:5000. To obtain $\frac{1}{10}$ mgr. of Polonium several tons of high grade pitchblende must be worked up. The activity of Polonium is about 5,000 times greater than that of radium.

Since Polonium is the last of the active products in the radium series it is to be expected that it should be transformed into helium and lead, one atom of helium and one atom of lead from each atom of Polonium—this point of view is further substantiated by the fact that before the formation of Radium F. seven α particles are successively given off, each of which being an atom of helium has the atomic weight 4. Therefore the atomic weight of polonium would appear to be $[4 \times 7 =]$ 28 less than that of uranium, i.e., $238.5 - 28 = 210.5$ —this loses an α particle, i.e., 4, giving a final atomic weight of 206.5—a value very close to that of lead.—Rutherford—Nature, Feb. 24, 1910, p. 491. Cf. also L. i./10, 661.

Polonium. Mme. Curie's method of extraction.—Nature, Feb. 24, 1910, p. 509. For further information regarding this element *vide* Edn. XII., p. 617.

For the *Medical Use* of the α radiation *vide* later p. 603 *et seq.*

The β Rays are deviable in an electric field. They consist of electro-negatively charged electrons, infinitely smaller than the α atoms, and have a mass about $\frac{1}{1836}$ that of the hydrogen atom. This does not mean weight—it refers to inertia—it is quite unknown whether electrons obey the law of gravitation.

They are 100 times more penetrating than the α rays, being reduced to half value by passage through 0.05 Cm. of aluminium. They are identical with the cathode rays in a Crookes' tube.

The average velocity of the latter particles is 5,000 to 10,000 miles per second, that of the fastest of the β particles of Radium is as high as 170,000 miles per second, i.e., approaching that of light.

In addition to the four radio-active substances already mentioned, a fifth, termed Actinium, has been isolated in the ammonium hydrate group from Pitchblende. It gives off β rays. Beta rays will pass through 1 Cm. of lead.

The β rays in all probability are responsible for the curative results in therapeutics.

The α and β rays "ionise" the gas through which they pass, making it capable of conducting electricity. The Hon. R. J. Strutt has devised a Radium Electro-scope for showing the dissipation of the negatively charged rays.

Phosphorescence produced by α and β -rays.—Nature, Feb. 24, 1910, p. 507.

The γ Rays, a secondary radiation, are apparently produced by and accompany the β rays, i.e., analogous with the "X" rays which are produced by and accompany Cathode rays.

They are given off by Thorium and Uranium also, and are about 100 times more penetrating than the β , being reduced to half value by 6 to 7 Cm. of glass or aluminium; they will pass through almost everything, even 7 centimetres of lead before being reduced to 1% of their original strength. According to Rutherford they can be detected after passing through 20 Cm. of lead. By some these rays are thought to have a wave-like motion. The quantity of these (γ) rays must be so small that the therapeutic effects cannot be due to them.

They are about 10,000 times more penetrating than the α . When γ rays pass through matter, β radiation appears in its place, moving first in direction of the original γ but afterwards scattering in the ordinary manner of β rays. The penetration and therefore speed of the β radiation thus produced increases with the penetration of the γ radiation to which it is due.

The speed of the β radiation in the case of Radium is nearly equal to the speed of the normal β rays emitted by Radium itself.—Na. July 23/08, 271.

Electronic Theory. Rutherford assumes the atoms of the Radio-active elements in a state of continuous disintegration and that these smallest units, which enter into chemical changes, are really made up of great numbers of small particles,—charged electrons. They are believed to be in rapid motion about a common centre in the atom, and to this is attributed the energy they are capable of giving out. The atom, as a whole, is assumed to be + charged. A definite number of radioactive atoms undergo disintegration in a unit of time: one or several electrons being dispelled, while the remaining ones form a new configuration, which in time changes in a similar manner, hence the radio-active atoms change into atoms of smaller weight, but greater stability; the rays therefore are simply the emission of particles resulting from the continuous disruption of their atoms.—Ex Am. Jl. Ph. Apl./08, 172.

The number of electrons in an atom according to J. J. Thompson is quite small comparable with the atomic weight or the valency—others think it is much greater.—Na. 28/5/08, 73.

Heat Evolution.—Half a grain of Radium Bromide evolves, according to F. Soddy, about 2 calories of heat every hour,—in 4 years 70,000 calories. Half a grain of coal gives out during complete combustion only about 250 calories so that in the period in question (4 years) Radium emits nearly 300 times the energy obtainable from the same weight of coal. In the combustion of carbon, i.e., the chief constituent of coal, more energy is obtained from a given weight than in almost any other change known. N.B.—The coal is rapidly consumed and burnt into oxidation products. 98% of the heating effect of Radium is due to the α particles,—Rutherford has shown.—Na., May 28, '08, 73.

The temperature of Radium can be shown to be always slightly higher than the surrounding atmosphere. This heating is due to the enormous energy produced by the atoms disintegrating.

Emanation. "Exradio" (Ramsay.)

Radium gives off a gaseous emanation allied to the Argon family. According to Ramsay it should occupy one of the two vacant places in this group in the periodic table (*q.v.*). It is inert,—not capable of absorption by chemical means. The Emanation (a gas) disintegrates in definite stages, and in doing so gives out the various rays,—see graphic representation, p. 593. It is void of chemical activity, and follows Boyle's law; it has an atomic weight of 222 probably.—Soddy. According to Ramsay, either 176 or 220. It boils at -71° C., and its critical temperature is 211° absolute.

The gas is given off without appreciable loss of weight of the original matter, and can be aspirated through a tube and be made to condense at -150° C. by freezing with liquid air.

It causes Willemite to glow brilliantly in the dark. It can be filtered through wool as distinct from cathode particles, *v.* p. 579. It was found by Sir W. Ramsay and Prof. Soddy to give the helium spectrum on keeping three or four days; in fact, the emanation changes into helium, i.e., the α particles, *vide ante*.

Ramsay found that in 37 days the amount of luminous gas was only half its original size, and in thirty days it was only the smallest pin-point in the tube.

This reduction in volume is concurrent with the change from the gaseous to the solid state (*c.f.* graphic representation). When Radium is dissolved in water and the liquid evaporated down to dryness, the Radium will be found to have lost the greater part of its radio-activity, i.e., the intensely radio-active Emanation will have passed off on dissolving in the form of a gas, unless steps are taken to prevent its disappearance. The β and γ rays will have disappeared, and the α rays would be only a quarter as powerful as initially—the activity, however, gradually recovers in a month. The Emanation changes into a third

body Radium A, this into a fourth "B." Nine successive changes are known—see Graphic representation. The same amount of Emanation is in existence whether separated or not. But while the de-emanated Radium goes on slowly producing and storing up more emanation until in about 1 month it has regained its maximum activity, the emanation which has been separated from its parent goes on decaying losing about half its strength in about 4 days and falls to nil in about a month. There is thus an equilibrium between the quantity of emanation produced and the quantity decaying.—Soddy.

Exradio decomposes water, hydrogen being 3% in excess and will cause the gases to recombine.—P.J. i./07, 591.

The volume of Helium produced from 100 volumes of emanation is about $3\frac{1}{2}$ volumes. Agreeing with the view that the a particle is a Helium atom.—Ramsay, Proc. Chem. Soc., Vol. 23, No. 328, 1907.

The Emanation is an exceedingly dense gas, denser probably than Mercury—it has, therefore, a very heavy atom. Its Atomic Weight is probably 4 units below Radium,—i.e., it is the fourth heaviest known.

The energy of the Emanation is three times as great as the Radium from which it is obtained. Radium freed from Emanation still gives out α particles (though only about a quarter as many as before). These are regarded as being produced from the Radium atom in the same change as that in which the Emanation is produced. The Emanation is regarded as Radium that has lost one α particle. A pint of Emanation obtained from $\frac{1}{2}$ ton pure Radium would radiate energy of a hundred powerful arc lamps. No known vessel could hold it—it would be instantly melted and dispelled into vapour.—Soddy.

An atom of Helium and an atom of Emanation are simultaneously expelled when an atom of Radium is disintegrated, but it must be remembered that when the quantity of Emanation has reached its maximum it does not accumulate further with further lapse of time.

It is dangerous to keep Radium in the form of solution in sealed vessels, as the gradual production of Hydrogen and Oxygen in the solution raises the internal pressure, which would ultimately lead to the bursting of the vessel.

Decomposition of water, and the recombination of Hydrogen and Oxygen under the influence of Radium Emanation have been confirmed. Carbon Dioxide, also Ammonia and HCl are decomposed.—Na., June 4/08, 119.

The Spectrum of the Emanation from about 250 mgr. Radium Bromide photographed.—Rutherford, Na., July 9/08.

Refractive Index of Radium Emanation—some approximate work would indicate a figure about 26 times that for Helium.—Na., Nov. 4/09, p. 7.

Ra. emanation is absorbed by cocoanut charcoal (*q.v.*) at ordinary temp. and pressure, and on heating the charcoal the emanation is driven off, and can thus be concentrated—in use at the Cavendish Laboratory for extracting the emanation always present in the atmosphere.

Induced Radio-activity.

Substances in the immediate neighbourhood of a Radium Salt acquire **Induced Activity**. After removal the activity decays abnormally rapidly at first, but subsequently in geometrical progression, $\frac{1}{2}$ value 30 minutes. Induced Activity consists of α , β and γ rays. It is in the form of an "Active deposit." In this active deposit changes take place at least three times in quick succession. The bodies are termed Radium A, Radium B, Radium C. *C.f.* graphic representation.

Willemite fluoresces under its influence. Secondary β radiation may be well shown (Glew) by placing a tube of radium above a photographic plate face downwards on a piece of metal, *e.g.* Platinum covered by a piece of black paper; there results darkening of the plate, the image being the image of the Platinum sheet taken, and if thin Platinum foil be used images of objects placed beneath it can also be obtained. The photographic efficiency of this secondary radiation is greater than that of the primary radiation which has already passed once through the film.

Helium (He = 4 I. Wts.) is occluded in various minerals especially those of Uranium and Thorium. This suggested to Ramsay and Soddy the investigation which led to the proof that radium emanation is in part helium.

In some instances its volume is nearly 100 times as great as the volume of the mineral in which it was obtained.

Helium has been liquefied at -270°C. , *i.e.*, only 3° from the absolute zero.

Helium is one of the ultimate products developed by nature from Radium, Uranium and Thorium, formed slowly but fast enough to ensure that all minerals containing these elements must contain Helium also.

50 mgr. Radium produce 0·000018 mgr. Helium in 60 days, or 0·0022 mgr. in 1 year from 1 Gm. of Radium Bromide.—Chem. News, May 27, 1904.

Dewar differs from Ramsay as to yield of Helium from Radium. Dewar finds only 0·37 C.m.m. from 1 Gm. per diem which approximates Rutherford's forecast.—Na., November 5/08, 29, or $5·32 \times 10^{-6}$ C.m.m. of helium per second.—C.E.S. Philips Pres. Add., J.R.S., Jan. 1910—i.e., 0·159 C.m.m. per Gm. per diem. (Ramsay found 3 C.m.m. per diem.)

Actinium also produces Helium.—Debierne.

Soddy has succeeded in detecting the production of Helium from Uranium and Thorium—the amount is 1/500,000,000,000 of the Uranium or Thorium per annum which accords with theory. The method of detection depends on the use of strongly heated Metal Calcium, which in *vacuo* absorbs all gases except Helium.

About 2 mgr. of Helium are produced from 1,000 tons of Uranium per annum.

Helium in Air and Minerals—Vesuvian Minerals contain Helium.—Nature, April 7, 1910, p. 172.

The question as to whether Helium is held mechanically or chemically in radio-active minerals has been discussed. The former view is upheld by the fact that grinding liberates about 28% of the gas.—C.E.S. Philips, Rontg. Soc., J.R.S., Jan. 1910.

Transmutation of Elements.

Much has been written on this subject which cannot well be dealt with in these pages.

These radio-active bodies are probably poisonous, acting directly on the nerve centres. If radium emanations were used criminally the excited activity would have to be sought for, and probably would not be found, whereas if an actual radium salt had been administered even the ashes of the dead body would show the necessary radio-activity to convict the murderer.

Beryl contains abundance of Helium without anything like sufficient radio-activity to explain its presence there.—Na., June 18/08, 166.

Radiation is stated to rapidly destroy the ferments, emulsin, tyrosin, pepsin, trypsin and ptyalin.

Action on Bacteria.

The Rays were found to have apparently no action on *B. Pyocyaneus*; similarly in case of *B. Anthracis* except apparently slightly greater tendency to spore formation. *Staphylococcus Aureus* similar result, similarly with the important organism *B. Coli Communis*. There was a slight difference in respect of *B. typhi abdominalis*—amount of Radium not stated—Guy's Hospital Experiments. L. i./09, 1445.

It is extraordinary to realize but the fact seems to be clear that Radium Rays are not bactericidal to any extent.

A descriptive leader on physical properties of Radium.—B.M.J. i/09, 347.

For older references consult Edm. xiii., p. 676.

Review and abstract of Prof. Soddy's "Interpretation of Radium,"—B.M.J. i./09, 728.

The "Role of Radium."—Leader. L. ii./09, 1508.

Therapeutic Use of Radium.

(I.) Radiation from Sealed Glass Tubes and Mica-covered 'Buttons.' (Mainly.)

Radium Emanation being a gas, and directly concerned in the production of the greater part of the activity of Radium, it is in the highest degree essential that Radium Salts, after preparation in their final form, should be kept in hermetically sealed tubes from the air, as otherwise, by the escape of Emanation, much of the activity of the preparation is lost. The glass covering may be made thin, e.g., a microscope cover glass.—Soddy, B.M.J. i./09, 797.

Rodent ulcers of superficial origin, lupus, epithelioma and papilloma have

been cured by juxtaposition. Mackenzie Davidson reports several cases treated by placing 5 milligram tubes in contact with the part for various successive lengths of time:—

Rodent Ulcer.

A rodent ulcer about an inch square on the nose, which had resisted Finsen and "X" ray treatment, was treated by about half a dozen applications of a 5 milligram tube with complete removal. There was no recurrence. This was the first case treated and cured in this country.

Tuberculosis verrucosa cutis on palm of the hand had been under treatment three years, two tubes applied for 20 to 30 minutes on seven occasions—cured.

Rodent cancer of nose. One and two tubes, eight applications about half-hour each, cured.

Rodent ulcer. An almost hopeless case, the whole of the right cheek destroyed and tongue laid bare. In this case as many as eleven tubes were applied at once, together with a thorium pad. A rash like erysipelas occurred but subsided; the serum, blood, &c., was, however, sterile. The patient recovered.

Rodent ulcer. Twenty-three cases treated without a failure. Paget's disease, &c., psorospermiosis and superficial carcinoma also treated with excellent results.—Mackenzie Davidson, L. i./06,1392.

Rodent ulcer cured with one or two applications with several weeks' interval. The dose with a tube of Radium Bromide is known absolutely, being for practical purposes constant—an advantage over "X" rays.—Mackenzie Davidson, B.M.J. i./06,1104, *vide* also Oph. Jan. 1907, 37.

Rodent ulcer. Admirable results, particularly on eyelids; applied one hour a day for several days.—B.M.J. i./04,1367.

Useful in cases of lypus of the nose and mucous membrane of soft palate not easily reached. Nodules disappeared entirely.—B.M.J.E. ii./04,63; B.M.J. ii./04,983.

In tabes dorsalis gave relief.—Gowers, B.M.J. i./05,5.

Malignant Growths.

Giant-celled sarcoma of jaw completely disappeared under Radium; also acts specifically on papillomata of tongue and larynx, and on leucoplakia (Form of Apparatus not stated).—Abbe, New York.—B.M.J. ii./08,1448.

"The tube of Radium (used for a week) was very successful in causing the breaking down of some cancerous glands."—A recent private communication.

Cancer and inoperable scirrhus treated by Radium and "X" rays. The latter case also had Sodium Cinnamate.—B.M.J. ii./05,1496.

In uterine fibromata—especially hæmorrhagic. Good results by introducing 27 mgr. into the uterus in aluminium sheath, each application 10 to 15 minutes.—B.M.J.E. ii./06,75; L. ii./06,264.

Œsophageal cancer cured.—B.M.J. ii./05,92.

Intra-tumour application of Radium rays from Radium in an aluminium rod introduced through a trocar—good result.—B.M.J.E. ii./07,16.

Epithelioma of nasopharynx disappeared under Radium in glass tube. Application at first 15 minutes a day, later 1 hour.—B.M.J. i./09,1239.

May prove of value in nerve diseases—in the treatment of neuralgia.

Port wine stain removed. Hartigan claimed good results as early as 1903.—B.M.J. ii./07,124.

Hairy mole 1 inch in diameter removed by Radium.—L. ii./06,1666.

In benign growth good results, *i.e.*, with angiomata, lupus, nævus, keloid, and tuberculous ulcer of tongue.—B.M.J. i./05,39.

In consumption.—B.M.J. ii./03,197.

No danger of dermatitis if reasonable caution used.—B.M.J. i./06,1288.

Ulcer on lobe of ear for 14 years, is recorded to have been cured in a month by applications of Radium for 15 minutes daily.

General review of treatment with Radium—good results in lupus, psoriasis, tabetic pains, facial paralysis, &c.—B.M.J.E. ii./06,39.

Lupus erythematosus, excellent result with Radium Bromide on a disc covered with mica. The disease was rapidly increasing at time when applications were begun. The disc was moved slowly over the surface from 20 to 30 minutes once or twice a week. Treatment was continued for a lengthened period.—B.M.J. i./09,841.

Treves says 10 mgr. of Radium in a glass tube method is almost useless. The powdered Radium is used on a disc or plate covered with a varnish in Paris. The 'ultra-Gamma' rays have been used,—applying hours at a time. Rodent ulcer, epithelioma of tongue and lip, nævus, port wine stain, pigmented mole, hairy mole, angioma of the eyelids, keloid, known by him, personally, to have been cured.—B.M.J. i./09,317.

Mackenzie Davidson recalls his rodent ulcer case on the eyelid treated in 1903 with two 5 mgr. glass tubes,—cured after 5 applications. No recurrence in March 1909, and the patient now perfectly well. Also recalls work of many other medical men in this country. Points out that placing a glass tube containing Radium in contact with nodules in a case of carcinoma did not destroy the cancer cells, which are, therefore, immensely more resistant to the β and γ rays than those of rodent ulcer and epithelioma. Glass tubes are cleanly and preserve the Radium, also filter out the rays dangerous to the surrounding tissue. The area of action from a glass tube can be seen with Willemite, and is much larger than one would imagine. A case of spring catarrh, with chronic photophobia, xerchymation and slight conjunctival discharge, cured by Radium. Each eye treated 8 times, with 15 minute exposures, during a year. 39 mgr., used at first, later 44 mgr. No pain, but granulations gradually subsided. Recurring erosion of the cornea, as also "X" ray burns, cured. One application of a tube containing about 29 mgr. for 15 minutes was sufficient to cure a bad burn of this kind. A few applications with a potent dose better than many weak ones.—L. i./09,1391; B.M.J. i./09,609,1237.

In *Ocular Therapeutics*, epithelioma, trachoma, inflammation of the uveal tract, rheumatic iritis, orbital neuralgia,—mostly good and encouraging results.—M.P., Aug., 1905. Ophthalmia has also been cured by Radium.

Trachoma cured by Radium.—B.M.J.E. i./05,43. Seven cases out of 16 cured.—B.M.J.E. i./07,4. In old-standing cases, complicated with pannus, healing is slow, but both nodules and pannus ultimately disappear.

Eye diseases, 17 cases treated at Moorfields with encouraging results,—mostly corneal ulcerations, 4 non-ulcerative and 1 episcleritis. Distinct

benefit to a hypopyon was obtained by 5 minutes exposure. Some punctate erosions were similarly treated with encouraging results, similarly an old standing trachomatous pannus. 5 milligrammes seemed to act as quickly as did larger quantities. The Radium was applied in sealed glass tubes, *i.e.*, employing the β and γ rays only. — Lawson and Mackenzie Davidson. L. ii./09,149. *Vide* also abstract immediately preceding Ocular Therapeutics.

In the knowledge of the authors 1 mgr. of pure Radium Bromide in a glass tube was applied to a urethral carbuncle for 10 minutes every other day for 10 days then stopped. *After further 10 days* a slight burn developed and the part healed up completely.—June 9/09.

ii. Metal Tube and Metal Screen Results.

Deep seated or deeply extending growths can be cured by Radium radiations from which the less penetrating rays are filtered out. Large recurrent scirrhus of breast and epithelioma of larynx treated with success. 50 mgr. of pure Radium Bromide in silver tube 0.6 m.m. thick advised, placed in two different positions during the treatment. Action at a depth is obtained by using large quantities of Radium and filtering out all the less penetrating radiations and giving long exposures. The question of success with Radium treatment appears to depend on structure and clinical characters.—Finzi, L. i./09,868.

Scirrhus, inoperable recurrent treated as above almost disappeared. Considerable dermatitis was produced, commencing almost at once and reaching maximum in 3 weeks. Radium applied for 53 hours.—L. i./09,1457.

Two cases of malignant disease, one of the breast, the other on the lip. Treatment with 50 mgr. through metal tubes. Disappearance and improvement respectively.—B.M.J. i./09,1238.

Deep-seated inoperable cancers treated,—a lymphadenoma apparently cured in 6 months by 5 mgr. contained in a gold cylinder 0.5 m.m. thick. Amelioration of an inoperable sarcoma, employing 50 mgr. in a silver tube 0.5 m.m. thick.—B.M.J. i./09,1557.

Tuberculous gland after recurrence on removal treated with Radium. Long exposure, using for filter 2 m.m. of lead. No trace left after three weeks. The method enables penetration without burning.—Sir Malcolm Morris.—B.M.J. ii./09,286.

At St. Mary's Hospital malignant disease of the gullet has been treated by William Hill with rays from 50 mgr. pure Radium Bromide passing through 4 m.m. of Lead applied for as long as 17 hours at a time, with the result that the tube in question ultimately dropped through into the stomach. Endoscopic dilatation of an œsophageal stricture is reported on. By this method, in suitable cases of stricture, dilatation by gradual use of bougies and the application of Radium can be carried out with precision.—M.P., Sept. 1/09,225.

Malignant tumour of the neck manifested continuous decrease of the swelling after application of 50 mgr. for 22 hours. Another case, carcinoma of the gullet, received six applications during six months, and could ultimately swallow almost anything.—L. ii./09,1818.

iii. 'Spread Surface' Results (*Mainly*).

Soddy points out that by spreading a minute quantity of Radium over a large area, the thin film gives α rays essentially free from β and γ , since the two last from a small quantity are practically negligible.—Soddy, "Interpretation of Radium."

Spread surfaces, as used in Paris, have the advantage that one can use, if desired, all three types of radiation (α , β , and γ), or by interposing screens one can cut off all the α , and, if necessary, the β also, the β by Aluminium or Lead screens of varying thicknesses.—Mackenzie Davidson, B.M.J. i./09,609, *vide* Beta Rays, p. 596.

By using surface applicators and interposing screens it is possible to obtain action at a depth without altering superficial tissue. By this filtration one diminishes the sum total of the rays considerably, necessitating prolonged exposures—50 to 200 hours. The very penetrating rays (passing through a screen of lead and rubber 1.28 m.m. thick) are called in Paris the 'hard beta' and the 'gamma rays,' the lead filter having absorbed the α , soft β , and 'medium' β rays.

One may combine the bombardment (at a depth) by using 2 or more applicators around a tumour. This 'crossed fire' effect is very great, hence length of applying is reduced, and results in many cases are superior to those produced by γ rays. Cases reported on (1) enormous cancerous tumour of the parotid, (2) cancer of the breast, (3) cancer of the uterus, (4) sarcomatous tumour in the neck.—Wickham and Degrais, B.M.J. i./09,610.

MacLeod on the uses of mica-faced lockets.—B.M.J. i./09,912, 1072.

Angiomata. Results favourable in the projecting, but more difficult in the superficial flat forms. When affecting the skin proper, sometimes of advantage to produce slight irritation of the surface.—B.M.J. i./09,912.

Radium Sulphate on a metal disc, mentioned in a bacteriological Research previously abstracted.—L. i./09,1445.

Wickham's Address before the Dermatological Section of the Royal Soc. of Medicine. Radium an effective and selective remedial agent for cancer, port-wine stain, eczema, angioma, and keloid. Divides the β rays into three types,—'soft,' of low penetration, the 'middle' and the 'hard' with penetrating power approaching that of the γ rays. All the α and most of the β rays absorbed by Lead Screens 1 m.m. thick. The remaining 'hard' rays, the γ and portion of the β almost as effective through 2 or 3 m.m. as through 1 m.m. These claimed to have the selective action on cancerous tissue. Ten or 20 sheets of paper with a further coating of indiarubber between the lead and the skin, employed to cut off secondary radiation, which is stated to be irritant. 'Cross-fire' method of intensifying results also referred to.—L. i./09,1546,1557. See also B.M.J. i./09,242 for résumé of the French method.

Sheet aluminium '0.001' or '0.008' advised to replace the varnish idea. In deep seated cases, e.g., of the breast, the ordinary Radium box can be shifted about after 10 to 15 minutes action, so as to get the 'cross fire' effect.—L. i./09,1557.

Wickham holds that Radium has a selective action on cancer cells. Has had experience of 1,500 applications in 1,100 various cases. Treves has made a *prima facie* case for its use as, at least, a useful adjuvant in treatment of cancer. Subcutaneous cancer, angiomatous tumour, and chronic eczema cured. *Specificity*, by which Radium transforms pathological cells into healthy tissues, as distinct from destructive action.—B.M.J. i./09,366,798,1131.

Weak preparations can be left in position a long time. Retrogression of cancer of the breast.—B.M.J. i./09,1250.

Consult also 'Traitement des Angiomes Tumours Vasculaires et Taches de Vin,' published by 'Le Radium' Paris, 1908.

Wickham opened discussion at 1909 *British Medical Association, Dermatology*

Section. Described apparatus used,—one being a flexible plaster with linen base, *Appareil toile* or *toiles radifères*, the other a fixed form of varnished applicator in various shapes.

If apparatus be used (1) naked there is special action on the surface,—duration of application to be short.

(2). If using a 'medium' filter, rays less numerous, action deeper, duration to be longer.

(3). Using 'thick' filter rays few, action much deeper, duration very long.

In the discussion Sir Malcolm Morris mentioned tuberculous glands treated by Radium, using 2 m.m. lead screen with long exposure,—2 hours a day for 6 days on one gland. Cured at end of three weeks and no sign of burning. Operable cases on mucous membranes better left to the surgeon. Results in such cases not so favourable as in superficial areas.

R. B. Wild said :—"The deeply penetrating γ rays after filtration, as indicated, were hopeful for secondary gland lesions of cancer hitherto untreatable." Pharmacological experiments have been conducted by him on a frog's heart, applying radiation from 16 mgr. pure Radium Bromide, it had no effect. The same applied to the skin in the same time would have caused a severe burn.

Siquira referred to 170 'pre-Wickham' cases. Radium Rays more manageable than "X" rays. Of same opinion as Sir Malcolm Morris as to epithelioma of the mouth.

Beta rays are divided as already mentioned into 'soft beta,' 'medium beta,' and 'hard beta.' The beta rays are emitted through the varnish, but not the α . They average 80-90% of the total radiation, the γ constituting 12-10% from these applicators.

Screens of lead of various thicknesses used, e.g., screens of $1\frac{1}{4}$ m.m. thick of lead, covered with rubber allow only γ rays to pass.

Others of lead $\frac{1}{16}$ to $\frac{1}{2}$ m.m. thick permit the 'hard beta' rays as well as the gamma.—B.M.J. ii./09,445.

To keep out the Alpha and soft β rays which have a distinctive action on healthy and disease tissues, and allow the γ rays, which have a selective action (and some of the hard Beta) to pass, it is customary to use 1 m.m. lead shields. If gamma rays actually have a more selective action than "X" rays Radium will have this marked advantage.—Jordan, L. ii./09,1742.

In the knowledge of the writers a case of sarcoma on the left side of the abdomen was markedly improved by the daily wearing of two circular aluminium faced Applicators measuring 3 inches in diameter,—the Radium being evenly spread (not varnished) in the Applicators. These were worn for over two months with a lead screen in addition of 1 m.m. thickness, and produced no burning whatever. Previously the case had been treated with a glass tube containing Radium, and burning had been produced which persisted for three months without healing. The case developed into keeping pace with the growth of the sarcoma by applying Radium; wherever there were no rays penetrating the growth spread.

The collodion or celluloid films used in France probably absorb the α rays. Attempts to use the α rays from these films involve risk of loss of emanation and weakening of activity of the preparation for no coating thin enough to allow α rays to penetrate is likely to be perfectly gas and water tight. To utilize the α radiation the layer must be spread out, otherwise it will be absorbed within itself.—Soddy, B.M.J. i./09,797.

Glass stops all the α , the least penetrating of the β and a great many of the less penetrating γ rays, which last would have just reached the subcutaneous tissue they were intended to affect. Varnish advised, but the disadvantage is that on a hot day, or with sweating patients, pieces of the varnish might come off, which is a very serious matter.—Deane Butcher, B.M.J. ii./08,722.

Radium Applicators.

Sir F. Treves states that Radium varnished on to various applicators can be sterilized by heat. There seems some danger of the varnish chipping off, (c.f. Deane Butcher *antea*). This result has also been communicated to us privately. Radium Carbonate or Sulphate are alone suitable for the

purpose. Radium Bromide, however, which is more readily obtained in commerce, can be evenly spread in the powdered condition into various forms of applicators with the total exclusion of atmospheric moisture. The following suggest themselves :—

Metal tube-form Applicators in aluminium, platinum, gold, silver, lead, etc. These are usually about 3.5 Cm. long by 1 mm. to 2 mm. thick in the wall, enclosing a sealed glass tube containing 10, 20 or more mgr. of Radium Bromide, and are suitable for general use where strong action at a superficial point is required, or for sinking into cavities, *e.g.*, sinuses or for throat work. In these there is absolutely no fear of loss of emanation.

Minute Metal Applicators may also be made, *e.g.*, 1.5 Cm. long by 3 mm. external diameter, so as to be completely filled by the Radium *without any glass lining*. For throat work a movable gag may be arranged on the flexible wire.

Either of the above can be provided with flexible metal wire, or metal chains. These latter are more particularly intended for *urethral* use. If so preferred they may be used in a rubber catheter.

They are also suitable for use in the œsophagus and uterus.

Suppository shaped Applicators are made for use in rectal cases, for such, however, one of the minute Applicators above-mentioned may be preferable, *i.e.*, where there is enlargement of the tissues.

Aluminium (Surface) Applicators.

These are circular in shape with a perfectly flat surface. They may be made of any diameter, *e.g.*, $\frac{1}{2}$ inch up to 4 or 5 inches or more. The powdered Radium is spread immediately beneath the aluminium window.

Lead screens of various thicknesses may be used. This form of Applicator may be curved to fit the surface requiring treatment.

'Locket' Applicators with square mica windows have been used by McLeod (*c.f. antea*). They are of convenience for surface use and enable the operator to plot out the affected parts for treatment without the danger of overlapping, which occurs in the case of circular applicators.

A word in conclusion as to Applicators. The effect produced by a sealed glass tube containing the 'crystalline grains' of the salt on a platino cyanide screen held a little distance away is very striking in its even distribution. A tube so arranged, though ridiculed by some, might produce an excellent even action on the part to be treated, and will have certain obvious advantages. (c.f. Mackenzie Davidson antea.) But N.B., burns may result by too close an application to the part, thus a burn, in the knowledge of the writers, which had been made by a glass tube containing 3 milligrammes or so of pure Radium Bromide did not heal up in the space of three months.

Radium Emanation in sealed glass tubes from 400 mgr. of Radium Bromide in solution has been introduced into the interior of the body,—mouth, throat, œsophagus, rectum, uterus, &c., where "X" rays cannot well be used. Such sealed tubes behave physically like similar tubes of Radium Bromide crystals. The radiations are the same, but their radio-activity fall to half value in 3.7 days. With the above stock solution it is possible to withdraw the equivalent of about 40 mgr. of Emanation daily without diminishing value of the stock solution (which, as is well-known,

regains activity). The glass tubes are then enclosed in 1 m.m. thick lead tubes, and these again in rubber and are suitable for insertion into the rectum or cervix uteri in recurrent or inoperable carcinoma. May be enclosed also in rectum or stomach tubes. "X" ray examination will show whether the tube lies at the right spot. Results have been promising.

Suggestion to employ a radiation obtained by exposing needles (negatively charged) to the emanation, by which a large quantity of active deposit is concentrated on same. Such needles to be inserted into growths. (The $\frac{1}{2}$ value of same would be 20 minutes).—Jordan. L. ii./09,1742.

Emanations in skin affections:—

Eczema of the fingers cured by a solution of Radium Emanation in weak gelatin. Applied with a covering of muslin and then with lead foil which was bandaged on. (Prolonged applications,—12 hours desirable).—L. ii./09,1446.

Granulomatous tumours well treated by weekly injection of Radium Emanation in 2 Cc. of water. This would be employing all three types of radiation.—L. i./09,1447.

Psoriasis patches on the knees completely removed by the gelatin solution. Mycosis fungoides benefitted by the Radium gelatin solution.—*Ibid.*

General References.

By employing the more penetrating β and γ rays a position of unquestionable utility has been gained. The prospects of radio-therapy are undoubtedly bright,—probably true that Radium can effect a cure where "X" rays fail.—W. G. Smith. M.P., Nov. 24,09,553.

Speaking generally, nævus, port-wine stain, angioma, itching, keloid, rodent ulcer, epithelioma of the tongue and of the lip, have been cured. Eczema and pruritus have been well treated. Radium rays remove cutaneous thickening and infiltration remaining after a rodent ulcer has been cicatrised. Lupus and secondary syphilitic infiltrations treated with good results.—Deane Butcher, B.M.J. ii/08,720.

Sarcoma and carcinoma in the throat (affecting tonsil). Not only is rate of growth not checked by Radium and "X" rays, but in some cases accelerates.—B.M.J. ii/09,197.

Filariasis.—Lymphatic obstruction (cervical, submaxillary, axillary) in a patient suffering from filaria nocturna, carefully treated by Radium. This is probably the first case in which measures other than surgical have proved effective in filariasis. Treatment lasted six weeks, general improvement.—L. ii/09,224.

Butlin reports a typical epithelioma of the inside of the cheek, which was so much better under Radium at end of four months that it looked as if it would be quite cured, but the most insignificant epithelioma is capable of affecting the lymphatic glands.—L. i/09,542; B.M.J. i/09,462; See also reference to Butlin's further reports later.

Rodent ulcer treated in 1904 with excellent result, reported on.—Sequeira. Proc. Roy. Soc. Med. Feb. 1909. L. i/09,770.

Warts dropped off in 3 weeks after 45 minutes' application of 10 milligrams. About 14 days elapsed before full effect of the Radium was observed.—L. i/09,1685.

Nævus treated in woman and child.—L. i/09,1685.

Epithelioma of the naso-pharynx treated. The Radium was passed in through the inferior meatus. At first left *in situ* 15 minutes, later 1 hour each day. Ultimate death by intracranial tumour.—B.M.J. i/09,1239.

Eczematous patches treated with cloths steeped in feeble solutions of Radium Salts.—B.M.J. i/09,1342.

With the aid of Hill's Direct Vision Operating Laryngoscope, when used as a deep pharyngoscope, a tube containing Radium can be introduced into the upper third of a cancerous gullet.—B.M.J. ii/09,1152.

Effects and use of Radium.—L. ii/09,1873.

The 'Role of Radium.' Leader referring to Butlin's last cases.—L. ii/09,1508.

Radium in disease.—Na. Feb. 17th 1910, p. 460.

Radium Institute.—Suggestions to the Committee for application of its

funds. A monopoly of "X" rays, Ultra Violet Rays; H.F. currents will also be necessary. The question is asked,—how will this Institute differ from an Electrotherapy Institute run for purposes of making a profit? Radiography is a special branch of the profession.—Hall Edwards, B.M.J. i/09,440.

Radium Institute, official statement of general arrangements.—B.M.J. i/09, 614.

Editorial on the Radium Institute.—L. i/09,772.

Radioactivity as a cause of Carcinoma.

The cancer developing in clay pipe smokers, in the serotum of chimney sweeps, betel nut chewers, pitch and paraffin workers, "X" ray workers, and so forth, was invariably squamous cell carcinoma. This suggested possibility of radioactivity of the substances in question as causative of the cancer.—B.M.J. i/09,1465.

Cholesterin gall stones, commonly associated with cancer, showed marked skotographic action, but clay pipes, paraffin wax, &c., had none.—*c.f.* p. 698.

Skotographic power of liver and kidney (in cases of death from non-malignant causes) was higher than spleen or lung, and the tissue from females in each case was more active than the male. Results, using the primary masses, as also with liver, kidney, &c., were similar with carcinomatous material, but carcinoma augments the skotographic power of the liver in males, and decreases it in females.

One sample out of two of soot had skotographic power; betel nut had it on numerous occasions, as also 20 cholesterin gall stones, but neither clay pipes, nor paraffin wax, nor pitch, nor coal showed this. The action in the case of cholesterin gall stones extends widely beyond the surface in touch with the photographic plate,—the action not being due to the cholesterin as such. The markings of a bisected betel nut show up plainly. This skotographic action resembles in some respects chemical (*e.g.*, H_2O_2) and in others physical action. The skotographic substance (or substances) in the animal tissues is neither protein nor fat, nor carbohydrate, nor colouring matter, nor salts, but it is of organic nature, deliquescent, and will withstand charring at $300^\circ C$. The effect can be observed through a thin colloidal coating. Exposure in these experiments was for 18 hours at $55^\circ C$. Effects differ from that obtainable with wood in that exposure to sunlight and darkness makes no difference. A protein-free watery extract of sheep's liver retained its skotographic power for a year. Similarly the calculus of an Egyptian mummy over 7000 years old showed a skotographic action. Of micro-organisms, *Staphylococcus pyogenes aureus* and *albus*, *B. tuberculosis*. (and *bovinus*), and *B. diphtheriae* had usual and considerable action. The substances in animal tissue with skotographic power occupy an intermediate position between the woods on one hand, and the recognised radioactive bodies on the other.—B.M.J. i/09,1465.

Carcinoma material extracted with water and subsequently with Ether, or once and for all with Acetone, gave evidence of radio-activity by aid of electroscope; similarly the inorganic constituents of bone, whether from non-malignant or carcinomatous cases, but whilst the carcinomatous material produces skotographic effects when extracted with water alone or ether alone, it fails to do so when extracted with both or with Acetone.

Furthermore evidence of anti-radio-activity was found. These bodies actually retard the leak in the leaves of the electroscope. This means actual synthesis of (heavier) atoms. An aluminium disc kept in proximity with a radio-active substance acquires this anti-radio-active property. The retarding power can be conveyed from a substance already possessing it (a gall stone) to an aluminium disc.

Carcinoma tissue after extraction with water and ether accelerates the leak of electricity in a charged electroscope. This is not the case with liver or lung from non-malignant cases. Liver from non-malignant cases, after extraction with Acetone, had retarding influence.

Recognised Radio-active substances, *e.g.*, Uranium in combination with a large organic molecule, *e.g.*, protein, shows a corresponding diminution of its influence on electroscopic leak, but the radio-activity of the Uranium is only masked and can be brought to light again by incinerating. Work was done to endeavour to set free a radio-active substance from animal tissues of all kinds, but they did not contain one capable of withstanding a white heat.

Carcinoma with its tendency to accelerate electroscopic leak, modifies the electrical conditions of the tissue in which it lies. The bombardment with α particles under gone by an aluminium disc, as suggested earlier, may possibly lead to the anti radio-activity of the disc

Experiments with "X" Rays, Radium etc., on animal cell division showed, in the case of "X" Rays, that short exposures hasten, and long retard cell division.

Remarkable evidence of a type of radio-activity is given by the fact that the proximity of a protein-free watery extract of sheep's liver, or of ovary of herring, causes ova of *ascaris megalocephala* to pass from the one- to the two-celled stage more slowly than in the control,—i.e. retards development, while a similar extract of the testis of the herring accelerates division.

Clay pipes, soot, etc., frequently associated with cancer, do not possess all the criteria of the recognised radio-active substance. These substances, as already mentioned, have skotographic power.

Seminal fluid possibly contains the essential cause of carcinoma of the cervix uteri. The spermatozoon is the most potent instigator of cell division—when acting on a specific cell—the ovum, and here is recalled the activity of the extract of the testis of the herring on *ascaris megalocephala*, and has strong skotographic power.

Then again viewing the skotographic power of bacteria—this is, in the main, associated with the organisms attacking man, and when one realises that the skotographic power of animal substances (if not of bacteria) may persist for months, if not years, it is possibly the cause that in mammary cicatrices old ulcers may be found affected with the bacteria underlying the primary chronic inflammatory condition. The incidence of carcinoma of the breast and of the cervix are exactly in accord with expectations on the lines of possible bacterial and spermatozoal origin respectively.

With regard to cancer affecting the part of the alimentary tract between stomach and rectum, in males the liability is not only greater, but it also reaches the maximum 10 years younger and persists at that for five years longer. There is possibly here some factor leading to more active epithelial cell division. Wheaten flour and other food may be radio-active. Men naturally consume more food than women.

(Are there no statistics showing that men with cancer of rectum were big eaters?—W.H.M.)

Radio-activity may yet explain a large number of the salient features of carcinoma as a disease. It would even explain cancer 'houses' and localities. In a sense the electrical department of every hospital is a cancer house. Whether cancer be produced by radioactivity is not yet definitely settled.—Lazarus Barlow, B.M.J. i./09, 1536, 1544.

The report of experiments by Lazarus Barlow seem to indicate that carcinomatous materials tend to accelerate electroscopio leak, as compared with innocent growth and normal tissues. There seems to be a causal relation, according to this author, between radio-activity and the carcinomatous process, though not fully demonstrable.—B.M.J. ii./09, 704.

Photographic representations of sheep's brains have been produced.—L. i./09, 654.

Butlin on Radium treatment of epithelioma. Only one undoubted case of epithelioma known to him to have been cured by Radium,—several cases reported with partial success. Doubtful whether leukoplakia should be treated by Radium. Admirable for rodent ulcers of small or moderate extent, seems to result in a complete cure. Will also heal epitheliomatous ulcers of small extent, but if extensive disease to be used only if inoperable. Glands must be treated by operation. As to leukoplakia Radium only cures by substituting thin scar tissues for them, but Radium treatment of this is painless if properly conducted.—L. ii./09, 1411.

Action of Radium on normal and cancerous tissue without causing their disintegration was of particular interest. After exposure to Radium for an interval within which no structural alteration could be observed in the tissues, either with the naked eye or microscope, they might be completely deprived of their powers of growing and of immunising, i.e., vital powers abolished with histological structure of the tissues retained,—but normal and cancer tissues behave the same way and selective action doubted.—Bashford. Seventh Imperial Cancer Research Fund, General Superintendent's Report.—B.M.J. ii./09, 152.

Mineral Waters.

Radium an oxidising agent. This possibly accounts in great measure for its efficacy, e.g., in the case of mineral waters, most of which are more or less radio-active. Natural mineral waters cannot be imitated to produce the same therapeutic results.—L. i./09, 469.

Radio active waters efficacious *per os* or inhaled. The effect of radio-active baths is stated to be very small.—L. i./09, 1283.

Sciatica and arthritis have been cured by water charged with Radium Emanation at Vienna. 46 Gm. of pure Radium (Salt) available for use there.—*L. ii./08,506.*

The radio activity of oceanic depths is far greater than that of river waters, *e.g.*, the Nile. It is being continually replenished and strengthened by the mineral waters.

Sand of the Arabian Desert contains $\frac{1}{4}$ a billionth part—1 oz. in 15 million tons.—*Na., Sept, 10/08,634.*

Water fresh from deep springs is the most active,—the activity is lost on exposure. It is well known that bottled waters are not as active as the fresh.

For ages people in the neighbourhood of the mines have worn a little bag of Pitchblende as a charm against rheumatism. It is stated that the miners themselves never suffer from gout, neuralgia or rheumatism,—these observations, however, are unsatisfactory, and they require strict investigation.—*B.M.J. ii./09,172.*

Coloration of glass by Radium did not seem to be dependent on the purity of the Radium Salt used. Glass in South Africa often colors with the sun's action, and it was found that glass so colored by Radium lost its color on exposure to sunlight for 12 days.—*Na., June 18/08,151.*

Secondary radiation of β particles from a plate exposed to the β rays from Radium described.—*Na., June 18/08,165.*

Radium Ointment, Radium Salve.—Preparations under these names have been supplied commercially—*see* Patent Medicines. There is every reason in our opinion to believe that weak Radium Ointments, preferably made with a thoroughly dried soft paraffin basis, might prove of considerable utility in some cutaneous affections, *e.g.*, in lupus, psoriasis, eczema, boils, ulcers, and ringworm.

***Emanosal (Bath Tablets).**—Used in the treatment of gouty affections of the joints, and in neuralgia.

Many old references to early work on Radium have been unavoidably cut out on this occasion.—*C.f. Edn. XIII., 668 et seq.*

RANUNCULUS FICARIA.

Syn. PILEWORT or CELANDINE.

This drug has been used in the form of ointment. It is prepared by digesting the fresh Pilewort with melted lard 24 hours, and straining after the manner of Savin Ointment. **Suppositories** are made containing 72 grains of the ointment and 18 grains of Spermaceti; also, more convenient, a smaller size, containing 45 grains of the ointment and 15 grains of Spermaceti; have been employed in hæmorrhoids.—*B.M.J. i./04,14; C.D. i./04,55.*

RESORCINUM, P.G.

Syn. **Resorcinol, U.S.**

$C_6H_4(OH)_2 = 109.22$ (*Off.* and U.S.) 110.048 (I. Wts.).

Dose.—2 to 8 grains (0.13 to 0.52 Gm.).

Fr. Cx. gives max. Single and *pro die* dose.

Metadihydroxybenzene is in white crystalline plates, melts at 230° F., = 110° C. Found correct. *P.J. i./08,758*) and is easily volatilised. U.S. has 109 to 110° C.

Soluble 1 in 1 of water, 2 in 1 of alcohol, 1 in 20 of olive oil.

Incompatible with Spirit of Nitrous Ether, and with caustic alkalis.

Uses.—It possesses powerful antiseptic properties. It coagulates albumin, and has a caustic action on the skin, but a 2% solution is not

irritating. It is an effective topical remedy in diphtheria, and produces no injurious consequences. A 5% solution may be injected into the bladder without causing any irritation, and is useful in inflammatory affections of this organ, likewise in vesical catarrh after gonorrhœa; 5 to 10% solution is of service also in syphilitic sores and skin diseases; and a 1% solution improves unhealthy wounds, and is useful as an eye lotion in conjunctivitis. Given internally, but with great care, it has a specific action comparable to quinine, but it is apt to produce profuse perspiration, and its antipyretic action is short; it is best administered well diluted with water and flavoured with syrup of orange or glycerin. In whooping cough 10 minims of 2% solution or this strength used as spray is of service, as also in hay fever.

Epithelioma and rodent ulcer have been well treated with ointments and plaster up to 30% strength.

It is applied locally to condylomata and mucous patches.

Pigment of 10% relieves irritation of tubercle of larynx. For eczema and alopecia, cold cream with 2% of resorcin is useful.

In gastric ulcer 2 to 5 grain doses have antiseptic and analgesic action.

Bronchitis and broncho-pneumonia: treatment by rendering the nasal fossæ and naso-pharynx antiseptic—ointment into the nostrils of Resorcin 1, Boric Acid 10, Vaseline to 100; also swab the mouth with 1% resorcin lotion.—B.M.J.E. i./o8,11.

In ichthyosis useful—favours desquamation and removes effete horny layer—used in the form of paste. Resorcin $\frac{1}{2}$ to 1 drachm, Glycerin of Starch $\frac{1}{2}$ ounce, Glycerin $\frac{1}{2}$ ounce. Combine this treatment with use of superfatted soap containing Resorcin 5% and Salicylic Acid.—B.M.J. i./o7,362.

Poisoning from external use of 220 Gm. of ointment containing 254 Gm. resorcin in a case of eczema. Hydrochloric acid internally should be taken when resorcin is used locally for some time.—B.M.J.E. ii./o8,51.

Tablets, 3 grains (0.2 Gm.). Dose.—1 to 3.

Glycerinum Resorcin, G.H.

Resorcin 1, Glycerin 3, Distilled Water 1.

In chronic urethritis resisting treatment, a single injection (25% resorcin) in fresh cases often beneficial.—Pr., Apl. 'o9,547.

Lotio Resorcini. Syn. SPIRITUS CAPILLARIS.

Resorcin 1, Ether 1, Castor Oil 1, Eau de Cologne 10, Alcohol (90%) 35. Useful for dandruff and alopecia. *Soap and alkali must be removed before use, or hair may be discolored.*

Lotio Resorcini Composita, St. M.'s H.

Resorcin 10 grains, Methylated Spirit 1 drachm, Water to 1 ounce.

Lotio Capillaris.—A stimulant to the growth of hair. Resorcin 5, Capsicum Tincture 15, Otto of Rose q.s. Castor Oil 10, Alcohol 90% to 100.—M. Arch.

Lotio Excitans, St. G. H.

Resorcin $\frac{1}{2}$ drachms, Mercuric Chloride 10 grains, Glacial Acetic Acid $\frac{1}{2}$ drachm, Chloral Hydrate 3 drachms, Cantharides Tincture 1 ounce, Alcohol 60% to 1 p

Lotio Resorcini et Acidi Borici.

Resorcin 1, Compound Tincture of Lavender 10, Glycerin 10, Saturated Solution of Boric Acid 80, as a mouth wash after operations on the mouth.

Nebula Resorcini.—For a common cold, spray nostrils with 1%

solution, to which may be added an alkaline 'Solube,' *e.g.* Borax and Cocaine Co. (for others *vide* Index).—B.M.J. ii./05,1679.

Gargarisma Resorcin E.L.

Resorcin 15 grains, Glycerin 1 drachm, Water to 1 ounce.

Unguentum Resorcini Compositum. Ihle's Paste, St. J. H.

Syn. PASTA RESORCINI, Mid. H.

Resorcin 20 grains, Zinc Oxide 22 grains, Starch 22 grains, Lanolin, Soft Paraffin, to 1 ounce.

For bromide acne, Resorcin, Starch, Zinc Oxide, of each 1, with Vaseline 3 is recommended.—B.M.J.E. ii./09,52.

Unguentum Resorcini Compositum, N.F. 'SOOTHING OINTMENT,' is best prepared as follows: Dissolve Resorcinol (Resorcin) 6 in water 10½ with aid of a little heat. Warm Anhydrous Wool Fat 24½ in a porcelain dish on water bath to soften and add Resorcin solution, stirring continuously, then add Bismuth Subnitrate 6, and Zinc Oxide 6, rubbing until smooth. Having melted Paraffin 10, and Petrolatum 25 together, add these to rest of the ointment, stirring continuously. Finally incorporate Oil of Cade 12. To produce a good colored Ointment it is a good plan to add the Oil of Cade at time of dispensing.—Am. Jl. Ph. Mar.'08,120.

Physicians should specify N.F. for this to distinguish from previous formula.

Pasta Resorcini Fortior (Lassar and St. M.'s H.)

Resorcin 20, Zinc Oxide 20, Wheat Starch 20, Liquid Paraffin 40 'Mitis' 10, 25, 25, and 40 respectively.

Pasta Resorcini et Zinci Oxidi, K.C.H.

Resorcin 1, Glycerin 1, Zinc Oxide 1, Paraffin Ointment (white to 8.

Baculum Resorcini, St. M.'s H.—Resorcin 3, Wax 2, Lanolin 5.

Resorcin Monacetate. *Syn.* Euresol.

A honey-like mass. Dissolves 10 to 30% in acetone, for use in acne, seborrhœa and sycosis.

Thio-resorcin. Yellowish powder slightly soluble in alcohol; as a substitute for Iodoform; 5% Ointment in skin diseases.

RHEI RADIX (Off.). U.S.

Dose.—3 to 10 grains (0.2 to 0.65 Gm.) repeated.

Single dose.—15 to 30 grains (1 to 2 Gm.) (Off.).

The erect Rhizome of *Rheum palmatum*, *R. officinale* and other species (and the variety *R. tanguticum*, U.S.) (*Polygonaceæ*) grown in China and Thibet, deprived of most of its bark and dried.

Purgative constituents of.—P.J. i./07,587.

Flavoring.—Syl Vanillæ, Glyl Pini; Syrupus Zingiberis, Syrupus Aromaticus.

Uses.—Laxative and stomachic; often given with Sodium Bicarbonate especially to children.

Tablets of Rhubarb, Soda and Ginger contain Rhubarb 3 grains Sodium Bicarbonate 2 grains, Ginger 1 grain.

Colorimetric Assay.—All good rhubarbs containing from 2.8 to 4% of oxy-methyl-anthraquinones comply with the test given in P.J. ii./05,580.

Extractum Rhei (Off.) *Dose.*—2 to 8 grains.

Prepared by extraction of Rhubarb Root with Alcohol 60% and evaporation to dryness. The U.S. preparation is made by concentrating the fluid extract (yield 35 to 40%) at not exceeding 50°C. Mixed with liquorice powder so that 1 = 2 of drug, the powder keeps well.—Caspari.

Fluidextractum Rhei, U.S. 1=1, Extraction with 75% Alcohol approximately. *Average dose.*—15 minims.
Liquor Rhei Concentratus.—v. p. 438.

Pilula Rhei Composita (Off.).

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Rhubarb 48, Socotrine Aloes 36, Myrrh 24, Hard Soap 24, Oil of Peppermint 3, Syrup of Glucose 44. May be kept in specie (*sine* Glucose Syrup). 3 parts=4 of mass. If the Oil of Peppermint 3 (which is objected to by pill manufacturers) were replaced by Menthol 2, dissolved in Alcohol *q.s.*, the pill would be improved.
Pulvis Rhei Compositus (Off.) Gregory's Powder. *Dose.*—20 to 60 grains (1.3 to 4 Gm.).

Rhubarb Root 2, Light Magnesia 6, Ginger 1. The Heavy Magnesia will produce a less bulky powder.

Flavoring. Syl Menthæ Piperitæ, Gyl Lavandulæ; Syrupus Zingiberis, Extractum Glycyrrhizæ Liquidum.

Tinctura Rhei Aquosa. P. Austr. (has this and "Vinosa.").

Dose.—1 to 2 dr. (3.5 to 7 Cc.).

Rhubarb sliced 10, Borax 3, moisten with Alcohol (70%) 20, set aside 1 hour, add Water 80, macerate 24 hours, shaking frequently, and filter. Sp. Gr. about 1.

Tinctura Rhei Aquosa. P. Jap. 1907.—Macerate Rhubarb, coarsely cut, 10; Potassium carbonate, 1; Sodium borate 1; in Boiling Distilled Water. 90, fifteen minutes; add Alcohol, 9; after the lapse of an hour strain with slight pressure; with every 85 of the strained liquid mix Cinnamon Water, 15; miscible with water without producing any turbidity. Prepare freshly when required.

Syrupus Rhei (Off.).

Dose.— $\frac{1}{2}$ to 2 drachms (1.8 to 7.0 Cc.).

Rhubarb Root 1, Coriander Fruit 1, Sugar 12, Alcohol (90%) 4, Water 12. To produce 20 by weight.

Syrupus Rhei Aromaticus, U.S.

Average dose.—2 drachms. Aromatic Tincture of Rhubarb 150, Potassium Carbonate 1, Syrup to 1,000.

Syrupus Rhei, U.S. *Average dose.*—2 drachms.

Fluidextract of Rhubarb 100, Spirit of Cinnamon 4, Potassium Carbonate 10, Water 50, Syrup to 1,000.

A modified form for this (made direct from the root): Mix rhubarb (No. 20 powder) 100 with 250 of sand, and moisten with 50 of a mixture of Glycerin 50, and Cinnamon Water 150; percolate and extract with remainder of menstruum, and then with Cinnamon Water till 600 of percolate is obtained. Add potassium carbonate 10, Sugar 800, dissolving on water bath, strain and add Cinnamon Water if necessary to 1000.—Am. Jl. Ph., July 09, 317.

Tinctura Rhei Composita. (Off.).

Dose.— $\frac{1}{2}$ to 1 drachm repeated, 2 to 4 drachms single dose. Rhubarb Root 2, Cardamom Seeds $\frac{1}{2}$, Coriander Fruit $\frac{1}{2}$, Glycerin 2, Alcohol (60%) *q.s.* to 20. Tinctura Rhei, U.S., has 1 in 5 with Cardamoms and Glycerin.

Flavoring.—Syl Rosæ, Syl Vanilla; Syrupus Zingiberis.

Tinctura Rhei Aromatica U.S.

Average dose.—30 minims. Rhubarb 20, Saigon Cinnamon 4, Cloves 4 Nutmeg 2, Glycerin 10, Alcohol 50, Water 40. By macero-percolation.

SACCHARIN.

Glusidum. GLUCUSIMIDE (*Off.*); *Syn.*—BENZOYL-SULPHONIC-IMIDE. BENZOSULPHINIDUM, U.S.

$C_6H_4 \langle \begin{smallmatrix} SO_2 \\ CO \end{smallmatrix} \rangle NH = 181.77$ (*Off.* and U.S. Wts.), (183.12 I. Wts.).

Dose.— $\frac{1}{2}$ to 2 grains (0.032 to 0.13 Gm.) or more.

A derivative of toluol (*q.v.*), in white, intensely sweet, crystalline powder. Its aqueous solution has an acid reaction; it forms crystalline sweet salts with alkaloids and metallic bases. Solutions of alkalis and their carbonates dissolve it, the latter evolving carbonic acid.

Soluble 1 in 400 of water, in alcohol 90% 1 in 25, in ether 1 in 100, incompletely in chloroform, and in glycerin about 1 in 50, slightly in oils and fat, also in acetone.

Use.—Instead of sugar for diabetic and obese patients.

Saccharin is generally sold standardised to a sweetening power of 300 times that of sugar. It is also prepared refined to a standard of 450 and 500 parts of sugar.

Saccharinum Solubile, contains about 90% of Saccharin in combination with soda. In yellowish granular, micro-crystalline masses, easily soluble in water, and therefore convenient for flavoring purposes. 1 in 2,000 or 2 grains to an 8-ounce mixture is sufficient.

Dose.— $\frac{1}{2}$ to 2 grains (0.032 to 0.13 Gm.) or more.

Elixir Glusidi, B.P.C.—*Syn.* Elixir of Saccharin. *Dose.*—5 to 20 minims. Gluside 5, Sodium Bicarbonate 3, Alcohol 12.5, Distilled Water *q.s.* to 100. 1% added to mixtures for flavouring.

Tablets of Saccharin. *Dose.*—1 or 2.

Contain Saccharin $\frac{1}{2}$ grain with sodium bicarbonate.

In making Saccharin Tablets it would either be better to employ the pure Sodium Bicarbonate or to use only half the quantity of ordinary Bicarbonate, which contains much Sesquicarbonate, $2NaHCO_3 \cdot Na_2CO_3 \cdot H_2O$, which is very alkaline and produces much less Sodium Saccharinate than it would if pure. If impure, tasteless Sodium Sulpho-benzoate is formed.—P. J. ii /05, 230.

Detection of in Beer, Wine, &c. Treat Ether Extractive with Potassium Permanganate and then heat with Sulphuric Acid and Di-resorcin. Add water and filter, Intense violet colour indicates presence. Wauters, in Int. Cong., 1909.

SACCHARUM PURIFICATUM (*Off.*) U.S.

Syn. SUCROSE. $C_{12}H_{22}O_{11} = 339.60$ (*Off.* & U.S. Wts.) (342.176 I. Wts.).

Crystals or powder, soluble 2 in 1 of water.

In addition to the B.P. Refined Sugar which is obtained from the juice of the Sugar Cane—*Saccharum officinarum* (*Graminaceae*)—various grades of granular cane and beet sugar both with and without the addition of "blue" are marketed. For the manufacture of Syrups a sugar without the colouring matter is essential. U.S. allows also beet sugar.

There is no known method of distinguishing between 'cane' and 'beet' when highly refined (in white crystal), the only means of differentiating is

the finding of the impurities present in the two 'brown' sugars. With the latter there is a difference in smell and taste between the beet and cane.

Cane Sugar may (in the absence of a polarimeter) be approximately estimated by heating 1 Gm. of the same in 50 Cc. of water, to which 10 drops of hydrochloric acid have been added, for half an hour on a water bath. The solution is then cooled and neutralised with soda and made up to 100 Cc. with water, and the Invert Sugar thus formed is estimated with Fehling's Solution, 1 Cc. of which is approximately equivalent to 0.005 Gm. of Invert Sugar, the calculation being on the basis that 360 of Invert Sugar represent 342 of Cane Sugar.

Polarimetric Estimation.—A 10% solution at 20° has $[\alpha]_D = + 66.486^\circ$.—P.J. ii./04,714.

Is said to be of considerable assistance in increasing the energy of the uterine contraction in labour.—Pr., Sept. 1907, p. 439.

Syrupus (Off.)

Sugar 1, Water to $1\frac{1}{2}$ by weight, Sp. Gr. 1.33. U.S. orders Sugar 85, Water to measure 100. Weaker strengths of syrup do not keep well. Potassium Carbonate 1 grain in 12 ounces of Syrup has been found to prevent crystallisation.—P.J. ii./05,750.

In Syrups as a general rule it may be taken that 16 of Sugar occupy about 10 fluid.

Invert Sugar is prepared by action of dilute mineral acid on Cane Sugar. Consists of a mixture, possibly a loose combination of equal weights of Grape Sugar (Dextrose) and Lævulose. A useful substitute for cane sugar in dyspepsia—more easily borne in gastritis.

Lævulose.—Syn. Diabetin, Fructose.

$C_6H_{12}O_6 = 178.74$ (180.096 I. Wts.).

A whitish crystalline lævorotatory powder, freely soluble in water; reduces Fehling's Solution. May be produced from Invert Sugar (above) by combining slaked lime with it in presence of water, pressing off the liquid Calcium Compound of the Grape Sugar, decomposing the residual Lævulose compound with Oxalic Acid or Carbon Dioxide, and evaporating the filtrate.

Manufacture.—Inulin from dahlia bulbs or chicory root which contain 6 to 12% is most suitable for producing pure Lævulose. If made from Invert Sugar is stated to produce an impure article. The dahlia or chicory method should permit of the production of lævulose at a very cheap rate.—Int. Cong. Sugar Industry, Paris, C.D. ii./08,142.

A stronger sweetening agent than cane sugar; has a pleasant flavor. Specially suitable for diabetics.

It is also prepared of the consistence of honey, and as a syrup for microscopic work.

In the wasting of phthisis, it has been suggested to give Sugar in large quantities. e.g., 4 to 8 ounce doses, with some bitter tincture or coffee to overcome intense sweetness. The Sugar is powerfully dynamogenic.—B.M.J.E. i./05,32.

Tropical abscess of the liver, Diagnosis of.—Administer 1 to 2 drachms at night, and examine the urine for alimentary glycosuria. Said to be easily produced in hepatic suppuration.—B.M.J. ii./08,1240.

SANSIVIERA.

The rhizome of this plant, *Sansiviera thyrsiflora*, a native of certain parts in South Africa, has attracted attention. An Acid Extractive of the powdered root treated in the presence of alkali with ether was conclu-

sively proved by experimental work to contain practically speaking no alkaloid. We obtained a minute precipitate with Picric Acid—no precipitates to speak of with Mercuric Chloride, or Gold or Platinum Chlorides.

Uses.—The root possesses laxative properties, and should prove valuable, being free from griping action, and pleasant to take. The Kaffirs chew a stick (two or three ounces) of the fresh root at a time, and swallow the juice for use as an anthelmintic, and more particularly for the treatment of hæmorrhoids—for the latter it is known to be efficacious.

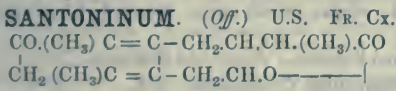
Becker, of Grahamstown, states the action of *Sansiviera* is entirely confined to the lower bowel, and particularly the rectum—hence its reputation in treatment of piles.

Would usefully be combined with a diuretic and sudorific drug to enhance its action. In any case the drug should be given in bold doses, as the active constituents only exist in small proportion.

Extractum Sansivieræ Liquidum. *Dose.*—2 to 4 drachms. Prepared in manner similar to Liquid Extract of Licorice. (*Off.*) A useful laxative preparation as above mentioned.

Extractum Sansivieræ Solidum. *Dose.*—10 to 20 grains (0·65 to 1·3 Gm.) Is suitable for preparing pills and gelatin Capsules.

The plant must not be collected for several months in the year after the spring rains, as at this season it is exhausting its energies in producing new shoots, which are inactive.—Oliver, C.D., i./09, 21.



or $\text{C}_{15}\text{H}_{15}\text{O}_2 = 244\cdot29$ (*Off.* and U.S. Wts.) (246·144 I. Wts.).

Dose.—2 to 5 grains (0·13 to 0·32 Gm.) in sugar. U.S. *Average dose.*—1 grain. FR. Cx.: *Max. single dose* $1\frac{1}{2}$ grains; max. during 24 hours 5 grains approximately.

A neutral crystalline principle. The inner anhydride, or lactone of Santonic Acid. U.S. obtained from *Santonica*, the dried flower-heads of *Artemisia maritima* var. *Stechmanniana* (*A. pauciflora*, Weber) (*A. Cina*, Berg.) (*Compositæ*).

Syn.—Levant Wormseed, *Flores Cinæ* (*Cynæ*)—P.G., Wurmsamen. Ormesukker (Danish) is a Confection of *Santonica*.

Soluble 1 in 40 Alcohol 90% and in Oils (1 in 200 of Castor Oil), in Chloroform 1 in 3. Also in Caustic Soda Solution. Insoluble in water. Turns yellow in sunlight.

Uses—It is an anthelmintic for round (*Lumbrici*) and threadworms (*Ascarides*), but is inoperative against tapeworm (*Tenia*) R. It colours the urine orange, and in too large a dose may cause objects to appear of a green or yellow colour. Hale White mentions that if urine be acid, a greenish yellow or saffron colour is produced, and if alkaline a purplish red. It relieves the lightning pains of *tabes dorsalis*. Hale recommends that immediately after taking a dose of Santonin a 2 or 3 grain dose of Calomel is to be given, followed by a saline purge six hours afterwards.

the flow of bile being particularly useful in making the worm let go its hold. In urinary incontinence Santonin will often effect a cure. Poisonous properties have been ascribed to it, probably due to impurities.

As an anthelmintic it is very active in an oily solution, *e.g.*, **Haustus Santonini et Olei Ricini**, Santonin in powder 4 grains, Castor Oil 3 drachms. Mix and emulsify with Mucilage of Acacia 4 drachms. Syrup 1 drachm, Peppermint Water to $1\frac{1}{2}$ ounces. Saccharin $\frac{1}{2}$ grain added is an improvement. Taken fasting in the morning makes a dose for a child of 6 to 12 years.

New Method of Administration.—A garlic draught should be given at bedtime and in the morning on an empty stomach. Heat a garlic clove, cut small, in a glass of milk 10 minutes, strain and sweeten. Said to render the parasites more vulnerable. Following on this—

Santonin Emulsion (*the Santonin being completely dissolved in almond oil*), is then given, 0.01 Gm. for each year of age up to max. dose of 0.3 Gm. The draught is given divided into 3 parts at 5 minutes interval, starting a few minutes after the garlic. During the forenoon give lemonade freely, and 2 hours after the Santonin purge with Calomel. This is said to be non-toxic to the patient.—L. ii./09,1189. P.J. ii./09,344.

In gastric trouble of nervous origin and in epilepsy.—C.D. ii./05,1052 (*ex Semaine Médicale*).

Pyrexia, diarrhœa, discharge of pus in case of a woman in labour, due to round worms which were removed by Santonin.—B.M.J. i/07,200.

Tablets, 1, 2 and 3 grains. *Dose.*—As Santonin.

Confectio Santonini Composita. E.L.

Dose.—1 drachm for a child 2 to 3 years.

Santonin 1, Powdered Ginger 1, Jalap 3, Sulphur 4, Senna Confection 51.

Pulvis Santonini Compositus, Gt. ORM. H.

Santonin $2\frac{1}{2}$ grains, Compound Scammony Powder 2 grains, Calomel $\frac{1}{2}$ grain. For a child 1 year old.

Trochisci Santonini (*Off.*). 1 grain (0.065 Gm.) in each; one every night for a few nights should then be followed by an early morning aperient. U.S., $\frac{1}{2}$ grain in each.

Suppositorium Santonini.

Contains 3 grains (0.2 Gm.), or more if ordered. Should be administered every 2nd or 3rd night, for 3 times. Is an efficient anthelmintic, especially for thread worms, which often infest the anus of children, causing them to have disturbed sleep.

In sprue, 3 grains morning and evening for three days.—Cantlie, B.M.J. ii./05,1281.

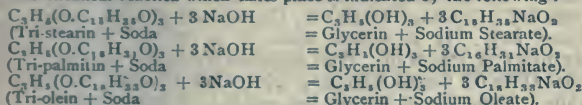
Santoninoxim, $C_{15}H_{18}O_2.N.OH=259.23(261.162 \text{ I. Wts.})$.

Made by the action of hydroxylamine in an alkaline solution. Said to be less toxic, but equally active when administered in double or triple doses. To be followed by a purgative.

SAPONES.

In soap-boiling caustic soda of high purity, 96-98%, is used for the best varieties. The lye employed (into which the melted fat is poured) has Sp. Gr. 1.075. Boiling proceeds with occasional further addition of lye.

The chemical reaction which takes place is indicated by the following:—



The soap thus produced is salted out with salt, and the glycerin formed is recovered as much as possible from the spent liquor. It is essential to ensure that the fats have been thoroughly saponified, as also that no marked excess of alkali is introduced. The next step is to clarify the soap by boiling with a fresh supply of water from any insoluble soaps, *e.g.*, Lime and Magnesium Salts of the acids indicated above. The "nigre" containing these impurities subsides in this manner to the bottom of the vessel. The soap is then allowed to slowly cool and "settle." When cooled to 165° F. it is removed to the frames to solidify. Here it remains for a month to consolidate, and drain through apertures in the sides of the containing vessel.

For Household Purposes this soap is then cut up with wires into bar form and stamped.

For Toilet Purposes special soap bases are employed containing a large proportion of Stearates (obtained from 'edible' animal fats—tallow). It is obvious that the fats must not be rancid or of strong colour. A high acidity and unpleasant odour would render the fat quite inadmissible. A proportion of palm oil is generally combined with the tallow.

After boiling and separating in the usual way the melted soap is run into a tank and thence on to cool stone rollers, and then again on to metal rollers, arranged as in a printing press. A set of teeth is so adjusted against the rollers as to cut up the solidified soap into ribbons (Cressonière Machine). The shreds thus formed are dried by passing over a special wire mattress, which is circulating over heated air. In passing, the soap loses about 30% moisture—this loss can be regulated. The next stage is to break up the shreds and combine with colour and perfume through a milling machine with teeth attached, which again converts into ribbons, and at the same time the heat generated by the pressure mashes the soap. The next process is the conversion into bar form by a Plodding Machine; finally the stamping into moulds is effected.

For Shaving Soap it is necessary to employ fats—'strong' tallow—with a high melting point.

Ordinary Household Soaps are made with vegetable oils of light gravity.

Good average soap can be produced by saponifying vegetable oils, such as those of Cottonseed, Palm, or Coconut (of this the best variety is known as "White Cochín" Oil, the second as "Ceylon" Oil); but these oils containing a large proportion of the Oleic Ester produce more soluble *i.e.* wasteful soaps.

The use of resin in household soap is not at all injurious; on the contrary resin soap is very soluble and lathers freely. The addition of the resin renders the soap smooth and prevents efflorescence. Further, the cleansing 'odour' imparted by the resin is liked by many. It is not, however, suitable for toilet purposes, and a large admixture cannot be allowed. Occasional additions to common soaps are chlorophyll, sodium silicate and French chalk.

Transparent Soaps are made by setting from methylated spirit. Many contain resin and sugar (as much as 20% of each).

In Germany manufacturers have the privilege of using pure spirit with 1 kilo of Castor Oil and 400 Cc. of Soda Solution per 100 litres of Spirit to 'denature.'—C.D. li. 66,718. It is stated that in the manufacture of transparent soap with methylated spirit only about $\frac{1}{2}$ the spirit is recovered—the rest is lost in drying.

The following is the approximate composition of Pharmacopœical Soaps:

Sapo Animalis (Off.). Curd Soap. Principally Sodium Stearate; made with Sodium Hydroxide and a purified animal fat consisting

principally of Stearin:—Fatty Acids 60%, Combined Alkali 9%, Uncombined Mineral Matter 2%, Water 30%. Limit tests for Alkaline Hydroxide and Carbonate are imposed for this and

Sapo Durus (Hard Soap) (*Off.*). CASTILE SOAP, principally Sodium Oleate. Manufactured with Sodium Hydroxide and Olive Oil:—Fatty Acids 60%, Combined Alkali 8%, Uncombined Mineral Matter 2%, Water 30%. It is soluble about 1 in 20 in Water. SAPO MEDICATUS, Ph. Ned. (Full directions for making are given.)

Genuine Olive Oil Castile Soap is greyish, while Coconut Oil Soap is pure white. Iodine No. is the best test.—C.D. i./o7,869; i./o8,523.

White Castile Soap and Mottled Castile Soap are trade varieties. Mottle is produced by adding iron or residues and scrapings of the lye tanks.

Sapo Mollis. Sapo Viridis (*Off.*), Soft Soap, consists principally of Potassium Oleate. Manufactured from Potassium Hydroxide and Olive Oil:—Fatty Acids 45%, Combined Alkali 8 to 11% (reckoned as K_2O), Insoluble Mineral Matter 1.0%, Water 35 to 45%, Matter insoluble in Alcohol 3% officially allowed (*i.e.* Potassium Carbonate and Insoluble Soaps).—W.H.M.—B. & C. D. ii./94,575.

Sapo Kalinus, P.G. iv., P. Austr. and **Sapo Mollis** U.S. are made with Linseed Oil. Soluble about 1 in 4 water, and 1 in 1 alcohol 90%.

Sapo Superadipatus, Ph. Ned.

Anhydrous Wool Fat 4, Potash Soap 20, Hard Soap 76.

Sapo Superadipatus cum Pice Liquida, Ph. Ned.

Anhydrous Wool Fat 4, Liquid Tar 5, Potash Soap 15, Hard Soap, 76.

Sapo Superadipatus cum Sulfure Precipitato, Ph. Ned.

Anhydrous Wool Fat 4, Precipitated Sulphur 10, Potash Soap 20, Hard Soap 66.

Sapo Mollis Peroleatus.—Tallow 32, Olive Oil 5, Potassium Hydroxide 3, Sodium Hydroxide 2, Borax $\frac{1}{2}$, Distilled water 100. Dissolve the Potassium and Sodium Hydroxides and Borax in Water, then heat to boiling, add the tallow and oil—boil until well saponified and proper consistency when cold.—C.D. i./10,79. Ex Edinburgh Infirmary Pharm.

To Soften Water, *i.e.*, to precipitate the dissolved Calcium Salts, so as to prevent them forming insoluble soaps during the lathering process, a small proportion of Sodium or Potassium Carbonate may be added to the water. Filtration through wood ashes was formerly used for laundry work.

Sodii Oleas. *Syn.* ★EUNATROL.

$CH_3(CH_2)_7CH:CH(CH_2)_7COONa=302.02$ (304.264 I. Wts.).

In 2 and 4-grain pills and is given to dissolve gallstones. Useful as cholagogue. Capsulæ Sodii Oleatis contain 5 grains.

In gallstones no advantage over the simple emulsions of fats.—B.M.J. i./o9,1305.

Capsulæ Sodii Oleatis Compositæ.

Dose.—One night and morning or 2 at night followed by plenty of hot water.

Sodium Oleate 1 grain, Phenolphthalein $\frac{1}{2}$ grain, Salicylic Acid $1\frac{1}{2}$ grains, Menthol 1 grain.

Pills of Sodium Oleate 1 grain, Salicylic Acid $1\frac{1}{2}$ grains, Phenolphthalein $\frac{1}{2}$ grain, become oily owing to double decomposition between the first two. Mass the phenolphthalein and the Acid with anhydrous wool fat and then the Sodium Oleate in dry powder with the same excipient, mix and stiffen with Althea or Kaolin.—P.li./o8,802.

An antiseptic cholagogue combination valuable for gallstones. The Menthol and Phenolphthalein regulate intestinal activity. Numerous cases reported with good effect.—Th. Gaz., July 15th, 1907, p. 464.

Cholelysin said to be composed of a mixture of Sodium Oleate 10 to 15, Validol 5, Valerian Tincture 10 and Peppermint Water to 200. For use in gallstones. Tablets are made.

Medicated Soaps.

Ⓢ Binioidide, containing $\frac{1}{2}\%$, 1% and 3% mercuric potassium iodide, reliable antiseptic.

Boric Acid 10%.

Carbolic, toilet and medicinal, strength 5%, 10% and 20%.

Cyllin.

Ⓢ Fels Germicidal.

Formaldehyde $\frac{1}{2}\%$.

Ichthyol 5% and 10%, in skin affections.

Ichthyol and Salicylic Acid.

" " Sulphur 5% each.

Ilanolin and Ichthyol.

Lysoform, toilet and medicinal.

Ⓢ Nicotine.

Price's Surgeons'.

Resinol.

Sphagnol 5 and 15%.

Ⓢ Sublimate 1%.

Sulphur, Camphor and Balsam of Peru, of each 5%.

Sulphur, Camphor, and Carbolic Acid, of each 5%.

Vinolia, medical.

Wright's Coal Tar.

The pharmacist according to Merck's Report (per P.J.ii./o6,566) can prepare his own Medicated Soaps.

Employ Cocoa-nut Oil (saponification is easiest with this) 900 Gm., Soda Lye (6.5%) 600 Gm. Boil the latter and add the Oil gradually with continued heat. When saponified so far add Soda Lye (14%) 375 Gm., stop heating when a small portion removed solidifies on cooling. Add about 500 Cc. Water, heat to boiling and add 375 Gm. Salt. Cool, pour off the liquor, mix the mass twice with a 20% Salt Solution, and finally with cold water. Drain and press;—the soap thus made in paste form (slightly warm) may be incorporated with Borax 10%, Ichthyol 10%, Beta-naphthol 10%, Carbolic Acid 5% (dissolved in Alcohol $\frac{1}{2}$), Ⓢ Sublimate 0.5% (dissolved in Alcohol 3). Cut or press into moulds weighing 3 to 4 ounces as desired, and dry at 30° to 35° C.

Linimentum Saponis (Off.). Soft Soap 4, Camphor 2, Oil of Rosemary 0.75, Alcohol 32, Distilled Water 8. U.S. orders Soap (Hard) 6, Camphor 4.5, Oil of Rosemary 1, Alcohol 72.5, Water to 100. It is expeditious to dissolve the Soap with the Oil of Rosemary and the Camphor in most of the Alcohol, then add the rest of the Alcohol mixed with water.

Emplastrum Saponis (Off.). Hard Soap 6, Lead Plaster 36, Resin 1.

Spiritus Saponis Alkalinus (Hebra). Mid. H. has Sapo Mollis 4, Alcohol (90%), 2.

Spiritus Saponis Kalinus (SPIRITUS SAPONATUS, P.G.).

Is prepared by saponifying Olive Oil 6, with Liquor Potassie (15%) 7, and Alcohol $7\frac{1}{2}$ in a stoppered vessel by frequent agitation. A small quantity of this product should mix clear with alcohol and water. Add then Alcohol 22 $\frac{1}{2}$ and Water 17; filter.

'Soap and Spirit Lotions' are frequently ordered containing Soft Soap 1 in Alcohol 90% 2.

Ether Soap.

Dissolve Soft Soap 32 in Alcohol (90%) 20, allow them to stand 24 hours and decant carefully from any sediment, then add Methylated Ether Sp. Gr. 0.720, 52 parts. As a surgical detergent prior to operation.

Ⓢ Ether Soap with Mercuric Iodide, contains 1 in 1,800.

Mercuric Iodide 25 grains, Potassium Iodide $\frac{1}{2}$ ounce, Soft Soap 2 lbs., Alcohol 90% 1 pint, Ether *q.s.* to 5 pints.

* **"Formosyl." Compound Liquid Glycerin Soap.**

A yellowish liquid (prepared scented and unscented) containing 40% of Glycerin. A bland and soothing preparation for delicate skins. It is a constituent of *Salicifrice*. *Formosyl Tooth Paste* is prepared.

Liquid Surgical Soap (Wilbert).—Dissolve Potassium Hydroxide 4 with Sodium Hydroxide 4, in Water 25; to this add Alcohol 25, and saponify with Cotton Seed Oil 50 (added in three or four portions), finally making the product 250 with distilled water. The mixed Potash and Sodium Soaps are more soluble and stable than soap made with either constituent alone—only 10% of Alcohol is necessary: Distilled Hamamelis Extract, Rose Water, &c., may substitute part of the water for toilet purposes.—P.J. ii./07,382.

***Sterilla.**—Liquid Surgical Antiseptic Soap.—B.M.J. i./09,412.

Saponification Equivalents of Fats and Oils.

The *Saponification Number* or Köttstorfer's Number is the number of milligrammes of Caustic Potash which the fatty acids contained in 1 Gm. of the fat (free from moisture) are capable of neutralising. To 1.5 to 2.0 Gm. of the purified and filtered specimen for examination contained in an Erlenmeyer flask of about 200 Cc. capacity add 25 Cc. of N/2 Alcoholic Caustic Potash. Warm half an hour on water-bath with reflux condenser, with occasional rotation, add a little phenolphthalein solution and titrate excess of alkali with N/2 Hydrochloric Acid. Conduct a control using the alkali alone.

The difference in the number of Cc. of N/2 Hydrochloric Acid required to neutralise in the control and the actual test is easily converted into the number of Mgr. of KOH consumed by the amount of the fat or oil originally taken, and the result is expressed in equivalent of 1 Gm. of the specimen.

Some Saponification Numbers:—

Adeps 195—203.

Adeps Lanæ 90—102.

Oleum Adipis (U.S.) 195—197.

Oleum Amygdalæ 191—200

Oleum Gossypii Seminis.

191—196.

Oleum Lini 187—195.

Oleum Morrhuæ 175—185.

Oleum Olivæ 191—195.

Oleum Ricini 179—180.

Oleum Theobromatis 183—195.

Oleum Tiglii 212—218.

For Iodine Number of Fats, *see* p. 413.

SARSÆ RADIX, SARSAPARILLA.

(Off.). U.S.

The dried root of *Smilax ornata* (Off.). (*Liliaceæ*.)

Imported from Costa Rica and known as Jamaica Sarsaparilla. U.S. defines *Smilax medica* (Chamisso and Schlechtendal), *S. ornata* (Hooker), *S. papyracea* (Duhamel), or a root known as Honduras Sarsaparilla probably obtained from *S. officinalis*—*N.O. Liliaceæ*. Contains the glucosides Parillin, Sarsa-saponin and Smilacin. Lima Sarsaparilla imported from Panama is considered best commercially, that from Honduras being of second quality.

Extractum Sarsæ Liquidum. (Off.) U.S. 1 = 1.

Dose.—2 to 4 drachms.

Liquor Sarsæ Compositus Concentratus. (Off.)

Dose.—2 to 8 drachms. (*see* p. 439).

Uses.—Sarsaparilla is employed mostly in conjunction with other drugs in chronic rheumatism, in skin affections and as a "blood purifier." Recently it has been brought forward again in the treatment of syphilis.

Zittmann's treatment of syphilis.—Beddoes, 135.

Incompatible with Alkalis.

The Decoctions and Mixtures of Zittmann and others are variously given by all authorities. We have endeavoured to clear up the statements:—

Decoctum Zittmanni Fortius.

Dose.—3 to 6 ounces (90 to 180 Cc.).

Sarsaparilla (cut small) 200, Water 5,200, maintain at 35° to 40° C. for 24 hours, then add Potash Alum 10, Calomel 8, Precipitated Cinnabar 2. Heat on a water-bath for three hours and add Bruised Anise and Fennel of each 10, Senna leaves (cut small) 50, Liquorice Root (cut small) 20. Continue heating for 15 minutes, strain, and press, passing sufficient water through the marc to make up to 5,000. This formula practically agrees with that in *N.S.D.* The preparation in *P.G.* is as above, with sugar in place of Calomel and Cinnabar.

Decoctum Zittmanni Mitius.

Dose.—3 to 6 ounces (90 to 180 Cc.).

Sarsaparilla 100, Water 5,200, Lemon Peel, Cassia Bark, Cardamoms and Liquorice of each 6. Proceed as in making the stronger decoction.

The **L.L.** formulæ in our *Edn. XIII. q.v.* are omitted for sake of space.

In malignant cases of syphilis, Sarsaparilla rather than Iodides.—*Sr F. Semon, L.i. 09,396.*

Zittmann's Decoction well spoken of—the mercury is in the form of an albuminate.—*L.i./09,396.*

Tertiary syphilis of malignant type successfully treated with these Zittmann's and Robert's preparations.—*B.M.J.i./06,62; L.i./06,1324.*

Full doses of Sarsaparilla Decoction, valuable in syphilis and in other cachectic conditions associated with wasting and anæmia, improve nutrition and restore health.—*B.M.J.i./06,770; C.D.i./06,533; P.J.i./06,100.*

The results may be due to the large volume of the warm fluid.—*B.M.J.i./06,960.*

Virulent syphilis, treatment of, with Zittmann's Decoction.—*L.ii./06,1206.*

Fluidextractum Sarsaparillæ Compositum, U.S.

Average dose.—30 minims (1·8 Cc.). Sarsaparilla 75, Glycyrrhiza 12, Sassafras 10, Mezereum (Bark) 3. Percolate with a mixture of Glycerin 10 and Diluted Alcohol 90; after macerating 48 hours, add more alcohol until drugs exhausted. Reserve first 80 of Percolate and evaporate remainder to extract, mix and make up to 100.

SCAMMONIÆ RADIX. (Off.)

Dried root of *Convolvulus Scammonia* (*Convolvulaceæ*), containing about 10% Resin and 15% Sugar.

Scammonium. (Off.) U.S.

Dose.—5 to 10 grains. Emulsifies with water.

The gum resin exuding from the living root on incision, containing at least 70% Resin soluble in Ether.

Ash Limit 5% would be about right. *B.P.* says 3%. White Cross Congress suggested 5%. The latter wanted also 85% Resin.

Scammoniæ Resina. (Off.) U.S.

Dose.—3 to 8 grains (0·2 to 0·52 Gm.). Prepared by exhausting the root with Alcohol 90% and pouring the concentrated tincture into water in a thin stream. Occurs in greenish lumps. Soluble almost entirely in Alcohol and Ether. Scammonin is this substance purified (*see p. 433*).

Uses.—Purgative in obstinate constipation. Produces copious watery evacuation in a few hours. Does not act until reaching the duodenum.

In the testing of Scammony Resin for complete solubility in ether the presence of water in the ether makes a considerable difference. A Soxhlet is not recom-

mended. It is best to macerate 6 hours 3 to 4 Gm. of the resin finely powdered in 30–40 Cc. of ether in a short, wide-mouth flask. Filter off and weigh insoluble matter and give percentage on the dry resin. An authentic resin extracted from the root gave 71% insoluble in ether (?).—P.J. i./07,401.

Solubility in 0.720 Ether, Acid and Saponification Values, also tests for Colophony, Guaiacum, etc.—P.J. ii./08,365.

Saponification Values characteristic of both the resins—of *C. Scammonia* and *Ipomœa Orizabensis*—and enables detection of the Mexican Scammony. In the case of the former the Saponification No. is in the neighbourhood of 238, and in that of the latter a little below 190. For quantities and method of work consult Am. Jl. Ph. Mar. '09, p. 105.

Pilula Scammonii Composita. (Off.)

Dose.—4 to 8 grains (0.26 to 0.52 Gm.).

Scammony Resin 1, Jalap Resin 1, Curd Soap 1, Tincture of Ginger 3.

Pulvis Scammonii Compositus. (Off.)

Dose.—10 to 20 grains (0.65 to 1.3 Gm.).

Scammony Resin 4, Jalap 3, Ginger 1.

Panis Purgans, P. Belg. Scammony Resin 0.25 Gm., Pasta Panis *q.s.* for 1 dose.

SENNA (Off.) U.S.

The dried leaflets of either *Cassia acutifolia* (Alexandrian) or *Cassia angustifolia* (N.O. *Leguminosæ*) (East Indian or Tinnevely). The activity of the drug is stated to be due to Cathartic Acid. Constituents are Emodin (Tri-oxy-methyl-anthraquinone), Chrysophanic Acid and Gluco-sennin, etc. In addition, the legumes or fruits of both these varieties are in use for making infusions. These are stronger than the leaves,—Tschirch. Clinical experience has shown that the legumes are more active if *green*—as distinct from the brown colour, in which they are usually supplied.—W.H.M. P. Austr. especially refers to *Fructus (Folliculi)* of Alexandrian Senna.

Confectio Sennæ (Off.).—Syn. LENITIVE ELECTUARY. *Dose.*—60 to 120 grains (4 to 8 Gm.).

Senna 7, Coriander 3, Figs 12, Tamarind 9, Cassia Pulp 9, Prunes 6, Extract of Liquorice 1, Sugar 30, Water *q.s.*

U.S. has Senna 10, Cassia 16, Tamarind 10, Prune 7, Figs 12, Sugar 55.5, Oil of Coriander 0.5, Water *q.s.* to 100. Oil of Coriander in place of the powdered fruit gives a non-gritty confection.

Elixir Sennæ, B.P.C. Syn. LIQUOR SENNÆ DULCIS.

Dose.—I to 3 drachms.

Macerate Alexandrian Senna 66, with 16.5 of Alcohol 90% mixed with 50 of Water for 3 days; press and pour the liquor on to Sugar 50. Repeat maceration with sufficient of the same menstruum to give, in all, 66 of liquor. Express again after 24 hours and add the liquor to the reserved portion and the Sugar. Heat in a closed vessel to 94° C. on a water bath. After ten minutes, cool, strain, and add, previously mixed, Chloroform 0.25, Oil of Coriander 0.03, Tincture of Capsicum 0.2, and Alcohol 1.5, shake and add, if necessary, Alcohol 60% *q.s.* to 100.

In this preparation the Cathartic Acid, a glucoside contained in senna, not being subjected to long exposure to heat, is preserved from oxidation: **Cathartic Acid** is sometimes prescribed in doses of 4 to 8 grains in pills, but is unstable.

Fluidextractum Sennæ. U.S. 1=1. By alcoholic percolation.

Average dose.—30 minims.

A strong alcoholic percolate is first made to remove the griping resinous matter—and rejected. Diluted alcohol is then used after drying. It is a good preparation therapeutically.—Caspari. As also the Elixir above.—W.W.W.

Extractum Sennæ (Leguminum) Liquidum, B.P.C.

Dose —1 to 2 drachms.

Senna Pods 16 ounces, bruised, are repeatedly macerated with a mixture of Alcohol 90% 6 ounces, and Water 12 ounces, pressing after each maceration, heating to 94° C. 10 minutes, and making up volume if necessary to 16 ounces.

Elixir Sennæ Leguminum may be prepared, as Elixir Sennæ, B.P.C., using legumes instead of leaves.

Infusum Sennæ (*Off.*). *Dose.*— $\frac{1}{2}$ to 2 ounces.

Senna 2 ounces. Ginger 55 grains, Boiling Water 1 pint. A grain of Potassium Nitrate to the ounce will preserve it.

Tinctura Sennæ Composita (*Off.*).

Dose.— $\frac{1}{2}$ to 1 drachm repeated; 2 to 4 drachms for a single dose. Senna 8, Raisins 4, Caraway Fruit 1, Coriander Fruit 1, Alcohol 45% 40. By maceration.

Flavoring.—Syl Vanillæ, Syl Rosæ; Glycerin, Syrupus Aurantii.

Tinctura Sennæ Leguminum. The same strength as above, using legumes in place of leaves.

Pulvis Glycyrrhizæ Composita. (*Off.*). Contains 1 in 6.

Mistura Sennæ Composita.—Syn. BLACK DRAUGHT (*Off.*).

Dose.—1 to 2 ounces (30 to 60 Cc.).

Magnesium Sulphate 5, Liquid Extract of Liquorice 1, Compound Tincture of Cardamoms 2, Aromatic Spirit of Ammonia 1, Infusion of Senna, *q.s.* to 20.

Wyatt's suggested formula.—P.J. ii./08,361.

Flavoring.—Syl Lavandulæ, Syl Rosæ, Gyl Coriandri, Gyl Vanillæ (best); Syrupus Aromaticus (full dose).

Syrupus Sennæ (*Off.*).

Dose.— $\frac{1}{2}$ to 2 drachms (18 to 7 Cc.).

Is prepared by three macerations with 20% alcohol, concentrating and heat to 180° F. for a few minutes, then filtering and adding to 40 ounces of the liquid extract thus made 1 = 1, 50 ounces of Sugar and Oil of Coriander 10 minims, dissolved in 40 minims of Alcohol 90%. U.S. has Fluidextract 50, Coriander Oil 1, Syrup to 200.

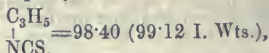
SINAPIS.

Mustard.

The dried ripe seeds of *Brassica nigra* (*Semen Sinapis*, P.G. iv., P. Austr. and U.S.) and *B. alba* (*Semen Erucae*, P.G. iv., *Sinapis Nigra*, U.S.—*Cruciferae*), powdered and mixed. The condiment sold as mustard consists of this mixture from which most of the oil has been expressed, and the cortical portion of the black seed has been removed. Black mustard contains the glu oside Sinigrin, which is—

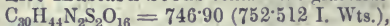
Potassium Myronate = $C_{10}H_{19}KNS_2O_{10}$ = 412.31 (415.394 I. Wts.). with Myrosin, which is similar to the ferment Emulsin in Bitter Almonds.

This glucoside splits up under the influence of water with evolution of Allyl-iso-sulphocyanate,—

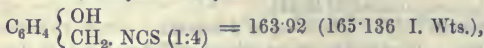


the principal constituent of the Essential Oil (*v. infra*).

White Mustard Seeds contain the glucoside Sinalbin,



which also splits up with water and Myrosin with evolution of an oil, White Mustard Oil (acrinyl isothiocyante)



which, however, cannot be distilled with water. As the black seeds contain an excess of their glucoside and the white an excess of the ferment, the combination of the two produces the strongest effect.

Uses.—In cases of poisoning a tablespoonful in half-a-pint of warm water is an emetic. In small doses is a stomachic and appetiser. Externally a counter irritant when applied as a poultice, or added to hot water and used as a foot bath. It may blister tender skins.

The percentage of oil is 0.3 to 0.86. Dutch Seeds are best. Examination, Detection of Myrosin, and Sinigrin.—P. J. ii./04, 475; i./05, 719.

Charta Sinapis (*Off.*).

Black and white mustard seeds in equal quantities are bruised and exhausted of fixed oil by means of benzol, the residue dried and powdered, and of this 5 parts are mixed with 18 volumes of **Liquor Caoutchouc** (*Off.*) (*q.v.*) spread on cartridge-paper and dried by exposure. In preparing this paper, the oil being removed, the glucoside more readily attacked by the ferment. **Charta Sinapizata**, Ph. Ned., is similar.

Charta Sinapis, U.S., is made with Black Seed only.

Linimentum Sinapis (*Off.*).

Camphor 3, Alcohol (90%) 43, dissolve and add Volatile Oil of Mustard 2, Castor Oil 7.

Oleum Sinapis Expressum. Is used as a rubefacient. Sp. Gr. 0.921 to 0.923.

Oleum Sinapis Volatile (*Off.*) **U.S.**

Average dose.— $\frac{1}{8}$ minim (U.S.).

Consists principally of Allyl-iso-sulpho-cyanate, (*v. antea*), Sp. Gr. 1.018 to 1.025. U.S. requires a content of 92% of this substance. **Soluble** about 1 in 50 of water—readily in ether and alcohol. This solution is suitable as a rubefacient.

Oleum Sinapis Volatile (*P. Off.*).—Obtained by distillation from black-mustard seeds after being deprived of fixed oil and macerated in water for several hours. Sp. Gr. 1.018 to 1.023. Distills between 148° and 156° C. [*Off.* 147.2° to 152.2°]. Should contain not less than 92 per cent. of allyl isothiocyante, determined by the following process: Weigh accurately about 1 gram of the oil, and add sufficient alcohol to make 50 Cc. contain exactly 1 gram of the oil. Of this solution transfer 5 Cc. to a 100 Cc. flask, and add 30 Cc. of decinormal silver-nitrate solution and 5 Cc. of solution of ammonia. Heat on a water-bath at 80° C. for thirty minutes (shaking frequently), cool the contents to 15°, make up to exactly 100 Cc. with distilled water, and filter. To 50 Cc. of the

filtrate add 4 Cc. of nitric acid and a few drops of ferric ammonium sulphate solution, then add from a burette sufficient decinormal potassium-thiocyanate solution to produce a permanent red colour—not more than 5.6 Cc. should be required. *Note*.—One Cc. of decinormal silver-nitrate solution corresponds to 0.00496 gram of allyl isothiocyanate. (I. Wts.).

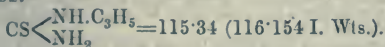
Oleum Sinapis Æthereum, CODEX, has synonym **ISOSULFOCYANATE D'ALLYLE**.

Allyl isothiocyanide, physiological action of. Minimum fatal dose was found to be $\frac{1}{2}$ minim per kilo body weight.—L. ii./09,36.

Cannot be recommended for internal use.—L. ii./09,302.

Spiritus Sinapis, P.G. iv. Oil (volatile) 1 to Alcohol (90 %) 49.

Thiosinamin.—*Syn.* RHODALLIN, ALLYL-THIO-UREA, ALLYL-SULPHOCARBAMIDE.



Dose.—Internally $\frac{1}{2}$ gradually increased to $1\frac{1}{2}$ grains (0.032 to 0.1 Gm.) (with caution—in capsule or alcoholic solution). Hypodermically $1\frac{1}{2}$ to 3 grains as in the form of **Fibrolysin** or **Injectio Thiosinamin et Antipyrin**.

Formed by warming oil of mustard with alcoholic solution of ammonia.

Soluble in water 1 in 18, alcohol about 1 in 2, and ether. Solution 10 to 15% in dilute glycerin preferred to alcoholic solutions which cause pain.

Flavoring.—It is practically void of taste.

Uses.—Hypodermically for lupus and uterine affections. Its application by subcutaneous injection softens scar tissue when a 10% solution is used; strictures of the gullet have been much relieved by this treatment.—B.M.J.E. i./04,75; i./05,63.

For keloid.—B.M.J. i./03,656; L. i./03,785.

Hypertrophy of pylorus with stenosis successfully treated by 10 to 15 minim dose of 10% alcoholic solution.—B.M.J. i./06,379.

In scleroderma.—B.M.J. ii./05,1362.

1 Cc. of 10% each Thiosinamin and Sodium Salicylate recommended.—P.J. ii./06,553; ii./08,862.

Experiments on rabbits and dogs.—B.M.J.E. ii./08,12.

Thiosinamin Plaster Mulls, 10, 20, and 30 Gm. per $\frac{1}{8}$ sq. m., are prepared.

Adhesive parametritis treated by hypodermic injections of 3 grains daily into the median line of the vault of the vagina. Results satisfactory. Firm bands, however, do not yield to it.—Muench. Med. Woch., Sept. 12, 05.

Relieves traumatic stricture of the parotid duct.—B.M.J.E. i./06,71.

In tinnitus aurium 5% aqueous solution hypodermically has been tried, dose being increased from 6 to 35 minims, also a 10% solution and a 20% Glycerin Solution. Improvement throughout. Should be tried before operating on the middle ear or labyrinth for this trouble. It was thought by another speaker that these good effects might have been secondary to the action of the substance elsewhere in the body, *e.g.* in cases of chronic gastric ulcer.—B.M.J. ii./09,1135.

Pericardial adhesions treated by 3 grain doses in 80 minims of water, every other day in the flanks, for 30 days. German Thiosinamin insoluble; French soluble. (?).—Pr. Oct./07,573.

***Fibrolysin** (Patented) consists of a 15% solution of combined thiosinamin and sodium salicylate. Ampullæ are supplied (for hypodermic or intramuscular injection) containing 2·3 Cc. of a solution equivalent to 0·2 Gm. (3 grains) of Thiosinamin.—Merck.

The thiosinamin and sodium salicylate are stated to be in the proportion of 1 molecule of thiosinamin and $\frac{1}{2}$ molecule of sodium salicylate.—L.i./09, 157; ii./09,217; B.M.J. ii./09,1135.

Dose.—40 minims (2·4 Cc.), e.g., every 2 or 3 days into the gluteal region or around the affected tissue. Injections may be intravenously (only in urgency), intramuscularly (gluteal) or hypodermically in the upper arm likely to cause least inconvenience.—L.i./09,158.

Not antibactericidal or antiseptic.—B.M.J.E. i./08,4.

A case of Dupuytren's stricture treated during five weeks with.—L. i./07,882.

In Dupuytren's contraction 2 Cc. injected on 19 occasions, not necessarily near the affected part, cured.—L. i./08,106.

Dupuytren's contraction in both palms treated with 18 injections with massage, was followed by purpura hæmorrhagica.—L. ii./09,450.

Leucoma following hypopyou-keratitis, corneal infiltrations of trachoma, iritis, and exudative choroiditis treated with good results. Intramuscular injections used into the gluteal, dorsal or lumbar region. Injections daily or every other day.—Oph., January, 1907,39.

Stenosis of the pylorus following gastric ulcer, much improved by the Thiosinamin treatment. Every three days 20 drops of 1 in 10 solution injected.—M.P. Oct. 16, 07, p. 420.

Fibrolysin will soften the substance of which a stricture is composed, but will not dilate it *per se*. It appears that in the case of stenosis of the pylorus if once dilated the stricture remains so—the cure of the obstruction must be effected by the passage of food.—Folia Therapeutica, July, 1907.

Pyloric obstruction cured by injections in the epigastric region. Doses of 2 Cc. daily for a month, every other day for a week and afterwards at intervals of 3 or 4 days for 3 weeks. Massage and stretching is a *sine qua non* for success.—B.M.J. ii./08,544.

In urethral strictures, injections in the upper parts of the thighs—the strictures become more amenable to bougie treatment.—M.A. 1908,35.

In 13 cases of urethral stricture seemed to facilitate dilatation by bougies.—B.M.J.E. ii./09,8.

On scar tissue has undoubtedly specific action. Has been given intravenously for rapid effect. Odour of garlic in the mouth shows that thiosinamin is speedily set free in the blood.

The effect on scar tissue is considered to be due to a serous infiltration or flooding, which slacking the old inflammatory and hardened fascicles render them more readily amenable to absorption by the increased lymph stream,—the effect is only on pathological connective tissue.—L. i./09,158.

Cicatricial tissue resulting from severe burn softened. Useful in non-tuberculous pleural adhesions. The drug has direct local effect and if not injected deep enough will produce punched out sores.—B.M.J. ii./08,1613.

In middle ear disease shows well the "remote action" of the drug—injections being made into the ear commencing with 0·3 Cc., and working up to the full dose of 2·3 Cc. (one ampoule). Treatment is spread over 2–3 months. Pronounced deafness may greatly benefit, as also tinnitus.—L. i./08,1069.

Middle ear deafness. The method of treatment with Fibrolysin was found to be more successful in the non-suppurative form than in the post-suppurative cases, but whilst this is the case as regards the percentage of cases showing improvement in hearing and diminution of tinnitus, yet in regard to amount of improvement the post-suppurative cases gave far better results.—L. ii./09,218.

Dupuytren's contraction, stricture of the urethra, chronic rheumatoid arthritis, stricture of the rectum, gastric adhesions, and fibrous ankylosis following gonorrhœal arthritis treated by injection into the gluteal muscles. This may be slower, but safer than the intravenous method advocated by Mendel.

Within 15 minutes alliacious odor of the breath is produced, which passes off in a few hours. Massage and other physical treatment must be carried out simultaneously with the injections, of which a long course may be necessary. General health also improves.—L. ii./09,529.

Mo8,219 relates some further remarkable results with the preparation.

Pain suspected to be caused by adhesions, stopped by several injections of Fibrolysin.—B.M.J. i./09,1281.

Used in a case of hæmophilic knee in which movement was limited. 76 injections disappointing.—B.M.J. ii./09,918.

Extensive trials, no benefit clinically. A large number of estimations showed no evidence of any effect on leucocyte count.—B.M.J. ii./09,329,541.

Pleural adhesions should be treated with contents of a capsule injected either locally, or into the gluteal muscles once or twice every week according to severity of case. Usually painless, but may cause rise in temperature, slight tiredness and headache.—B.M.J.E. i./09,36.

Thiosinamin: Some New Applications. Pres. 1910,16.

Pericarditis is treated by injection of Fibrolysin without any convincing proof that it will resolve even recent scar tissue. Barr prefers to prevent the adhesions by eliminating Lime Salts from the diet and using decalcifying agents freely.—B.M.J. i./09,989.

In tinnitus aurium Barr has tried, but is not greatly encouraged. Neurotic element is strong in these cases. Thinks apparent good of a new treatment may be due to eager hope acting on fond imaginings.—B.M.J. ii./09,1131.

Injectio Thiosinamin et Antipyrin, Martindale. *Syn.*

CICATRINE.

Dose.—8 to 17 minims ($\frac{1}{4}$ to 1 Cc).

= $1\frac{1}{2}$ grains to 3 grains (0.1 to 0.2 Gm.) Thiosinamin approximately, and $2\frac{1}{2}$ to 5 grains (0.16 to 0.32 Gm.) Antipyrin.

Thiosinamin 20, Antipyrin 33, Water to 100, dissolve. A little Cocaine may be injected at the same time if desired.

It is stated (F.N. 1909, 306) that a mixture of one molecular proportion of Thiosinamin with $\frac{1}{2}$ molecular proportion of Antipyrin forms a clear liquid which will dissolve in three parts of water. In our hands this was found to be true if the solution be warm,—it was thrown out again, however on cooling.

A formula is then given (*ibid*) using Thiosinamin 15, and Antipyrin 7.5 with Water to 100, but these obviously do not bear the relationship referred to. To be in relationship the figures should be 15, 12 and 100. Nevertheless we acknowledge the reference, and state that Antipyrin does assist solubility.

The Solution referred to by the French authority is stated to be inodorous, non toxic, and non-irritating.

We found that equimolecular proportions, e.g., in round numbers, Thiosinamin 115 and Antipyrin 187, liquefy, and give the most soluble combination, and we use these proportions in our formula. Furthermore, equal weights of the two substances produce a mixture which will dissolve to the extent of a 20% solution of such mixture, i.e., 10% of each.

The injection has been used therapeutically for the treatment of cicatricial tissue. It should form a useful solution of Thiosinamin for injection.

SODIUM.

Na = 22.88 (23.00 I. Wts.).

A soft white metal, decomposing water. Is prevented from oxidation by keeping under mineral naphtha.

Is employed in making *Liquor Sodii Ethylatis* (q.v.).

An electrified gas from *Sodium*, according to C.E.S. Philips, exists which discharges a —charged electroscope : not so much when + charged. This is *not* due to rapid oxidation of the surface of the Sodium. Na, May 28, '08, 79 ; June 11, '08, 127.

Bismuth-Cæsium-Potassium Nitrite.

Dissolve 50 Gm. of Potassium Nitrite in 100 Cc. of Water, neutralise with Nitric Acid and add 10 grams of powdered Bismuth Nitrate, then add sufficiency of 10% solution of Cæsium Nitrate to precipitate the Sodium present in the Potassium Nitrate —filter and add Cæsium Nitrate to a total of 2.5 grams.

Is a reagent by means of which small amounts of Sodium may be detected and estimated in presence of large quantities of potassium, the corresponding Sodium Salt $5 \text{ Bi}(\text{NO}_2)_3 \cdot 9 \text{ Cs} \cdot \text{NO}_2 \cdot 6 \text{ Na} \cdot \text{NO}_2$ being almost insoluble.—*Nature*, Feb. 24, 1900, p. 498.

Uses of Sodium Salts.—These are much less depressing to the heart, muscles and nervous system than are the corresponding Salts of Potassium, hence the Bromide, Iodide and Chlorate of Sodium are preferred as medicines, but c.f. p. 560.

Sodii Acetas. (Off.) U.S.

$\text{CH}_3\text{COONa} \cdot 3\text{H}_2\text{O} = 135.10$ (B.P. and U.S. Wts.) ; (136.072 I. Wts.).
Average dose.—15 grains.

Colourless crystals or white powder. Soluble in water about 1 in 1 with alkaline reaction, and about 1 in 35 in alcohol 90%. Is rarely used medicinally. According to U.S. should contain in uneffloresced condition 99.5% pure Sodium Acetate as formula.

Flavoring.—Glyl Pini, Syl Lavandulæ ; Syrupus Aurantii, Syrupus Zingiberis.

Sodii Chloridum. (Off.).

$\text{NaCl} = 58.07$ (58.46 I. Wts.). *Dose.*—10 to 60 grains (0.65 to 4.0 Gm.).

White cubical crystals.

Soluble 1 in $2\frac{3}{4}$ of water (not more in boiling water) very slightly in Alcohol 90% (about 1 in 200). It produces neither rise in temperature on dissolving (exothermic), nor diminution (endothermic),—it is therefore equally soluble in either hot or cold water.

Flavoring.—Syl Coriandri, Syl Menthæ Piperitæ (double dose) ; Syrupus Zingiberis.

Uses.—Although in common use is not requisite to those having ordinary mixed diet, but is necessary to vegetarians. Given in excess leads to scurvy, while a want of sufficient salt in the food leads to anæmia, debility and œdema of face and ankles. Large doses are emetic and may relax the bowels. Rectal injections are used to kill threadworms. Hypodermically or into the veins as saline solution for the coma of diabetes.

Transfusion apparatus v. p. 218.

Saline Solution, Normal. PHYSIOLOGICAL SALT SOLUTION.

This is intended to be isotonic with the blood corpuscles and possesses the same osmotic pressure as the liquid of the liquor sanguinis. The proportion has been calculated at 0.6% for frogs ; for man a solution of sodium chloride 0.9%, or roughly 80 grains to the pint of boiled water, is generally used for intravenous injection in hæmorrhage, uterine flooding, or collapse. The solution should be at a temperature of about 105° F., and injected into any convenient vein, at the

rate of about a pint in ten minutes, or into the rectum; particularly useful in the hæmorrhage of typhoid. Also tends to recovery from poisoning by Carbolic Acid, Morphine and Alcohol.

Serum Factitium, P. Belg., is 0·8%.

Fortunately only an approximation to an isotonic solution is necessary, as mucous membranes are practically insusceptible to changes in osmotic pressure within fairly wide limits. The solution should be slightly alkalised. 0·1% Sodium Bicarbonate is sufficient.—Marshall, '08.

Tubes of Saline Solution, Sterilised, contain in saturated solution sufficient for two pints, hermetically sealed. Best for post-partum hæmorrhage; are convenient for carrying in the surgical bag.—L. i./99,35; ii./100,1866.

Sodium Chloride Shells.—Xylonite Boxes containing 1 drachm of Sterile Salt for 1 pint of Normal Saline Solution are convenient for the operating bag.

References to Injections of Saline Solution.

Vomiting, recurrent of infants, normal saline per rectum or subcutaneously.—B.M.J. i./05,350.

In pneumonia, give liquids freely. Normal salt solution is very useful.—Amer. Med., Aug. 26/05; M. Arch., 06/90.

Relapsing fever and a case of severe osteomyelitis well treated by injections. The sedative effect of duboisine, hyoscine, and bromides is increased by giving 400 Cc. of normal saline.—M.A. 1904,21.

Dellrium tremens, best treatment.—B.M.J.E. ii./05,20.

Tetanus, three cases recovered by intravenous injections of sodium chloride.—L. ii./04,831.

In cholera, injections subcutaneous and intravenous, 30 cases, good results.—L. i./06,1468.

Prostatectomies, 38 cases treated successfully. In the treatment of uræmia, if arising introduce per rectum Sodium Chloride Solution warmed to 102°—110° F. at the rate of 2 pints per hour.—L. i./07,1152.

Injections into the cellular tissue, during shock, preferable to intravenous injections, because if the fluid does not find its way into the vessels from the cellular tissues an attempt to force it into a vein is likely to prove either futile or, indeed, harmful; preventive treatment is the most important.—L. i./07,499.

In ascites due to tubercular peritonitis, and in pleurisy with effusion, de-chlorination (food without salt) gave good results.—Pr. lxxiii.,629.

Bacilluria temporarily relieved by washing out the bladder with—25 Cc. being left in daily for seven days.—L. i./08,79.

In surgical shock inversion of the patient, perfusion of the lungs with oxygen and intravenous injection of Saline alone or combined with Adrenalin.—L. i./09,913.

In gastric or duodenal ulcer rectal injections of Normal Saline are preferred by many to nutrient enemata, - at any rate for some days. One authority orders $\frac{1}{2}$ pint four times in the 24 hours, or sometimes 1 pint.—Pr. Nov. '08,699.

In septicæmia large quantities of Normal Saline Solution hypodermically of great value.—B.M.J. ii./08,528.

For pruritus vulvæ a tablespoonful to a pint of boiled water injected.—B.M.J. ii./08,692.

In diphtheria, in grave toxæmias, much good may be expected from transfusion.—L. ii./08,1444.

In a case of Chloroform poisoning (Chloroform taken internally) after lavage with Sesame Oil 2 litres, and as recovery proceeded 300 Cc. of blood were removed and 2,000 Cc. injection given. Recovery.—P.J. ii./09,344.

A 10-gallon uterine and vaginal douche of hot Normal Saline in a case of gangrene of the vulva, vagina and cervix.—B.M.J.E. ii./09,43.

Laparotomy and Saline transfusion by the rectum saved life in a case of abnormal pregnancy.—B.M.J. i./10,70.

Ringworm has been treated by 25% ointment in Vaseline,

Artificial or Inorganic Serum of Trunecek for nervous ailments and high arterial tension.—B.M.J. ii./02,149.

Dose.—Subcutaneously 1 Cc. to commence with, increasing by 0·2 Cc. May also be given by rectum and mouth.

Sodium Sulphate 44, Sodium Chloride 492, Sodium Phosphate 15, Sodium Carbonate 21, Potassium Sulphate 40, water *q.s.* to make 10,000.

Tablets of Trunecek's Serum are prepared 5 grains each (Martindale), *i.e.*, equivalent approximately to 5 Cc. of the serum. *Daily dose* 3 to 6 with meals. Administration *per os* is equally effective.—Wien. Klin. Rund, July 23 and 30, 1905.

For atheroma and sclerosis of arterial coats.—B.M.J.E.ii./04,43.

For a large number of Artificial Sera under inventors' names consult F.N. 1906,253, and 1908,250.

Other Transfusion Preparations.

Hayem's Solution. Sodium Chloride 5, Sodium Sulphate 10, Water 1,000. Sterilise. This must be distinguished from Hayem's Blood Examination Fluid. **Chéron's Solution.** Sodium Chloride 2, Sodium Sulphate 8, Sodium Phosphate 4, Phenol 1, Sterile Water 100. *Dose* intravenously 5 to 10 Cc.

Iodized Serum, De Renzi.

Dose.—200 to 300 Cc. per diem.—*Vide* Edn. XII.

***Antisclerosin (Tablets). Syn.—Regenerative Tablets.**

Dose.—6 Tablets daily, 2 at each meal. The mixed inorganic Salts of the normal blood, each Tablet containing Sodium Sulphate 0·04, Chloride 0·4, Carbonate 0·016, and Phosphate 0·012 Gm., with Magnesium Phosphate 0·016, and Calcium Glycero-phosphate 0·012 Gm. Useful in the treatment of arteriosclerosis. These Tablets, according to various authorities, exercise a reviving stimulating action upon the vessels and circulation—preferable to the customary Iodine treatment, as they are free from the lowering effect of that substance. High rectal injections of a solution of 10 Tablets to the pint of water (approximating normal artificial serum solution) have been practised. This method has proved of value in heat collapse, weakness from vomiting of alcoholism and pregnancy.

Dechlorination or Salt-free Diet.

In cases of nephritis, Sodium Chloride produces œdema, while during a milk diet (without Sodium Chloride) the œdema disappears.—L. ii./03,61.

Chronic Bright's disease treated by the salt-free diet. Copious diuresis sets in, œdema disappears and remains more or less absent so long as the treatment is kept up.

In many forms of nephritis it has long been known that the kidneys fail to eliminate salt. Dropsy is caused by retention of water in the tissues in order to maintain a constant osmotic pressure. The eating of salt is a luxury not a necessity. A salt-free dietary is given.—M.P., Oct. 13/09, p.388.

The curve of the body weight of a patient follows closely the proportion of salt retained. The salt-free diet should be tried in certain cases where heart and lungs are hampered by excessive œdema.—B.M.J. ii/09,330.

In renal dropsy a salt-free diet is often disappointing. This may be because salt retention is the result not the cause of the trouble.—B.M.J.ii/09,538.

Cameron emphasized necessity of recording weight in cases of this kind. In certain cases of anasarca curve of body weight follows that of salt retention.—B.M.J.ii/09,539.

In chlorosis salt with food must be limited.—B.M.J.ii/09,1668, *c.f.* Caffeine p. 197.

Anasarca in an infant caused by feeding with milk with added Sodium Chloride.—B.M.J.i/10,504.

Relative to the potash ingestion in vegetable food by the poor in Ireland there is a deficiency in the intake of Sodium Chloride—may account for prevalence of tuberculosis there. Many tubercular patients resent salt.—B.M.J. i./07,866.

Baths of Common Salt (or *Tidman's Sea Salt), about 2 pounds to each bath, act as a tonic and stimulant, and are useful for chronic rheumatism.

Sal Marinum Artificiale.—Potassium Iodide 1, Potassium Bromide 1, Calcium Chloride 40, Magnesium Sulphate 200, Bay Salt 760—Ph. Notes.

'Solubes' Sodium Chloride, 15 grains each, are useful for producing extemporaneously 5 ounces of a normal saline solution for surgical use.

*Cerebos Salt.

Sodium Chloride with 4% of phosphates, mostly Calcium Phosphate; less deliquescent than 'Salt.' Is intended to replace the phosphates removed in the preparation of food.

Digestive Salt. *Syn.* ★PEPSALIA.

This consists of Sodium Chloride and Pepsin.

Pulvis Sodii Chloridi Compositus.

Potassium Chlorate 1, Alum 1, Boric Acid Powder 1, Sodium Chloride 6, Sodium Biborate 6.

A saltspoonful in a half a tumbler or more of warm water as a gargle is very beneficial for inflamed conditions of the throat.

Sodii Bromidum. (*Off.*) $\text{NaBr} = 102.23 (102.92 \text{ I. Wts.})$.

Dose.—5 to 30 grains (0.32 to 2 Gm.).

Tablets, 5 grains (0.32 Gm.). *Dose.*—1 to 6.

In slightly deliquescent granular white crystals, tasting like common salt; soluble 8 in 9 of water. U.S. requires 97% pure.

Flavoring.—Syl Mentha Piperitæ, Glyl Coriandri; Syrupus Aromaticus (double dose), Syrupus Zingiberis.

Uses. In epilepsy, insomnia, maniacal attacks, and hysteria. Full doses combat morphine habit.

A mixture of bromides in the proportion of potassium bromide 2, sodium bromide 2, and ammonium bromide 1, is said to have a better action than either salt alone.

Gowers suggests small regular dosage of sodium bromide, *e.g.*, with food, as substitute for the salt in the 'saltless' treatment of epilepsy. (*See also* Sodium Phosphate.) The theory is that diminishing the chloride increases the readiness with which bromide enters the nerve elements. *See also* B.M.J. i./09,206, large doses used, and *c.f.* Dechlorination p. 630.

Sal Bromatum Effervescens.—*Arzn.*

Dose.—60 to 120 grains (4 to 8 Gm.).

Potassium Bromide 400, Sodium Bromide 400, Ammonium Bromide 200, Sodium Bicarbonate 1,000, Citric Acid 380, Tartaric Acid 445, Sugar 175, all in powder, separately dried and sifted. Mix in above order, and moisten with Absolute Alcohol 300; sift the mass quickly through a coarse sieve and dry at 104° F.

Sodii Bicarbonas. (*Off.*). **U.S.** $\text{NaHCO}_3 = 83.43$ (84.008 l. Wts.).

Dose.—5 to 30 grains (0.32 to 2.0 Gm.).

Occurs in small white crystals or powder. *Soluble* 1 in 11 of water; 20 parts are neutralised by 17 of Citric or 18 of Tartaric Acid. Is largely employed in dyspepsia and is of value in diabetes. A little rubbed on to the gum or placed in the cavity of a tooth, stops toothache. Large doses very useful in infantile vomiting; to neutralise the acid intoxication in these cases 100 grains should be given when attack threatens.—M.A. 1904, 379. Moderate doses better at short intervals, *e.g.* 10-15 grains every hour when premonitory symptoms present or attack commencing.—Still, Pr. Oct. 07, p. 554.

Chlorides might be limited to 0.1% NaCl, and should be As.—free.—C.D. ii./09, 581.

Incompatible with acids and acid salts, and with metallic and alkaloidal salts.

Flavoring.—Syl Lavandulæ, Syl Amygdalæ Amaræ; Syrupus Aurantii, Elixir Simplex.

Nebula Alkalina, T.H. Sodium Bicarbonate 15 gr., Borax 15 gr., Carbolic Acid 4 gr., Glycerin 45 m., Water 1 ounce. *Vide* also Dobell's Solution. **C.L.T.E.** has approximately half this strength *sine* Glycerin. **Nebula Sodii Bicarbonatis, C.L.T.E.** Sodium Bicarbonate 20 grains, Glycerin 1 drachm, Water to 1 ounce.

Non-suppurative middle ear disease best treated by sterile solution injected with Eustachian catheter.—B.M.J.ii./04, 1206.

For gastric pain and hyperacidity incorrect treatment unless preceded by an acid draught.—M.A. 1908.

For dyspeptic complaints, gout, rheumatism, etc., often prescribed, but discretion necessary. Often valuable in suppression of urine.—Eustace Smith, B.M.J.i./09, 263.

Diabetic coma treated by intravenous injection of 1 litre of 3 to 5% solution slowly (in $\frac{1}{4}$ to $\frac{1}{2}$ hour).—B.M.J. i./09, 667.

Functional disorders of the stomach: in hyperchlorhydria bodily rest essential, and neutralise increased acidity with 15 to 20 grain doses of Sodium Bicarbonate $\frac{1}{2}$ hour after meals, best given with hydrocyanic acid or morphine.—B.M.J. i./09, 600.

A Russian suggestion is that the presence of Nitric Acid is an important factor in the production of Cholera. Benefit may be obtained by washing out the stomach with alkaline solutions.—Pres. 1910, p. 11.

Collutorium Alkalinum Compositum, R.D.H.

Sodium Bicarbonate 15 grains, Sodium Chloride 10 grains, Sodium Salicylate 1 grain, Thymol, Menthol, $\frac{1}{4}$ grain each, Glycerin of Borax 1 drachm, Thymol Solution to 1 ounce.

One part to be used in 4 of water.

For consumptives suffering from post-nasal catarrh, the following Collutorium Alkalinum is useful:—Sodium Bicarbonate and Borax each 3 grains, Phenol 1 grain, Sugar 5 grains, Water to 1 ounce.—Pr. Apl. 09. 529.

Bain dit de Vichy. FR. Cx.

Sodium Bicarbonate 500 Gm. dissolve in the bath (250 to 300 litres) at time of use.

Sodii Carbonas (*Off.*). $\text{Na}_2\text{CO}_3, 10\text{H}_2\text{O} = 284.11$ (286.16 l. Wts.).

Dose.—5 to 30 grains (0.32 to 2.0 Gm.).

Is prepared from Sodium Chloride either by (the Solvay or Ammonia process) interaction with Ammonium Bicarbonate and subsequent ignition (Sodium Bicarbonate is an intermediate product), or by converting it into Sodium Sulphate and the action of heat on a mixture of the sulphate with Carbon and Calcium Carbonate (Leblanc process). It is soluble in less than 2 of water and effloresces in the air. Internally in gout and skin diseases and for 'acidity.' A lotion, 2 grains to the ounce, relieves eczema. 1% is used as mouth wash or nasal douche.

Instruments are boiled in a 1% solution to sterilize and to prevent rusting.

In diabetic coma the intravenous injection of 30 ounces of 3 to 4% solution affords best chance of restoring patient.—Pr. July, 07.

Sodii Carbonas Exsiccatus (Off.).

107 of the exsiccated salt are obtained from 284 of the crystals approximately; seldom used internally as such.

Sodii Carbonas Monohydratus, U.S.

$\text{Na}_2\text{CO}_3 + \text{H}_2\text{O} = 123.19$ (U.S. Wts.). *Average dose.*—4 grains.

Contains not less than 85% pure Anhydrous Sodium Carbonate Na_2CO_3 , corresponding to not less than 99.5% of the crystallized monohydrated salt.

Sodii Chloras, Sodium Chlorate, U.S.

$\text{NaClO}_3 = 105.71$ (105.7 U.S. Wts.) (106.46 I.Wts.).

Dose.—10 to 30 grains (0.65 to 2 Gm.).

Caution.—Not to be rubbed with combustible substances. Colourless crystals with saline taste, soluble 1 in less than 2 parts of water, and 1 in 34 of 90% alcohol. Useful in diphtheria, stomatitis, sore throat (for which Potassium Chlorate is also used), and in urethritis.

Tablets of Sodium Chlorate and Borax, 5 grains. Useful in loss of voice and relaxed throat.

Trochisci Sodii Chloratis, 3 grains in each (0.2 Gm.).

Made with black currant paste, and with plain sugar. More palatable than potassium chlorate.

Gargarisma Chlorig. *Syn.* EUCHLORINE GARGLE.

Sodium Chlorate in powder 10 grains.

Hydrochloric Acid 30 minims.

Mix in a pint bottle, and let the gas generate and replace the air in the bottle, then cork the bottle, and let it stand for two minutes; lastly add gradually shaking after each addition, Distilled Water to 1 pint.

According to the hypothesis that $4\text{NaClO}_3 (= 4 \times 105.71)$ are decomposed by 12 HCl ($= 12 \times 35.19$) yielding 12 Cl ($= 12 \times 35.19$) in part? (as ClO_2), this gargle contains about 10 grains of Chlorine, in other words it is about 0.125% Chlorine.

This is a good antiseptic. *c.f.* p. 852.

Useful to remove follicular patches, *e.g.*, in diphtheria 2 or 3 ounces in a quart jug may be used as an inhalation (cold).

St. Th. H. Has Potassium Chlorate 200 grains, Hydrochloric Acid 40 minims, and Water 1 pint, and is used with an equal quantity of water, or more.

Liquor Potassii et Sodii Hypochloritum (Becker). Potassium Hydroxide 5, Sodium Hydroxide 4, Water to 1,000. Dissolve and pass Chlorine *q.s.* into the solution to saturate.

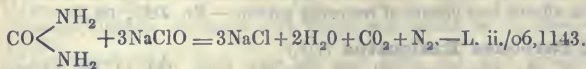
Inoperable cancer treated by injections of $1\frac{1}{2}$ to 2 Cc. under the skin daily for varying periods over deltoid muscle, or over the great trochanter,

avoiding the growth and neighbouring skin. Platinum needle is used.—B.M.J. i./09,274.

Liquor Sodæ Chlorinatæ (Off.). 2·5% Cl. U.S. 2·4%. *Dose.*—10 to 20 minims (*Off.*). Dissolve Sodium Carbonate 600, in Water 1,000. Triturate Chlorinated Lime 400, with Water 3,000. Mix and filter. (*Off.*). U.S. employs Monohydrated Sodium Carbonate 65, Chlorinated Lime 90, Water to 1,000. Process slightly modified.

Other Pharmacopœias use more Sodium Carbonate—it is suggested to increase it in the *Off.* article by one-third, to obtain a preparation which will keep better.—B.C.D. i./09,178.

The action of the hypochlorite on Urea would be :—



The Hermite process yields a liquid of an average strength of 4·2 to 4·8 Gm. available Chlorine per litre. The electrolytic decomposition of Magnesium Chloride and Sodium Chloride Solution produced by the process is said to result in formation of Magnesium Hypochlorite. The Magnesium Hypochlorite is decomposed, forming Hypochlorous Acid in solution and Magnesium Hydrate in suspension, *c.f.*—i./08, 157. Alexander improves on the process by adding a little Magnesium Hydroxide to assist in picking up the unstable compounds of Oxygen and Chlorine at the positive pole.

No water has been found which cannot be sterilised by 2 parts of chlorine per million. 25,000 gallons can be sterilised for 1d.—Thresh, L. ii./08,1597,1846.

Nesfield found 0·125 Gm. Chlorine per litre (125 per million) of water teeming with *B. typhosus*, *B. Coli*, etc., sufficient to sterilise it in 5 minutes. Description of principle of Nesfield's Sterilising Tablets.—L. ii./08, 1708.

Sodii Citras. $2\text{C}_3\text{H}_4(\text{OH})(\text{COONa})_3 + 11\text{H}_2\text{O} = 709\cdot20$ (*Off.* and U.S. Wts.); 714·256 I. Wts.).

Dose.—10 to 60 grains (0·65 to 4 Gm.). Small granular crystals or powder.

Solubility.—1 in 3 of water. Is given as a cooling saline in preference to Potassium Citrate.

Flavoring.—Glyl Aurantii Amari, Syl Vanillæ; Syrupus Aromaticus. Useful in azoturia, for it diminishes both polyuria and the loss of urea, and recommended for diabetes.

Solutio Sodii Citratis, Gt. Orm. H.—Sodium Citrate $2\frac{1}{2}$ grains, Chloroform Water $\frac{1}{2}$ drachm, Water to 1 drachm.

Sodium Citrate Tablets.—5 and 10 grains.

For infant feeding:—(1) For weaning the healthy infant; (2) for increasing the amount of milk taken in the 24 hours; (3) for correcting milk dyspepsia; (4) for the avoidance of scurvy.—B.M.J. ii./05,1021.

In the case of a child 4 months old commence with proportion of 1 grain to the ounce of milk, increase to 3 grains if necessary.

20 Cc. of 25% solution per litre of milk prevents clotting. Metabolism experiments.—L. i./06,1153.

Causes the casein to be precipitated as a flocculent curd, hence more easily assimilated.—L. i./09,763; B.M.J. i./09,724.

2 grains to the ounce of undiluted milk advised.—M.P. 1909/87,241.

Wright has shown that the citrates have a decalcifying effect on the blood, at first lessening coagulability, but later, on continued use, this again increases, probably owing to the fact that the citrates dissolve the lime salts from the tissues.—B.M.J. i./06,126.

In mitral stenosis decalcification of the blood in the system is advised.—B.M.J. ii./08,1789.

Anæmic patients (from menorrhagia due to fibroids) who undergo hysterectomy should have 20 grain doses twice daily to diminish tendency of the blood to coagulate in the vessels. Should certainly be given if the least tendency towards thrombosis.—B.M.J. ii./08,13.

Scurvy in the adult and in the infant is associated with a diminished alkalinity of the blood. Sodium Citrate increases the alkalinity, and symptoms of scurvy disappear rapidly. Lime Juice contains 0.3% Sodium Citrate.—Sir A. E. Wright, L. ii. 08,725.

A chronic callous ulcer of the leg can be softened in a week by applying Solution of Salt and Sodium Citrate from time to time to encourage flow of lymph. This can be checked if necessary by rubbing into the part a mixture of 1 of Calcium Chloride to 399 Precipitated Chalk.—L. ii./08,731.

Dyspepsia treated by Sodium Citrate in average dose of 30 to 60 grains taken divided when pain sets in.—L. i./07,309; M.A. 1908,14.

In Bright's disease many patients do well on a pure milk diet (2½ to 3 pints), which may be slightly diluted and Sodium Citrate added with advantage. There are nevertheless several difficulties in use of milk for nephritis.—Consult Pr., Aug. 09/157.

Liquor Sodii Ethylatus (Off.).

Is prepared by dissolving Sodium 1, in Absolute Alcohol 20, keeping the latter cool by a stream of cold water; has Sp. Gr. 0.867, and contains 18% of C_2H_5ONa .

The solution is syrupy, colourless, but darkens to a brown colour.

Uses.—Effective caustic for nævi and moles and lupus; also in hypertrichosis. Applied with a glass rod for 2 or 3 successive days.

No water should be allowed to touch the part.

Sodii Hydroxidum, Soda Caustica. (Off.) U.S. $NaOH = 39.76$ (B.P. and U.S. Wts.) (40.008 I. Wts.).

Dose.—½ to 1 grain (0.032 to 0.065 Gm.) well diluted.

In coarse white powder, fused masses, or moulded sticks. That of U.S. contains not less than 90% pure anhydrous $NaOH$.

Sodium Hydrate transfused through the heart increases the tonicity and frequency.—B.M.J. ii. 1128.

Pasta Londinensis, London Paste, T.H.

Caustic Soda and Unslaked Lime of each equal parts, rubbed together in a warm mortar, made into paste when required for use as a caustic. It is said to be less painful than Vienna Paste, which is Caustic Potash 5, Slaked Lime 6 (Pasta Potassæ cum Calce, Mid. H. has equal parts), made into a Paste with alcohol.

Sodium Hypobromite Solution.

Caustic Soda 100 Gm., Distilled Water 250 Cc. Dissolve, cool, and keep acid while adding *guttatim* Bromine 25 Cc.

Mix and dissolve. This solution is used to estimate the amount of urea in a given quantity of urine. On adding the solution, nitrogen is evolved from the

urea, and is measured in a **Doremus Tube**, in which each graduation represents 1 per cent. of urea in the urine, or by the ureometer of **Squibb's** pattern, the number of Cc. displaces an equivalent volume of water, and by tables this amount gives the equivalent.

Vide also Urea Estimation, p. 884.

It is better to keep the bromine separate; it is therefore supplied in tubes containing 1, 2·2, and 4 Cc. respectively; 1 Cc. of bromine should be added to 11 Cc. of the solution as required. In place of these, **Liquor Bromi**—Bromine 1 Cc., Potassium Bromide 1·5 Gm., Distilled Water *q.s.* to 11 Cc. (=1 in 11) may be used in equal quantity to the soda solution.

Sodii Iodidum (Off.). U.S.

NaI = 148·78 *Off.* and U.S. Wts. (149·92 I. Wts.).

Dose.—5 to 20 grains (0·32 to 1·3 Gm.).

A dry, white crystalline deliquescent powder, *soluble* 3 in 2 of water and 1 in 3 of alcohol 90%. Is required officially to be nearly 99% pure, and must be distinguished from the hydrous salt containing 2H₂O, which crystallises from cold solutions.

Flavoring.—Glyl Amygdalæ Amaræ, Syl Cinnamomi; Syrupus Aurantii.

Uses similar to the potassium salt *q.v.* but considered less depressant.

Instead of the potassium salt in actinomycosis.—L. ii./04,1204,1225.

Sodii Nitras. *Dose.*—15 grains. U.S. requires 99% pure. NaNO₃ = 84·45 (U.S. Wts.).

Saline, refrigerant, diuretic.

Sodii Nitris, Sodium Nitrite (Off.).

NaNO₂ = 68·58 (69·01 I. Wts.).

Dose.—1 to 2 grains (0·065 to 0·13 Gm.).

Is obtained by reduction of Sodium Nitrate by fusing it with lead.

In white, deliquescent, crystalline granules, or in sticks, with a cooling saline taste, soluble 2 in 3 of water; useful in angina pectoris and in epileptiform convulsions,—action similar to nitrite of amyl.

Compressed Tablets, 2½ grains each, are prepared.

For asthma 3 to 5 grains frequently repeated; specially useful with hyoscyamus.—L. i./90,240.

Even ½ grain distinctly affects the circulation, yet large doses do not cause death.—D. J. Leech.

The modern treatment of high tension by nitrites had been recommended in the time of Queen Elizabeth—nitre and blood-letting were advocated to prolong life—the nitre contained nitrites.—M.P., Apl. 24/07,456.

In granular kidney valuable. High tension of the pulse is natural to the disease. For urgent symptoms.—L. ii./08,519.

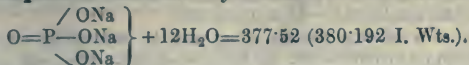
Raised arterial tension where a source of danger, well treated by ½ grain doses, gradually increased to 4 or 5 grains.—Brunton, L. ii./08, 1132.

See also Pulvis Potassii Nitritis Compositus and Pulvis Sodii Nitritis Compositus, p. 566.

Sodii Phosphis.

Na₂HPO₃ + 5H₂O = 214·6 (216·088 I. Wts.) white crystalline powder soluble in water,

Sodii Phosphas Neutralis. *Syn.* TRIBASIC SODIUM PHOSPHATE.



Used for softening water and for boilers, preventing incrustation.

Soluble in water with alkaline reaction, by dissociation of Sodium Hydrate.

Sodii Phosphas (Off.), U.S. P. Austr. *Syn.* HYDROGEN DI-SODIC PHOSPHATE; TASTELESS PURGING SALT.

$\text{Na}_2\text{HPO}_4, 12\text{H}_2\text{O} = 355.64 \text{ (355.61 U.S. Wts.) (358.20 I. Wts.).}$

Dose.— $\frac{1}{4}$ to $\frac{1}{2}$ ounce (7 to 15 Gm.) or 30 to 120 grains (2 to 8 Gm.) repeated. Colourless crystals or white granules.

Soluble 1 in 6 of water, is very efflorescent, loses 63% of its weight when heated to dull redness. Has an alkaline reaction.

Flavoring.—It is practically tasteless.

Sodium phosphate is mildly aperient, well suited for a delicate stomach; small doses antacid and diuretic, useful in bilious sick-headache and jaundice.

For hepatic calculi, 60 grains 3 times a day, recommended with $\frac{1}{10}$ grain sodium arsenate added, if any evidences of gastric intestinal catarrh.

In a diabetic, sodium phosphate *per os* and injected, reduced the urine and glucose.—B.M.J. i./03,1205.

Injected (2 grain doses) in nervous affections.—B.M.J.E. ii./92,80.

Fireproofing.—Fairly concentrated solutions of sodium phosphate, ammonium phosphate, sal ammoniac, or sodium tungstate (20%) are all useful.

Sodii Phosphas Effervescens (Martindale).

Dose.—1 to 3 drachms (4 to 12 Gm.).

A convenient and pleasant mode of taking this useful purgative. Introduced by W. Martindale, and made Official in the British Pharmacopœia.

In exophthalmic goitre and neurasthenia of value.—M.P.ii./07,73.

As nerve tonic in dilatation of the stomach—must be persevered with.—M.P., Oct. 07,418.

'Vescettes' of Sodium Phosphate. 30 grains.

Dose.—1 to 6 crushed and taken in a draught of warm water.

Sodii Phosphas Exsiccatus, U.S. Contains not less than 99%.

$\text{Na}_2\text{HPO}_4 = 141.08 \text{ (141.05 U.S. Wts.), (142.008 I. Wts.).}$

Dose.—10 grains to 4 drachms (0.65 to 16 Gm.) in some warm liquid.

Sodii et Ammonii Phosphas. *Syn.* MICROCOSMIC SALT.

$\text{Na}(\text{NH}_4)\text{HPO}_4 + 4\text{H}_2\text{O} = 207.66 \text{ (209.114 I. Wts.).}$ Used in chemical analysis with the blowpipe.

Sodii Phosphas Acidus. Dihydrogen Sodium Phosphate.

$\text{NaH}_2\text{PO}_4 + \text{H}_2\text{O} = 137.08 \text{ (138.032 I. Wts.).}$ *Dose.*—30 to 60 grains (2 to 4 Gm.).

Crystals soluble about 1 in 1 of water, and 1 in 300 of alcohol 90%. Has been given in alkalinity of urine with good results. Particularly useful in cystitis, and after operations on the bladder to keep the urine acid. If diarrhœa occurs, the administration should be stopped for a short time. A solution of 2 drachms of the salt to a pint of water may also be ordered to drink from time to time.—L. i./03,662; B.M.J. i./03,1256.

In enuresis where urine is alkaline (due to alkalis and not to any inflammatory septic condition).—M.A. 1906, 203.

Passage of a calcium oxalate stone may be assisted by employing this salt owing to its solvent action on calcium oxalate. The salt given by the mouth is eliminated as such. Two ounces per diem in 100 ounces of distilled water were administered, and in six weeks no symptoms of stone remained, yet no calculus was passed—the stone was dissolved. The solvent action can be demonstrated *in vitro*. The same treatment is advised in cases of Calcium Oxalate deposit without stone formation,—should be given from time to time to prevent concretion.—B.M.J. ii./09, 1347.

Sodii Pyrophosphas, U.S.

$\text{Na}_4\text{P}_2\text{O}_7 + 10\text{H}_2\text{O} = (443\cdot02 \text{ U.S. Wts.}).$

Average dose.—30 grains (2 Gm.). Colourless transparent crystals, with cooling saline and feebly alkaline taste. Has cathartic properties.

Sodii Sesquiphosphas.

$\text{Na}_3\text{H}_3\text{P}_2\text{O}_8 = 260\cdot28 (262\cdot024 \text{ I. Wts.}).$

Average dose.—30 grains (2 Gm.) *pro die* in divided doses.

This compound was first mentioned in 'Comptes Rendus' 1881, 93, 388. The Salt was stated to contain water of crystallisation,—Joulie, 'Comptes Rendes,' 1902, 134, 635, gives it as almost anhydrous. In experiments which we have conducted we found when freshly prepared H_2O approximating one molecule in the Salt. For convenience in dispensing the Salt is, however, supplied in a dried granulated condition. It may be considered as a combination of equimolecular proportions of the Ortho-phosphates, — Na_2HPO_4 and NaH_2PO_4 . Joulie regards it as of a distinct series. The compound is prepared by neutralising 426 Gm. of Exsiccated Sodium Phosphate (*Off.*) with Phosphoric Acid 1·75 Sp. Gr. (about 110 Gm.) in presence of sufficient water. The solution is carefully concentrated and allowed to crystallise, the crystals being finally exsiccated at a moderate temperature.

The Salt is virtually neutral to both blue and red litmus. It distinguishes itself as an Ortho-phosphate Compound by not coagulating Albumin, and by yielding a yellow precipitate with Silver Nitrate Solution. **Soluble** with ease in water. It is not so hygroscopic as Sodium Acid Phosphate.

The preparation is not at all objectionable to the taste.

The so-called alkalinity of the blood is due to the presence of Bicarbonates which are chemically Acid Salts, so that in spite of the alkalinity to litmus the blood may according to Joulie be viewed as an acid fluid. The acidity due to Sodium Acid phosphate is masked by the excess of the Bicarbonates. The blood contains in solution Calcium Phosphate and Magnesium Phosphate, and seeing that these are precipitated in alkaline or even faintly acid solution, this is considered another point in favour of the view that blood is acid in reaction. Bicarbonates are practically absent from the urine. A treatment has been evolved based on determination of the acidity of the urine (according to Joulie, due to Sodium Acid Phosphate) by adding standardised Calcium Saccharate Solution. This acidity shall thence be an index of the acidity of the blood. A precipitate is formed of Tri-Calcium Phosphate which re-dissolves, forming Mono-Calcium Phosphate so long as there is a sufficiency of the Acid Phosphate to combine and produce the soluble Mono-Calcium Phosphate.

Joulie compares the degrees of acidity of urines for equal amounts of Solids in specimens as indicated by the increase in Specific Gravity over that of water, and expresses the result in percentage, *e.g.*, if the Sp. Gr. be 1·015 and we find acidity 0·505 (in terms of H_2SO_4) then an excess of density equal to 100 would give

$$\frac{0\cdot505 \times 100}{15} = 3\cdot36 \text{ as Ratio of Acidity ('R.A.')}$$

It is then obviously possible to find a Urine with Specific Gravity lower, *e.g.*

1.005, showing a lower acidity per litre, *e.g.*, 0.308, which is in reality more acid when we eliminate the increase of water,—thus

$$\frac{0.308 \times 100}{5} = 6.16 \text{ as Ratio of Acidity.}$$

The determination of acidity per litre is, therefore, considered fallacious. The average R.A. in health is 4.55. A ratio above is hyper-acid, and below is hypo-acid. The latter condition is much more common, due to failure of hepatic function.

In vegetarian diet the excess of alkalis appearing as Carbonates in the urine will produce an alkaline reaction.

To relieve the hypo-acidity with the resultant pathological deposition of lime salts, and the production thereby of phosphatic gout, it is suggested to administer dilute Phosphoric Acid. (Other Acids would have the same effect, but they coagulate Albumen and are not well tolerated by the stomach. Phosphorus exists as Calcium Phosphate in the bones, Sodium Phosphate in the plasma, Potassium Phosphate in the nervous system, in combination with Iron in the red blood corpuscles, and as Magnesium Phosphate in the muscles.)

The daily total average loss of Phosphoric Acid is estimated at 3 Gm. in the urine and 1.5 Gm. in the *feces*—total 4.5 Gm.

To raise the acidity of the urine (and hence of the blood as Joulie claims) large amounts of Phosphoric Acid have to be given.

Sodium Acid Phosphate would be indicated where there is deficiency of H_3PO_4 accompanied by a mild hypo-acidity—usually up to 5 Gm. per diem is given.

The Ratio of Phosphoric Acid (R.P.) to excess of density of urine over water is as an average 11 to 11.5. If above this, the condition is called hyper-phosphatia.

$\frac{R.P.}{R.A.} = 2.45$ (Joulie's co-efficient or Acido-phosphoric ratio).

Phosphatia, according to Joulie, generally indicates R.P. is abnormal. It *excessive*, is treated by diet rich in phosphates—gruyere cheese, haricot beans, mutton, beef, white cheese, eggs, cereals, milk (enumerated in order of preponderating percentages). If R.P. *deficient* this means excessive phosphoric excretion has preceded, therefore also administer phosphates; the kind of Phosphate to give depends on the R.A.

If the R.A. is *normal*, a neutral phosphate must be given. Sodium Sesquiphosphate as above described has been suggested and is specially prepared.

Hyper-acidity will rapidly yield to the ordinary Sodium Phosphate, *e.g.*, in the form of Effervescent Sodium Phosphate. *q.v.*—Abstracted from a paper read at the London Homœopathic Hospital, December 5th, 1907, and Jan., 1908. Special Report sheets are arranged, and a table of indications of disease is also prepared. *v. also L. ii./o6, 1382.*

The view that the blood is acid is supported. Its alkalinity is only apparent. The carbonates in the serum are certainly present as bicarbonates. Gautrelet appears to have shown that the function of the liver is to correct by acid formation (lactic, etc.) the ammoniacal alkalinity arising from general catabolic changes.—B.M.J. ii./o8, 1532.

Sodium Silicate, Solution of. *Syn.* SOLUBLE GLASS, Water Glass. $Na_2SiO_3 = 122.30 (+ Aq.)$ I. Wts.

A viscid solution, of the consistence of treacle, usually containing 10% of caustic soda and 20% of silica. Sodium Silicate solution has a remarkable power in arresting the putrefaction of organic matter.

Potassium Silicate, Solution of. Variable amounts of $K_2SiO_3 = 154.50$ (I. Wts.) and $SiO_2 = 60.3$ (I. Wts.). *Syn.* SOLUBLE GLASS, Water Glass.

Is less viscid than the last and is used to impregnate bandages for treating fractures. This was the original preparation. Soda was substituted in its manufacture.

Salufer. A mixture of Silicofluorides used in the moist treatment of wounds. There is no fear of absorption.—B.M.J. i./o3, 712.

Sodii Persulphas, Sodium Persulphate.

$\text{Na}_2\text{S}_2\text{O}_8 = 236.44$ (238.14 I. Wts.).

Dose.—1 to 3 grains in water before meals.

In small white granular crystals, soluble in water. Recommended in France for tuberculosis because it stimulates the appetite. Similarly for chlorotic and neuropathic subjects. Useful in hyper-acid dyspepsia at the onset, also in gastric cancer. This, in common with the other persulphates is a strong oxidising agent.

Liberates about 13% active oxygen against 10% from Sodium Perborate and 11% from Calcium Peroxide. If it is desired to avoid production of free sulphuric acid, the persulphate may be mixed with $1\frac{1}{2}$ times its weight of Sodium Carbonate. 3 to 10% solutions as gargle and dressing. Suitable for wounds requiring moist dressing and where disinfection necessary. For small ulcers may be used as dusting powder with equal quantity of powdered talc. Odorless and non-toxic.—L. ii./08,1619.

Ammonium and Potassium Persulphates, $\text{K}_2\text{S}_2\text{O}_8 = 268.34$ (270.34 I. Wts.), (the latter known as **Anthion**), are used in Photography to reduce dense negatives—they oxidise and then dissolve part of the silver.

On adding Barium Chloride to a Solution of Potassium Persulphate there is no precipitation. But on warming decomposition occurs and Barium Sulphate is thrown down.

The Ammonium Salt $(\text{NH}_4)_2\text{S}_2\text{O}_8 = 226.56$ (228.224 I. Wts.) is prepared by electrolysis of a solution of ammonium sulphate containing sulphuric acid. It is stable at 100°C . but in the moist condition, readily yields ozonized oxygen, liberates iodine from potassium iodide, converts uric acid into guanine, &c., oxidizes hæmatin in ammoniacal solution.

To sterilise sponges, the solution does not stain. Also suitable as a hand disinfectant. It bleaches.—L. ii./05,1106.

Sodii Sulphas Acidus. $\text{NaHSO}_4 + \text{H}_2\text{O} = 137.10$ (138.094 I. Wts.).

Syn. **SODIUM BISULPHATE.**

In crystals or in fused masses, is recommended to purify water which may have typhoid contamination; 15 grains to a pint of water destroys *B. typhosus* after 15 minutes contact, as also *B. enteritidis*, *Spirillum cholerae* and internal parasitic worms.

'**Anti-Typhoid**' Tablets (Patented), containing the equivalent of $7\frac{1}{2}$ grains of active Sodium Bisulphate are prepared, to dissolve in $\frac{1}{2}$ pint of water.

They are effervescent and yield a slightly acid drink. Refreshing and thirst-quenching in hot weather and hot climates.

They should also be used for washing food, *e.g.*, Salads.

These Tablets were used in the South African and in the Russo-Japanese wars with success.

For the army *e.g.* the Territorials, in forced marches not exceeding 3 days useful. After a few days' use it acts as a purge.—L. ii./09/418.

Nauheim Bath Salts are prepared with this Salt and Sodium Bicarbonate. The Nauheim Water contains in addition Sodium and Calcium Chlorides, *c.f.* List of Mineral Waters.

Fused Sodium Bisulphate Tablets, 5 ounces and packets of Sodium Bicarbonate for making effervescing baths are patented by E. Sandow.

In hydropathic establishments according to Ph. Form. baths are prepared extemporaneously with the following:

No.	Sodium Chloride.	Calcium Chloride.	Sodium Bicarbonate.	Hydrochloric Acid.
1	4 lbs.	6 ozs.	None.	None.
2	5 "	8 "	None.	None.
3	6 "	10 "	6 ozs.	7 ozs.
4	7 "	10 "	8 ozs.	9½ ozs.
5	9 "	11 "	1 lb.	18½ ozs.
6	10 "	12 "	1½ lb.	27½ ozs.

The tablet system is preferred.

Sodii Sulphas. (*Off.*)

$\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O} = 319.90$ (322.23 I. Wts.).

Dose.— $\frac{1}{2}$ to $\frac{1}{2}$ ounces, or 30 to 120 grains repeated.

Transparent efflorescent crystals with bitter taste, soluble about 1 in 3 of water—also in Glycerin; insoluble in Alcohol.

Flavoring.—Glyl Vanillæ, Glyl Menthæ Piperitæ; Syrupus Zingiberia.

Experiments in infantile diarrhœa led to the conclusion that Sodium Sulphate is apparently strongly antiseptic—as the diarrhœa disappears. The dose was insufficient to produce any aperient action.

About 6 grains initially for a baby under 6 months, increasing up to 1 drachm for adults every 6 hours in fennel water. Children over 6 months can take 10 to 20 grains without producing aperient action.—L. ii./o6, 1251.

Sodii Sulphas Exsiccatus. Natrium Sulphuricum Siccum,

P.G. iv. $\text{Na}_2\text{SO}_4 \cdot \text{H}_2\text{O} = 158.98$ (160.086 I. Wts.).

Dose.— $\frac{1}{2}$ to 2 drachms (2 to 8 Gm.).

On drying, Sodium Sulphate (Glauber's salt) loses about one-half its weight, leaving the almost anhydrous salt.

Sodii Sulphas Effervescens (Martindale).

Dose.—A teaspoonful or more in half a tumbler of water, taken half an hour before breakfast; it produces as a rule one efficient evacuation.

An agreeable and palatable aperient introduced by W.M., containing about half its weight of dried sodium sulphate; stimulates both the liver and bowel without causing depression. Its action resembles that of Carlsbad Water. It is suitable for travellers, being portable, non-deliquescent, stable and keeps well in the Tropics.

Sodii Sulphas Effervescens (*Off.*). Is similar.

Sodio-Magnesi Sulphas Effervescens. (Martindale.)

Dose.—A teaspoonful or more in half a tumbler of water, taken half an hour before breakfast.

An agreeable and efficient aperient introduced by the writer. The Sulphates of Sodium and Magnesium combined resemble Hunyadi Janos and Pullna waters; also Friedrichshall, if a little common salt be added to each dose. This preparation is palatable, stable in composition, and convenient to use when travelling.

'Vescettes' of Sodio-Magnesium Sulphate. Each equivalent to 60 grains of the above, to be crushed and dissolved in a little warm water.

Sodium and Magnesium Sulphates are useful in clearing out the intestinal tract and lower the blood-pressure (in arterio-sclerosis).—B.M.J. i./o6, 126.

Sodio-Magnesi Sulphas Effervescens cum Caffeina (Martindale). *Dose*.—One teaspoonful or more.

A useful "pick-me up," and for headaches.

'Vescettes' of this preparation contain 60 grains.

Chloro-Sodio-Magnesian Aperient.

Dose.—A teaspoonful or more.

An efficient saline purge, useful in migraine and other forms of headache; also in constipation, and for assisting digestion and relieving depression by increasing the action of the liver, intestines, and kidneys, and promoting free excretion of waste products.

The activity and palatability of the last five preparations may be increased, especially in winter, if taken in *warm* water. The combination of the salts of sodium and magnesium makes a more active purgative, but the effervescent sodium sulphate alone is more pleasant to take.

Sal Carolinum. True Carlsbad Salt.

Dose.—1 to 2 drachms. This is imitated by:—

Sal Carolinum Factitium, P.G. Ph. Ned. Artificial Carlsbad Salt. *Dose*.—20 to 60 grains (1·3 to 4 Gm.), in warm water.

Dried Sodium Sulphate 44, Potassium Sulphate 2, Sodium Chloride 18, Sodium Bicarbonate 36, all in fine powder. Mix. 53 grains to 1 pint of water is similar to Carlsbad Water. Marienbad Salt is a similar aperient.

Marienbad Salt Tablets may be prepared containing 60 grains of the mixture.

Aqua Aperiens Mitius. MILD APERIENT SOLUTION.

Dose.—as required.

Sodium Sulphate 87 grains, Potassium Sulphate 4 grains, Calcium Sulphate $2\frac{1}{2}$ grains, Magnesium Sulphate 1 grain, Sodium Chloride 71 grains, Potassium Chloride $3\frac{1}{2}$ grains, Calcium Chloride 2 grains, Magnesium Chloride 1 grain, Water to 1 pint.

Aqua Aperiens Fortis.

Double the sulphates, otherwise as above.

METALLIC BALANCE IN SALINE APERIENTS.

Arguing on the ground that for transfusion in a surgical operation it has been recognised that a solution more approximating the blood in content of sodium, potassium, calcium and magnesium is less likely to disturb the normal metallic balance and diminish the organ's efficiency—it has been advised that Saline Aperients should be similarly constituted. Note minute proportion of Magnesium Sulphate which is thought to act in a poisonous manner. Note also that Hunyadi Water contains almost equal quantities of Magnesium and Sodium Sulphate. In Apenta the first exceeds the latter.—L. ii/09,883.

'Vescettes' of Carlsbad Salts. Each equivalent to 2 ounces of Carlsbad-Sprudel Water.

Sal Emsanum Factitium, Ph. Ned.

Sodium Sulphate Exsiccated 7, Potassium Sulphate 13, Sodium Chloride 325, Sodium Bicarbonate 655.

Sal Hunyadi Janos Facticum, Ph. Ned.

Desiccate Magnesium Sulphate 950 to 500, add Sodium Chloride 50, and Sodium Sulphate Desiccated 450.

Sal Vichy Facticum, Ph. Ned.

Desiccate Sodium Phosphate 40 to 16, add Potassium Sulphate 50, Sodium Chloride 80, Sodium Bicarbonate 854.

Sal Wildungerse Facticum, Ph. Ned.

Sodium Sulphate Exsiccated 5, Potassium Sulphate 10, Calcium Carbonate 240, Magnesium Carbonate 240, Sodium Bicarbonate 225, Sodium Chloride 280.

Sodii Sulphis. (Off.) U.S.

$\text{Na}_2\text{SO}_3 \cdot 7\text{H}_2\text{O} = 250.38$ (250.39 U.S.; 252.182 I. Wts.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

Colourless efflorescent crystals (keep in stoppered bottles).

Soluble in water about 1 in 4, also in Glycerin 1 in 25; sparingly soluble in Alcohol 90%. Incompatible with acids. Antiseptic. U.S. requires 94% pure.

As a lotion for skin affections and sores of the mouth, and internally for sarcinae in the stomach.

The Warwick Purifier contains trays of this and Glycerin. The Glycerin arrests the organisms, and the Sulphite decomposes. Suggested for hospitals—L. i. 07,899.

Sodii Sulphis Exsiccatus contains about 90% $\text{Na}_2\text{SO}_3 = 125.22$ (126.07 I. Wts.); is used in photography. Being in dry powder is convenient for transit, especially for export.

Sodii Bialphis. $\text{NaHSO}_3 = 103.34$ (104.078 I. Wts.).

Dose.—5 to 30 grains (0.32 to 2 Gm.).

White powder soluble 1 in 4 water. Incompatible with acids. Has antiseptic properties. Employed in stomatitis and skin affections.

Sodii Metabisulphis. *Syn.* SODIUM PYROSULPHITE. $\text{Na}_2\text{SO}_3 \cdot \text{SO}_2 = 188.8$ (190.14 I. Wts.). Made by passing Sulphur Dioxide into a hot concentrated aqueous solution of Sodium Sulphite.

Suggested Dose.—2 to 5 grains (0.13 to 0.32 Gm.).

Sodium Metabisulphite 20 grains, Alcohol 90% 1 ounce, Peppermint Oil 5 minims, Glycerin 2 ounces. Has been used as an antiseptic throat pigment. It is said to be a specific to kill yeast fungus in the intestines. In photographic use is similar to the Potash Salt, *q. v.*

Sodii Sulphidum, $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O} = 238.5$ (240.214 I. Wts.). Yellowish deliquescent crystals soluble in water. Employed in skin affections.

A 25 to 40% Aqueous Solution as depilatory.—B.M.J. ii/06,1779.

Balneum Sulphuris Alkalinum, St. M.'s H.

Sodium Sulphide 2 ounces, Sodium Chloride 2 ounces, Sodium Bicarbonate 1 ounce. To be added to 50 or 60 gallons of hot water.

Soda Tartarata (Off.). Potassii et Sodii Tartras, U.S.

Sodium Potassium Tartrate. ROCHELLE SALT, SEIGNETTE SALT. $(\text{CH}_3\text{O})_2\text{COONa} \cdot \text{COOK} + 4\text{H}_2\text{O} = 280.15$ (282.196 I. Wts.).

Dose.—120 to 240 grains (8 to 16 Gm.). Colourless crystals.

Soluble 1 in $1\frac{1}{2}$ of water. Almost insoluble in Alcohol.

Flavoring.—Syl Lavandulae, Syl Rosae; Syrupus Aurantii, Elixir Simplex.

Is a constituent of

Pulvis Sodae Tartaratae Effervescens (Off.).

Seidlitz Powder.

Sodium Potassium Tartrate, in dry powder, 120 grains. Sodium Bicarbonate, in dry powder, 40 grains, in the blue paper. Tartaric Acid, in dry powder, 38 grains, in the white paper. 'Extra Strong' (3 drachms Rochelle Salt) and 'Double Strength' (4 drachms) are also supplied.

Seidlitz-powder in Italy is composed of magnesium sulphate 15, sodium bicarbonate 2, tartaric acid 2.—Ph. Notes.

Sodii Tartras (Neutrale).

$\text{CHOH.COONa} \left. \vphantom{\begin{matrix} \text{CHOH.COONa} \\ \text{CHOH.COONa} \end{matrix}} \right\} 2\text{H}_2\text{O} = 228.44 \text{ (230.064 I. Wts.)}$

Dose.—As aperient $\frac{1}{2}$ to 1 ounce. Diuretic, 15 to 66 grains repeated. White crystalline powder comparatively tasteless. Soluble in water. Relaxes the bowels and increases the flow of urine.

Sodii Sulphocyanidum.

$\text{N}\equiv\text{CSNa} = 80.55 \text{ (81.08 I. Wts.)}$

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

A crystalline colourless salt, soluble in water 1 in 0.3, and 1 in 0.6 of Alcohol 90%. It has a sedative action on the nervous system, is an analgesic and may be found useful in nervous affections, arterial sclerosis, and chronic nephritis.

Sodii Taurocholas, $\text{NaC}_{26}\text{H}_{44}\text{NSO}_7 = 533.46 \text{ (537.432 I. Wts.)}$

Dose.—2 to 6 grains (0.13 to 0.4 Gm.), in pill, keratin-coated to prevent solution until it reaches the bowels. A whitish powder, prepared from pig's bile, *soluble* about 2 in 1 of water. It has been recommended for gouty obesity and dyspepsia. Is added to culture media for separation of *B. Typhi abdom.* from *B. coli communis.*—B.M.J.i./02,1473.

Sodii Glycocholas.

$\text{NaC}_{26}\text{H}_{42}\text{NO}_6 = 483.76 \text{ (487.346 I. Wts.)}$

Dose.—2 to 6 grains (0.13 to 0.4 Gm.).

A similar salt, soluble 1 in 2 of water and 1 in 3 of alcohol 90% which appears to be a useful cholagogue for congestion of the liver, gallstones, constipation and melancholia.

Produce slight fall of blood pressure, the taurocholate more than the glycocholate.—B.M.J.i./05,59.

Bile salts have a deterrent effect upon the growth of gonococci *in vitro*. They may be used locally to the conjunctiva with advantage.—Annus Medicus, L. ii./09,1895.

Cholalic Acid. *Syn.* ★ COLALIN. $\text{C}_{24}\text{H}_{40}\text{O}_5 = 405.24 \text{ (408.3 I. Wts.)}$

An active principle of bile in amorphous yellowish powder, non-toxic and non-irritating.

Soluble in alkalis, particularly caustic potash, and in alcohol about 1 in 1; insoluble in acids, ether, and water.

Colalin Tablets ($\frac{1}{8}$ and $\frac{1}{2}$ grain in each. *Dose.*—One three times daily before food) also contain a small proportion of magnesium carbonate.

Uses.—Stimulates the liver and increases flow of bile. It converts a thick viscous bile into a normal fluid one. Has slight depressant action on heart. It is not dissolved in the stomach as it is insoluble in dilute Hydrochloric Acid, but is soluble in the alkaline juice of the small intestine. It is best administered on an empty stomach. For biliousness, melancholia, recurrent sick-headache and intestinal indigestion.

Should the substance constipate due to the action the bile has on absorption of fats—

Colalin Laxative should be administered. Colalin combined with the anthraquinone principle of Cascara. Tablets contain $1\frac{1}{8}$ grain each. In this proportion, *viz.*, Colalin $\frac{1}{4}$ grain, Anthraquinone of Cascara $\frac{7}{8}$ grain. *Dose.*—One thrice daily.—B.M.J.i./06,687.

Sodii Telluras, Sodium Tellurate.

$\text{Na}_2\text{TeO}_4 \cdot 5\text{H}_2\text{O} = 327.58$ I. Wts.

Dose.— $\frac{1}{8}$ to $\frac{3}{4}$ grain (0.02 to 0.04 Gm.) in pill daily. A powerful antisudorific, in phthisical and other sweating. It gives the characteristic Tellurium smell to the breath.—M.P. Feb. 20, 1907,209.

Ⓢ SPARTEINÆ SULPHAS.

$\text{C}_{15}\text{H}_{25}\text{N}_2 \cdot \text{H}_2\text{SO}_4 \cdot 5\text{H}_2\text{O} = 419.27$ (422.394 I. Wts.) (water content varies). Fr. Cx. and P. Jap.

Dose.— $\frac{1}{4}$ to 1 grain (0.016 to 0.065 Gm.) increased.

Fr. Cx.—*Max single dose* $\frac{3}{4}$ grain, max. during 24 hours 4 grains approximately.

The sulphate of a volatile liquid alkaloid $\text{C}_{15}\text{H}_{26}\text{N}_2 = 232.53$ (234.228 I. Wts.), obtained from the leaves and branches of Broom, *Cytisus scoparius*. Is in colourless crystals, *soluble* 3 in 2 of water, and about 1 in 6 of alcohol 90%. This contains also a crystalline principle Scoparin.

Ⓢ Injectio Sparteinæ Hypodermica.

Contains 1 grain of the Sulphate in 6 minims.

Dose.—2 to 6 minims (0.12 to 0.35 Cc.).

Ⓢ Hypodermic Tablets contain $\frac{1}{2}$ grain (0.032 Gm.).

Ⓢ Pills contain $\frac{1}{4}$ grain (0.016 Gm.).

Has been recommended for **morphine habit**, *v.p.* 454.

In morphine suppression acts as a perfect and immediate heart tonic. Enables patients to take active exercise—which without would be impossible.—Oscar Jennings, M.P. July 21, '09,62.

The only cases in which it is unsuitable in ordinary dose ($\frac{1}{8}$ to $\frac{1}{4}$ Gr.) is where high tension exists due to excess in smoking.—*Vide* also p. 454.

Has a tonic action on the heart, restoring its rhythm and strengthens its beats when in a weak atonic state.

Is not cumulative; a valuable diuretic; should be tried when digitalis fails; relieves stenocardiac attacks.

Useful in uncompensated heart disease—Pr. xlv.60.

Dr. Samuel Johnson passed 20 pints of urine in 24 hours after taking the infusion.—B.M.J. ii./09, 537.

B.P.C. says that the claims to digitalis-like action are unfounded, and that sparteine lowers blood pressure.

In post-operative suppression of urine.—L. i./07,960. *Large doses.*—1 to 2 grains as hypodermic injection every 3 to 6 hours.—M.A. 1908,33.

Ⓢ Oxysparteina, $\text{C}_{15}\text{H}_{24}\text{N}_2\text{O} = 246.41$ (248.212 I. Wts.) is an oxidation product of Sparteine.

Ⓔ Oxysparteine Hydrochloridum.

$C_{15}H_{24}N_2O, HCl, 4H_2O = 354.12$ (356.744 I. Wts.).

Dose.— $\frac{1}{2}$ to $1\frac{1}{2}$ grains (0.032 to 0.1 Gm.) daily.

In transparent crystals, freely soluble in water. May be given hypodermically. **Ⓔ Oxysparteine Sulphas** is also prepared.

A useful cardiac stimulant where there is much contraction of vessels, as it hardly affects the latter.

SPHAGNUM.

Turf-Moss, *Sphagnum, sp. var.*

This, when dried, on account of its elasticity and great capability of sucking up or imbibing liquids, forms a useful dressing for absorbing the discharge from open wounds, and especially urinary discharge in bladder, kidney, and dropsical affections. It is antiputrescent, and at the same time deodorant. It is sold in compressed sheets, like cardboard, measuring 24 inches by 15 inches (for varieties *vide infra*), which absorb 20 times their weight of water, and when disintegrated, may be formed into pillows or pads by enclosure in muslin bags, or the compressed dressing may be placed just as it is beneath the bed sheets.

Recommended as an absorbent of pus, leaving wound clean. May be used as a padding for splints. Several varieties are in use, viz.—

“**Hagedorn**” for general hospital and private practice. Is largely employed as a general absorbent dressing for urine, pus, and other discharges. These sheets are approximately $\frac{1}{4}$ inch thick.

“**Rudolphi**,” thinner and more fragile than the above. May be placed beneath the bed sheets.

“**Gauze-Covered**,” ready covered with a layer of absorbent gauze.

Moss Felt, softer, woven into sheets, not compressed. Suggested as a packing for splints.

In addition, **Moss Towels** for menstruation are prepared, the material being well suited for the purpose, and **Moss Soles** for boots, which are claimed to be warm in winter and cool in summer. **Moss Accouchement Sheets**, 36 × 36 inches, and **Pillows** are prepared.

Moss (Loose) is one of the most useful absorbents for beds in the case of insane persons. It is deposited on the bedstead in place of the mattress, and the imbeciles lie direct on it in short shirts. The moss absorbs and deodorises all excrements.

* ‘STERULES.’

‘Sterules’ are glass capsules of sterile solutions for ophthalmic, hypodermic and Ionic use. The **ophthalmic sterule** is inserted through an **Ejector**, and its ‘breech’ end is snapped off at the file mark. It is drawn further through the ejector, held horizontally, and the other end is broken off at the file mark. The ‘breech’ end of the ejector is now covered with the index finger, and the soft part is pressed with the thumb and second finger

to release a small quantity (sufficient for one application in eye work) of a sterile solution. The file marks are situated $\frac{1}{4}$ inch from the ends of the 'sterule.'

For general purposes **Large 'Sterules'** are prepared containing 10 minims of solution, *e.g.*, cocaine hydrochloride 5 and 10 %, v.p. 265.—B.M.J. ii./02,980; B. & C.D. ii./02,77; **Hypodermic Sterules** are as a rule flask-shaped. They contain solutions prepared for injection.

Ionic Sterules are for use in Iontophoresis, *vide* p. 425.

For list of solutions in 'Sterule' form, *see* Index.

STRAMONIUM.

Dried leaves and dried ripe seeds of *Datura Stramonium* (Off). U.S. (*Solanaceæ*). U.S. requires not less than 0.25% mydriatic alkaloid when assayed as for belladonna.

Fr. Cx. has max. single dose, 4 grains, max. dose during 24 hours, 15 grains approximately. **Uses.**—Action similar to belladonna, and employed for same purposes. Is an usual ingredient in cigarettes and the fumigating powders employed in asthma.

Ⓔ **Daturina.** Dose. $\frac{1}{16}$ to $\frac{1}{4}$ grain (0.0005 to 0.0016 Gm.) in solution with diluted sulphuric acid.

Datura Stramonium yields this alkaloid, which consists principally of Hyoscyamine (*q.v.* for formula).

Datura Metel and *D. Arborea* contain Scopolamine.—P.J. ii./c5,230,617. For further details, *v.p.* 391.

Methods of assay of Stramonium leaves—yield about 0.3% alkaloid.—P.J. i./03, 426 (0.2% B. & C.D. i./06,234).

Schmidt confirms that hyoscyamine is the only alkaloid in.—P.J. ii./05,127.

Results of examination of dry extracts from seeds and leaves with different menstrua.—C.D. i./06,420.

From the seeds of *Datura fastuosa* var. *Flor. coerul. plen.* which plant is said by many authorities to be identical with *D. alba*, Schmidt obtained Scopolamine 0.21%, Hyoscyamine 0.034%, and traces of Atropine. The var. *D. fastuosa flor. alb. plen.* gave slightly less of the constituents.—B. & C. D. ii./05,210.

Stramonium seeds contain about 16-30% of a fixed drying oil. The seeds and leaves have about the same alkaloidal strength—average 0.22%.—P.J. i./06,310.

Ⓔ ***Extractum Stramonii.** (Off.)

Dose.— $\frac{1}{4}$ to 1 grain (0.016 to 0.06 Gm.).

An extract of the seeds in No. 40 powder prepared with Alcohol 70%. U.S. Extract (by concentrating Fluidextract) is assayed to 1% mydriatic alkaloids. The average yield of extract from the leaves is 20%.—Caspary.

In spasmodic asthma the extract found better than the tincture. The Off. dose said to be excessive, but sufficient should be given to be slightly toxic. Most patients show toxic effects on taking $\frac{3}{4}$ grain in 24 hours.—B.M.J. i./09,788.

Ⓔ **Fluidextractum Stramonii, U.S.**

Average dose.—1 minim, 1=1 (of leaves), standardised to 0.25 Gm. mydriatic alkaloids in 100 Ce.

Ⓔ **Tinctura Stramonii.** (Off.).

Dose.—5 to 15 minims, 1 in leaves in 5 of 45% alcohol by percolation. (Might be made with 30%.—P.J. ii./09,142). U.S. 1 in 10 of

* Stramonium Alkaloids may be viewed as Belladonna Alkaloids.

alcohol 48·9% vol. Standardised to 0·025% mydriatic alkaloids. A standard of 0·06% alkaloid has been suggested.

Ⓟ **Mistura Antispasmodica, N.H.W.** Tincture of Stramonium, Tincture of Lobelia (Ethereal), Tincture of Opium, of each 6 minims, Chloroform Water to $\frac{1}{2}$ ounce.

Ⓟ **Mistura Asthmatica, N.H.W.** Tincture of Stramonium, Tincture of Lobelia (Ethereal) of each 10 minims, Ether 15 minims, Potassium Bromide 10 grains, Chloroform Water to $\frac{1}{2}$ ounce.

Ⓢ ***Unguentum Stramonii, U.S.** Extract of Stramonium Leaves 10, rubbed smooth with Diluted Alcohol 5, and Hydrous Wool Fat 20, and Benzoated Lard 65 added.

Ⓢ ***Eupneuma Asthma Spray.** "Liquor Stramonium 100, Anæsthesine, Subcutin 2, Methyلاتropine Bromide 0·3."—B.M.J.E. ii./09, 47.

Ⓢ **Daturinæ Sulphas.—Daturine Sulphate.**

Dose.— $\frac{1}{200}$ to $\frac{1}{100}$ grain (0·00032 to 0·00065 Gm.). Minute, white, granular crystals, readily soluble in water.

Ⓢ **Guttæ Daturinæ, R.O.H.** 0·5%.

Ⓢ **Ophthalmic Discs** contain $\frac{1}{5000}$ grain of Daturine Sulphate in each, combined with Gelatin.

In acute mania it acts like hyoseyamine and atropine, in producing sleep.

STRONTIUM.

Sr=87·62 I. Wts.

Strontium is probably the most inoffensive of the alkaline earth-metals. Its salts improve the appetite, assist assimilation and nutrition, and increase body weight, also said to be antiseptic to the digestive tract.

Strontium salts are innocuous, not diuretic, and check formation of albumen in epithelial and parenchymatous, but not interstitial nephritis.—L. i./92, 47.

Strontii Bromidum, U.S. Fr. Cx.

$\text{SrBr}_2 + 6\text{H}_2\text{O} = 352·94$ (U.S. Wts.) ; (355·556 I. Wts.)

Dose.—5 to 30 grains (0·32 to 2 Gm.).

In deliquescent crystals with bitter saline taste, *soluble* in less than an equal quantity of water.

Flavoring.—Syl Lavandulæ, Syl Menthæ Piperitæ, Elixir Saccharini.

Used successfully in gastric affections, dyspepsia, and vomiting of nervous origin ; also in epilepsy and chronic cardiac and renal diseases. Has but little toxic action.

In epilepsy bromide is the 'sheet anchor'—the strontium salt is best if tendency to acne be great. In ordinary attacks 15 to 20 grains thrice daily. To prevent depression add a little nux vomica (which is not so likely to arise if potassium bromide is avoided). If acne troublesome small doses of arsenic with the bromide.—L.i./09, 908.

Tablets contain each 5 grains (0·32 Gm.)

Effervescent Strontium Bromide. *Dose.*—1 drachm (contains 10 grains) or more.

* Stramonium Alkaloids may be viewed as Belladonna Alkaloids.

'Vescettes' of Strontium Bromide equal to 10 grains of Strontium Bromide.

Strontii Bromidum Exsiccatum.

Dose.—4 to 24 grains (0.26 to 1.5 Gm.)

On drying Strontium Bromide it loses most of its water of crystallisation, 4 parts are about = 5 of crystals.

Preferred in epilepsy to the other bromides.—L.i./07,20.

Strontii Carbonas. $\text{SrCO}_3 = 147.62$ I. Wts.

Dose.—5 to 30 grains (0.32 to 2 Gm.).

Strontii Iodidum. U.S.

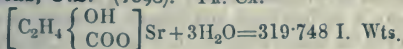
$\text{SrI}_2 + 6\text{H}_2\text{O} = 446.02$ U.S. Wts. (449.556 I. Wts.).

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

In white crystalline masses, freely soluble in water.

Bromide and Iodide of Strontium in exophthalmic goitre of children are beneficial, also in asthma, rheumatism, and in chronic endocarditis.

Strontii Lactas, U.S. (1890). FR. CX.



Dose.—5 to 30 grains (0.32 to 2 Gm.).

A white crystalline powder, very soluble in water.

Of great service in albuminuria and Bright's Disease.

May well be combined with iron in the albuminuria of pregnancy.

To increase coagulability of the blood, 15 to 30 grain doses useful.—L. ii./06,433. *c.f.* Calcii Lactas.—L. i./08,96.

Strontii Salicylas, U.S. $[\text{C}_6\text{H}_4.\text{OH}.\text{COO}]_2\text{Sr} + 2\text{H}_2\text{O} = 394.72$ U.S. Wts. (397.732 I. Wts.).

Dose.—5 to 20 grains (0.3 to 1.3 Gm.) in cachet.

A white crystalline powder, slightly soluble in water and in alcohol.

Valuable for chronic gout and lithæmia, and a good intestinal antiseptic.—B.M.J. i./95,14.

STROPHANTHUS (Off.). U.S.

The mature ripe seeds of *Strophanthus Kombé* (Oliver), (*Apocynaceæ*) freed from the awns, of a fawn colour, and covered with hairs. A section of the seed should give a green colour with a mixture of sulphuric acid 80 and water 20. *S. Courmontii* and several other species have been used as adulterants.

FR. CX.—Seed of *S. hispidus*, which on cutting and moistening with sulphuric acid, colours blueish green passing to red. P. HUNG. gives *max.* single dose $\frac{1}{2}$ grain (0.05 Gm.), *max.* in 24 hours 0.15 Gm.

Commercial History of (Holmes).—P.J. i./06,312.

Antidotes to Strophanthus preparations—

After stomach pump or emetics give Tannin or Gallic Acid in water, followed by stimulants. Anæsthetics to relieve spasm. Potassium Permanganate has been recommended.

Strophanthus sp. have yielded two crystalline glucosides:—Strophanthin, from *S. Kombé*, which gives a green reaction with sulphuric acid, melts at 172.75°C .—and Pseudo-Strophanthin, probably from *S. hispidus* (red with sulphuric acid), and is twice as active physiologically.

***Strophanthin, U.S. FR. CX.**

$C_{40}H_{66}O_{19} = 844.12$ (850.528 I. Wts.). (U.S. gives, however, no formula.)
FR. CX. gives $C_{31}H_{45}O_{12} = 612$. (FR. CX. Wts.) and directs to be prepared from *S. hispidus* only.

Dose.— $\frac{1}{300}$ to $\frac{1}{100}$ grain (0.0002 to 0.00065 Gm.) hypodermically. Is irritating at the seat of injection.

Dose by the mouth 1 to 4 mgr. and up to 4 mgr. a day; by intramuscular injection 1 to 3 mgr. a day and by intravenous injection $\frac{1}{4}$ to 1 mgr. and up to 2 mgr. a day. Given by the mouth it is often ill tolerated and strychnine (1 to 3 mgr. in the day) is the best antidote. Signs of overdose: headache, sense of tightness in the chest and præcordia, marked slowing or bigeminy of pulse, marked rise in blood pressure, cardiac arrhythmia, insomnia, nausea, are least seen with the intravenous use of the substance. Little success in heart affections obtained with the drug taken *per os*.

Contraindicated where there is high blood pressure and marked arterio-sclerosis and to those with acute or chronic nephritis or granular kidney.—B.M.J.E. ii./c9,11.

A white glucoside, or "mixture of several" (U.S.). Soluble in water and alcohol 90%, allied in its physiological action to digitalin and of bitter taste. Fuses at 170°C. (finally melting at 190°C.—U.S.).

Determination of Strophanthin.—P.J. ii./o5,580; (Mann) P.J. ii./o6,93.

Uses.—As a cardiac tonic and diuretic. Resembles digitalis in action and is employed for same purposes. Occasionally of service where the latter has failed or is not tolerated. Especially valuable in mitral stenosis, but unsuitable in aortic disease; pulse improves in force and rhythm, dyspnœa and palpitation are lessened, appetite is increased, action of bowels and perspiration not affected,—non-cumulative. Of great value in renal insufficiency; its action is prompt compared with digitalis.

Useful in the cardiac failure of acute pneumonia following influenza.

In heart failure, *intravenous* injection of 8–12 minims of 1 in 1,000 strophanthin solution ($\frac{1}{2}$ to $\frac{3}{4}$ mgr. of the base) valuable.—Pres., Feb. 4, o7,80. Chronic heart affections treated by 1 mgr. intravenous doses.—B.M.J.E. i./o9,71. In grave cases of cardiac insufficiency.—L. ii./o8,273.

Caution.—To our knowledge the drug occasionally acts in an unaccountable manner—loss of consciousness has followed an ordinary dose in a weakened patient.

Granules de Strophanthine, FR. CX., $\frac{1}{16}$ mgr. and are colored pink.

Poudre de Strophanthine au Centième, FR. CX. *Max. single dose* $\frac{1}{2}$ grain, *Max. during 24 hours* $1\frac{1}{2}$ grains approximately.

Ⓢ Extractum Strophanthi (Off.)

Dose.— $\frac{1}{4}$ to 1 grain (0.016 to 0.065 Gm.).

The seeds are first percolated with purified ether, and then with 90% alcohol; the alcoholic percolate concentrated and mixed with milk sugar, so that 2 parts of extract in powder = 1 part of seeds.

Ⓢ Tinctura Strophanthi (Off.).

Dose.—5 to 15 minims (0.3 to 0.9 Cc.)

Strophanthus Seeds in No. 30 powder, 1; moisten with Alcohol (70%) *q.s.*; macerate for 48 hours, then percolate slowly to produce 20 and dilute to 40 with more alcohol. Is half the strength of the 1885 preparation. U.S. is 1 in 10 with Alcohol (94.9% Vol.) and Water in proportion of 650 and 350. 1 in 10 Alcohol (70%).—P. Austr. and Ph. Ned.

F.I. requires 10% strength prepared by percolation with Alcohol 70%.

FR. CX. has this with *max. single dose* 3 minims approx. *Max. during 24 hours* 12 minims approx. P. HUNG. has also with *max. dose* in the day 2 Gm.

* See note under Digitalis p. 303.

C.R. states this would make a tincture nearly 4 times as strong as the old. The dose may have to be diminished to about 1 to 5 minims, which would be inconveniently small, and the great difference in the dosage might produce untoward results.

Experiments on removing fat from, by cooling to 14° C., and by other methods. Cooling satisfactory.—P.J. ii./99,469.

The tincture gives better results than strophanthin.—B.M.J. i./90,1327.

The 1885 preparation gives better results in pneumonia—5 minim doses with the same amount of Capsicum Tincture.—L. i./07,808; B.M.J. i./07,626.

It has been stated that the fat in Strophanthus Tincture gives it an emetic action. Experiments on animals in America shows this to be unfounded,—the fat being void of action. On the other hand a dose of fat-free tincture injected subcutaneously produced prompt emesis.

In making the tincture it is important to employ slow extraction (by 65% Alcohol) in a long narrow percolator. A lower percentage Alcohol extracts the active principle more rapidly, producing an unsightly tincture which may be cleared by chilling and filtering in the cold. Defatting the seeds aids percolation but does not affect the strength of the tincture. When making in small quantities percolate at least 7 days with 1000 Cc. of Menstruum for each 100 Gm. of seeds. In addition there should be several periods of exhaustion of at least 8 hours each. Suggested min. lethal dose of the tincture $\frac{1}{2}$ to $\frac{1}{4}$ Cc. per kilo of cat, injected subcutaneously (i.e., about 40 cat units per Cc.) The seeds should be standardised to start with, i.e. of the strength indicated by about 400 cat units per Gm. of seed.—Am. Jl. Ph., May, 09,209.

The Official Tincture said to be ten times more toxic than Digitalis Tincture Off. Strophanthus has less effect on the force of the heart than either Squill or Digitalis.—Pr. Oct. '07,489.

The need for physiological standardisation is well shown by the fact that four samples of Strophanthin varied so much that one was 90 times more toxic than others. L.i./09,1744.

It is also obvious that unification amongst physiological assayers is desirable otherwise it would appear that the whole method is likely to cause just as much trouble as it sets out to overcome.—c.f. pp. 229-301.

Houghton found after testing a large number of Tinctures of Strophanthus that 0.00015 Cc per Gm. body weight represented fairly well the toxic activities of an average sample. Strophanthus Tincture properly stored loses little in activity.

The 'H.T.U.' method of assay is described under Digitalis. Vide p. 300.

Ⓟ **Pilula Strophanthi** = 2, 4 or 8 minims of Tincture combined with milk sugar. *Dose.*—1 to 3.

Ⓟ **Tabellæ Strophanthi**, equal to 4 minims of Tincture combined with chocolate. *Dose.*—1 to 5.

Ⓟ **Tablets**, Compressed, are also prepared equal to 2 and 5 minims of the Tincture.

• **Tablets**, Hypodermic of, Strophanthin, $\frac{1}{600}$ grain are prepared.

* Ouabain. $C_{20}H_{34}O_{12}$ = 593.86 (598.368 I. Wts.). A glucoside from Ouabaio wood, obtained from a *Carissa* sp. of the same natural order as strophanthus, is in colourless lamels, slightly soluble in cold water, insoluble in absolute alcohol and ether, but soluble in glyccero-alcohol (according to Schmidt 1 in 150 water at 11°C. and in 27 alcohol 85%). It gives a red

* Should certainly be treated as Ⓣ.

colour with sulphuric acid and has similar properties to Strophanthin, but is much more toxic in action. Ouabaïn has been used for whooping-cough in doses of $\frac{1}{1000}$ to $\frac{1}{250}$ grain every three hours. Study of its physiological action.—B.M.J.E. i./92,27. It is also obtained from *Acocanthera* sp., q.v.

① STRYCHNINA (Off.) U.S. FR. CX.

① *Applicable to Ireland also, and Salts of Strychnine.*

$C_{21}H_{22}N_2O_2 = 331.75$ (334.196 I. Wts.).

Dose.— $\frac{1}{60}$ to $\frac{1}{15}$ grain (0.001 to 0.004 Gm.), in solution or in pill. FR. CX.—Max. single dose $\frac{1}{2}$ grain. Max. during 24 hours $\frac{1}{4}$ grain approx.

The alkaloid obtained from *Nux Vomica*, St. Ignatius' beans (q.v.) and the seeds of other species of *Strychnos*. In characteristic colourless crystals. Exceedingly poisonous. Its absorption in the rectum is even more rapid than in the stomach, small intestine, œsophagus or colon. Should not be coloured by strong nitric acid (absence of Brucine.)

The crystals are supplied commercially coloured with carmine to cover the brownish tinge which develops in hot climates.

Soluble.—Slightly in water, about 1 in 6,700, about 1 in 400 of alcohol 60%, 1 in 150 of alcohol 90%, 1 in 400 of absolute alcohol (FR. CX. says insoluble), 1 in 6 of chloroform, nearly insoluble in ether.

Antidotes.—Apomorphine Injection or Emetics followed by washing out the stomach with Potassium Permanganate, then give Potassium Bromide 4 drachm dose repeated in 2 drachm amounts every hour, continued if necessary. Chloral in drachm doses. Chloroform or Ether Anæsthesia. Try also Amyl Nitrite Capsules and Paraldehyde. Artificial respiration.

Calcium Permanganate 5 % solution yields innocuous product with Strychnine.—J.C.S.A. ii./05,107.

The physiological actions of Strychnine and Brucine are so different as to make it inadvisable to attempt to express the clinical value of the one in terms of the other. Death under Strychnine and Brucine differ entirely. Its action is stated to resemble methyl strychnine more than Strychnine. Strychnine compares with Brucine in toxicity as 33 : 4.—Wright and Dixon.—P.J. ii./08,366, 367.

Adrenalin administered by the mouth diminishes rate of absorption.—B.M.J.E. i./09,68.

Toxicology.—Simplified method of extraction by means of Acetic Acid and Alcohol. The Alcohol is useful to assist filtration.—P.J. ii./07,639.

Flavoring.—For Strychnine Salts and preparations containing Strychnine, Syl Aurantii Amari, Syl Menthæ Piperitæ (very full dose); Syrupus Aromaticus (very full dose).

① *Pilula Strychninæ* contain $\frac{1}{25}$ $\frac{1}{30}$ $\frac{1}{40}$ $\frac{1}{50}$ $\frac{1}{60}$ $\frac{1}{80}$ and $\frac{1}{100}$ grain.

① *Ferri et Strychninæ Citras, U.S.*

Average Dose.—2 grains in solution.

In scales varying in colour from garnet red to yellowish brown, freely soluble in cold water. It contains not more than 1% of Strychnine, and Ferric Citrate corresponding to not less than 16% Metallic Iron.

① **Ferri, Quininæ et Strychninæ Citras.**

Dose.—3 to 6 grains (0·2 to 0·4 Gm.).

This is in scales of a greyish-golden colour like the former preparation, but in addition to 1% of Strychnine it contains about 15% of Quinine.

① **Strychninæ Acetas.**

$C_{21}H_{22}N_2O_2 \cdot CH_3COOH = 391.33$ (394·228 I. Wts.).

Dose.— $\frac{1}{80}$ to $\frac{1}{15}$ grain (0·001 to 0·004 Gm.).

In small colourless acicular crystals, soluble 1 in 44 water, imperfectly through loss of acetic acid.

① **Strychninæ Arsenas.**

$C_{12}H_{22}N_2O_2 \cdot H_3AsO_4 \cdot \frac{1}{2}H_2O = 481.71$ (485·228 I. Wts.).

Dose.— $\frac{1}{80}$ to $\frac{1}{15}$ grain (0·001 to 0·004 Gm.).

In small white acicular crystals, soluble 1 in 29 of water.

In phthisis by hypodermic injection of $\frac{1}{4}$ % mixture with liquid vaselin
Dose.—4 to 15 minims daily.

① **Strychninæ Hydrobromidum.**

$C_{21}H_{22}N_2O_2 \cdot HBr + H_2O = 429.98$ (433·14 I. Wts.).

Dose.— $\frac{1}{80}$ to $\frac{1}{15}$ grain (0·001 to 0·004 Gm.).

White crystals, soluble about 1 in 70 of water; in alcohol 1 in 100.

① **Strychninæ Hydrochloridum (Off.).**

$C_{21}H_{22}N_2O_2 \cdot HCl \cdot 2H_2O = 403.70$ (406·696 I. Wts.).

Dose.— $\frac{1}{80}$ to $\frac{1}{15}$ grain (0·001 to 0·004 Gm.).

Small trimetric prisms, soluble 1 in 35·5 of water; alcohol (90%) 1 in 73.

A case where life in danger had $\frac{1}{80}$ grain increased to $\frac{1}{4}$ grain *pro die* in a month. A Chinaman with beri-beri (paralysis of) had up to $\frac{1}{4}$ grain *t.i.d.* Recovery in both.—M.P. Mar. 13, 1907, p. 281.

① **Liquor Strychninæ Hydrochloridi (Off.).**

Dose.—2 to 8 minims (0·12 to 0·5 Cc.).

Strychnine Hydrochloride 1, Alcohol (90%) 25, Distilled Water to 100.

For hypodermic injection. *Dose.*—2 to 6 minims.

Incompatible with *Liquor Arsenicalis*, and with an alkaline salt such as potassium bromide often is. Acidulating the latter with hydrobromic acid will, in most cases, prevent this. (Poisoning by.—L. ii./07, 1173.) Also with Potassium Iodide, for an insoluble Iodide may be thrown out. It is unsafe to prescribe alkaline mixtures containing more than 5 minims of this solution per ounce, or crystals of Strychnine may separate. It is wiser to avoid the possible deposition by not prescribing with Sodium Bicarbonate, Sal Volatile, &c.

A small quantity of glycerin added in place of equivalent of the spirit prevents crystallisation of the salt round the neck of the bottle.

① **Haustus Strychninæ Compositus, Mid. H.**

Strychnine Hydrochloride Solution 4 minims, Quinine Sulphate 1 grain Zinc Sulphate 1 grain, Dilute Sulphuric Acid 2 minims, Water to 1 ounce Useful nerve stimulant.

① **Haustus Strychninæ et Acidi Phosphorici, St. Bart.'s H., Vic. Park.**

Solution of Strychnine Hydrochloride 3 minims, Diluted Phosphoric Acid 15 minims, Spirit of Chloroform 15 minims, Infusion of Quassia to 1 ounce. Contains $\frac{1}{30}$ grain approx. Strychnine Hydrochloride in 1 ounce,

① **Strychninæ Nitras**, U.S., P. Belg., P. Hung. *Dose*.— $\frac{1}{64}$ to $\frac{1}{15}$ grain (0·001 to 0·004 Gm.). U.S. *Average dose*.— $\frac{1}{64}$ grain. P. Hung gives *max. single dose* $\frac{1}{6}$ grain (0·01 Gm.), *max. in a day* $\frac{1}{3}$ grain (0·02 Gm.).

$C_{21}H_{22}N_2O_2 \cdot HNO_3 = 394\cdot33$ (U.S. Wts. 394·30), (397·214 I. Wts.).

In hard colourless needles, soluble 1 in 60 of water; in 42 at 25°C.

U.S.

① **Tablets, Hypodermic**, $\frac{1}{100}$, $\frac{1}{50}$, $\frac{1}{40}$, $\frac{1}{20}$ grain.

Tabellæ Nitroglycerini et Strychninæ v.p. 468.

① **Strychninæ Phosphas Acidus**.

$C_{21}H_{22}N_2O_2 \cdot H_3PO_4 \cdot 2H_2O = 464\cdot83$ (468·252 I. Wts.).

Dose.— $\frac{1}{60}$ to $\frac{1}{15}$ grain (0·001 to 0·004 Gm.).

In light shining crystals, soluble 1 in 31·5 of water.

① **Strychninæ Sulphas**, U.S. FR. CX.

$(C_{21}H_{22}N_2O_2)_2H_2SO_4 + 5H_2O = 850\cdot24$ (856·558 I. Wts.), (850·21 U.S. Wts.).

Dose.— $\frac{1}{60}$ to $\frac{1}{15}$ grain (0·001 to 0·004 Gm.). FR. CX. *Max. single dose* $\frac{1}{10}$ grain; *max during 24 hours* $\frac{1}{4}$ grain approximately.

The neutral salt is in prismatic crystals, soluble 1 in 62 of water; in 31 at 25°C., U.S.; M.Pt. 200°C.

① **Granules de Sulfate de Strychnine**. FR. CX. contain 1 mgr.

① **Hypodermic Injection** 1 in 100. *Dose*.—1 to 6 minims.

① **Tablets**, $\frac{1}{60}$, $\frac{1}{50}$, $\frac{1}{40}$ grain each, for administration *per os*.

① **Hypodermic Tablets** $\frac{1}{100}$, $\frac{1}{50}$, $\frac{1}{25}$ and $\frac{1}{10}$ grain.

① **Strychninæ Sulphas Acidus**.

$C_{21}H_{22}N_2O_2 \cdot H_2SO_4 + 2H_2O = 464\cdot85$ (468·314 I. Wts.). *Dose*.— $\frac{1}{60}$ to $\frac{1}{15}$ grain (0·001 to 0·004 Gm.).

In white silky acicular crystals with a slightly acid reaction, soluble 1 in 42 of water.

① **Strychninæ Valerianas**.

A non-crystallisable salt supplied in aqueous solution equivalent to 25% of the base. *Dose*.— $\frac{1}{2}$ minim to $\frac{1}{10}$ minim ($=\frac{1}{100}$ to $\frac{1}{40}$ grain of the base). In dispensing, dilution must be carefully made, and part rejected if necessary. A useful nervine tonic, especially for hysterical patients.

Uses of, and References to Strychnine Salts.

In surgical shock—large doses, up to 20 minims of Liquor injected are most valuable. This has hitherto been the general opinion, but note—

In surgical shock not advised—in fact is condemned for use prior to or during operation. A dose of $\frac{1}{60}$ to $\frac{1}{30}$ grain immediately before an operation is only likely to lead to an exhaustion of the centres and thus render them less able to resist the causes of shock. It is preferable to give it regularly for a week beforehand.—A. J. Walton, L. ii./08, 21; but *c.f.* use of Strychnine with Stovaine, etc.

Dixon says strychnine is not a direct cardiac stimulant. By exciting the vasomotor centre it may slightly increase cardiac activity indirectly.—B.M.J. ii./09, 329, 540.

Strychnine hypodermically the only treatment found capable of arresting

progressive muscular atrophy. Acts more directly than by mouth.—Gowers, *Diseases of the Nervous System*, 2nd ed., vol. i. p. 496.

In nocturnal incontinence of urine and for cardialgia and gastralgia, Strychnine preparations have been used with good results.

Chorea minor in child which has resisted all ordinary methods, cured by strychnine nitrate, $\frac{1}{20}$ grain in pill 3 to 5 times daily.—M.C. Jan. 1892, 252.

Drink-craving in cases of alcoholism is relieved by strychnine either by mouth or hypodermically.

In beri-beri $\frac{1}{30}$ grain injected into each thigh daily.—B.M.J.ii./05, 1288. *c.f.* also Strychnine Hydrochloride for large doses.

In obviating and controlling post-partum bleeding of immense value.—B.M.J.ii./85, 913, 1059; i./86, 175.

Paralysis of soft palate after diphtheria in children quickly cured by hypodermic injections of $\frac{1}{32}$ to $\frac{1}{16}$ grain.—L. i./91, 1060; B.M.J.i./92, 1303; Pr. xlix, 295.

Discussion on the hypodermic dose to relieve chloral poisoning.—L. i./94, 782, 840, 915, 1044.

Heart failure in diphtheria treated with antitoxin, is relieved by strychnine and oxygen.—L. i./06, 97.

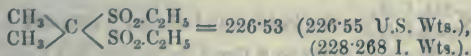
Immunisation of animals against strychnine—the effect of which is very much like that of the tetanus toxin—has been produced by injection of the serum of an immunised animal.—Berlin Klin. Woch., Sept. 18, 1905.

In broncho-pneumonia of infants one minim doses of the Liquor every four hours as routine practice excepting where there is diarrhœa or marked respiratory stridor. When signs of advancing cardiac strain add 1 minim doses of Strophanthus Tincture, B.P. 1885.—B.M.J.ii./08, 372.

In severe cases of puerperal sepsis with failure of circulation often of great value hypodermically.—B.M.J.ii./09, 1038.

In myasthenia, Strychnine hypodermically is frequently beneficial but not curative.—L. i./10, 355.

ⓈSULPHONAL (Of).



Sulphonmethanum, U.S. FR. CX. P. HUNG.

Syn. Dimethyl-methane-diethylsulphone. Produced by oxidation of a compound of ethyl-mercaptan and acetone. In colourless crystals or powder, tasteless and odourless, *soluble* about 1 in 450 of water (in 360 at 25°C. U.S.), 1 in 50 of cold, freely in hot alcohol. Melts at 125.5°C.

Dose.—10 to 30 grains (0.65 to 2 Gm.). In cachets or suspended with mucilage. FR. CX. has *Max. single dose* 30 grains; max. during 24 hours 60 grains. P. HUNG. gives *max. dose* in 24 hours 30 grains. Should be finely powdered, and followed by a draught of hot fluid. Unless in solution, a dose should be given an hour before sleep is desired.

Antidotes.—See chapter on.

Uses.—Soporific, but is not curative of pain; does not affect digestion, pulse, or temperature, especially desirable for nervous subjects. Is slow in

action on account of slight solubility; 30 grains may be given in solution in 1 ounce of brandy with 2 ounces of boiling water added (= about 140° F.).

In chorea useful.

Trismus neonatorum cured by enemata of 3 grains, supplemented by internal use.—L.i./91,1060.

Not without risk where considerable physical prostration.—L.i./92,488.

Recovery after 365 grains.—L.i./04,219. Also after 5 to 6 Gm.—L.i./09,811.

May be continued a long time without increasing dose.—B.M.J.i./09,524.

(P) **Tablets**, 5 grains (0.32 Gm.). *Dose*.—1 to 6.

Should be crushed and taken in warm water.

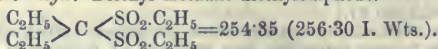
(P) **Capsules** contain 5 and 10 grains.

(P) **Effervescent Sulphonal**. Contains 5 grains in 1 drachm. *Dose*.—1 drachm, or more.

(P) **Hanstus Sulphonal**, G.H. Sulphonal 20 grains, Mucilage Mixture 1 ounce.

Mistura Mucilaginoso, G.H. Mucilage of Gum Acacia 2 drachms, Syrup 30 minims, Water to 1 ounce.

***Tetronal**.—*Syn.* Diethyl-methane-diethylsulphone.



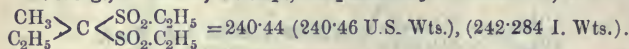
Dose.—10 to 20 grains (0.65 to 1.3 Gm.). Best given in cachets, followed by a draught of hot liquid.

Tablets, 5 grains (0.32 Gm.). *Dose*.—1 to 4.

In shining white crystals, melting at 185° F., odourless, with a camphoraceous bitter taste. Soluble 1 in 450 of water, 1 in 15 of alcohol 90%.

Two ethyl groups replace the two methyl groups in sulphonal. This is stated to increase hypnotic effect. The replacing of only one methyl group in sulphonal by ethyl forms—

***Trional**.—P. Austr. Fr. Cx. *Syn.* Diethyl-sulfone-methyl-ethyl-methane. Methyl-sulfonalum, P.G. iv., Ph. Ned., P. Belg., P. Helv., P. Jap., Sulphonethyl-methanum, U.S.



Dose.—10 to 30 grains (0.65 to 2 Gm.), in cachets, in a large cup of hot liquid. Fr. Cx. gives latter approx. as max. single, and during 24 hours.

An oxidation product of mercaptol made by the condensation of methyl-ethylketone with ethylmercaptan.

In minute crystals, soluble about 1 in 480 of water (1 in 195 at 25° C., U.S.) in alcohol 90% about 1 in 11, and in ether.

Uses.—Has a hypnotic action intermediate between those of sulphonal and tetronal.—B.M.J. i./90,87. Useful for insane persons.

Tetronal is the best sedative, Trional more effective in sleeplessness connected with neurasthenia and organic brain disease. Both are useless in insomnia due to pain, and in morphine and cocaine habits.

Chorea cured by Trional.—B.M.J. i./02,267.

Cured case of combined alcoholic and nicotine poisoning.—L. ii./01,223.

Tablets, 5 grains (0.32 Gm.). *Dose*.—1 to 6.

Recovery after effects of 125 grains.—L. i./03,1096.

Poisonings by Trional successfully treated by injections of Strychnine, Smelling Salts, and 1 drachm doses of Sulphate of Magnesium every four hours.—Li. 10,104.

Haustus Trional, G.H. 30 grains to Mucilage Mixture 1 ounce (v.p. 656.

Applying Hans Meyer's Theory *q.v.*, Therapeutic Index,—Insomnia, to these methane derivatives of the Sulphones, the coefficient of Trional is 4.46, Tetronal 4.04, Sulphonal only 1.59, which is in practice approximately the activity of same. *Trional best of the three, Sulphonal should be dropped, Tetronal too dangerous.*—B.M.J. i./09,554.

May be used as advised by Pouchet as an adjunct to Paraldehyde *q.v.*

SULPHUR.

S = 31.82 (32.07 I. Wts.).

Dose.—20 to 60 grains (1.3 to 4 Gm.) in milk or treacle, with confection of senna, or as Pulvis Glycyrrhizæ Compositus, *q.v.* *Official* are **Precipitated** and **Sublimed Sulphur**. Sublimed sulphur in fine powder, for use either internally or externally, is preferred.

Uses.—A good laxative for children, and for adults who have piles. In chronic skin affections and rheumatism. Sublimed Sulphur checks dysentery.—L. i./01,1676.

Tetanus cured by internal and external use.—B.M.J. ii./05,1160.

Sweating of the feet has been treated by Crocker by drachm doses thrice daily.—C.D. ii./09,326.

Emulsio Sulphuris.

Sulphur 120 grains in Oil 4 ounces. (The Sublimed Sulphur finely powdered and suspended in sterilised Almond or Olive Oil.—W.H.M.)

Ulcerative colitis successfully treated by injection through an artificial anus into the colon of the above emulsion every other day, and alternate days thorough sluicing with boric acid lotion. 7 weeks treatment. Shiga has employed Enemata of Gum Mucilage with Bismuth, Bismuth Subgallate or Iodoform.—B.M.J. i./09,770.

Emulsion of Sublimed Sulphur in glycerin used to swab out gum pockets in dental work.—B.M.J. ii./08,479.

Sulphur Lotum, U.S., is washed with ammoniated water.

Confectio Guaiaci Composita, L.H. Chelsea Pensioner.

Dose.—1 to 2 drachms (4 to 8 Gm.).

Guaiacum in powder 2, Sublimed Sulphur 3, Magnesium Carbonate 2, Ginger 1, Treacle, by weight, 12.

Acid Potassium Tartrate is added to some formulæ.

St. M.'s. H. has Guaiacum Resin 10, Magnesium Carbonate 10, Sublimed Sulphur 15, Treacle 60.

Confectio Sulphuris. (*Off.*).

Sublimed Sulphur 100, Acid Potassium Tartrate 25, Tragacanth 1, Syrup 50, Tincture of Orange 12.5, Glycerin 37.5 *Dose.*—1 to 2 drachms.

Confectio Sennæ et Sulphuris, G.H., U.C.H.

Dose.—1 to 2 drachms (4 to 8 Gm.).

Confection of Senna 1, Confection of Sulphur 1.

St. M.'s H. has Confection 3, Sublimed Sulphur 1.

Pulvis Guaiaci Compositus (Chelsea Pensioner), St. George's H. *Dose*.—20 to 40 grains (1·3 to 2·6 Gm.).

Guaiacum Resin, Precipitated Sulphur, Heavy Magnesium Carbonate, Gum Acacia and Potassium Bicarbonate, equal parts. The Confection (*above*) is more used.

Jephson's Powder. *Dose*.—60 grains (4 Gm.).

Precipitated Sulphur 2, Guaiacum Resin 1. For tonsillitis, acne, and constipation.

Tablets of Precipitated Sulphur 5 grains with Potassium Acid Tartrate 1 grain are prepared.

For acne, Precipitated Sulphur 15 grains, with Menthol 4 grains given 2 or 3 times a day over several months, is said to be good.—B.M.J.E. i./07, 94.

Trochisci Sulphuris. (*Off.*) *Dose*.—1 to 6.

Contain Precipitated Sulphur 5 grains, Acid Potassium Tartrate 1 grain, Tincture of Orange 1 minim, in each.

Continued use is beneficial in chronic diseases of alimentary canal and liver, also of skin and articulations.

Where sugar is to be avoided, may be given as

Pastillus Sulphuris Compositus, v.p. 342.

Unguentum Sulphuris. (*Off.*) 1 to 9 Benzoated Lard. U.S. 15%.

Scabies treated by Sulphur Ointment after washing with soft soap.—L. i./09, 968.

Unguentum Sulphuris et Zinci cum Kaolin. Sulphur 4, Zinc Oxide 3, Kaolin 1, Benzoated Lard 8.

For arresting sweating of the feet.—C.D. ii./09, 326 (modified).

Ⓟ Unguentum Sulphuris cum Hydrargyro, U.C.H.

Sublimed Sulphur $2\frac{1}{2}$ drachms, Sublimed Mercuric Sulphide 10 grains, Ammoniated Mercury 10 grains, Olive Oil 1 drachm, Lard to 1 ounce.

To this may be added, if ordered, either 2 grains of vermilion, 10 minims of eucalyptus oil, 10 grains of phenol, or 5 minims of creosote. Useful in scabies and allied skin diseases.

Unguentum Sulphuris Hypochloritis.

Sublimed Sulphur 12, Essential Oil of Almonds 2, Prepared Lard 84; mix, and add with quick manipulation Sulphur Chloride (Reddish Liquid) [$S_2Cl_2 = 134\cdot02$ (*Off.* and U.S. Wts.) (135·02 I. Wts.)] 2.

Keep in a stoppered bottle; is sometimes made double this strength, *i.e.*, with half the quantity of basis. Useful in acne, psoriasis and scabies.

Unguentum Sulphuris Iodidi (*Off.*). Contains Sulphur Iodide $S_2I_2 = 315\cdot44$ (317·98 I. Wts.):—

Sulphur Iodide 4, Glycerin 4; mix in a warmed mortar, and add Benzoated Lard 92. For tinea.

Unguentum Sulphuris et Naphthol Salicylatum.

Tinea circinata can be rapidly cured by an ointment of Sulphur $\frac{1}{2}$ drachm Salicylic Acid 10 grains, Naphthol 3 grains, Vaseline 1 ounce.—L. i/09, 966.

Sulphuretted Hydrogen Solution (*Off.*).

Is prepared by saturating Distilled Water with Hydrogen Sulphide (H_2S) To preserve, add a little Carbon Di-sulphide.

Lotio Sulphuris cum Sapone.

Precipitated Sulphur 30, Eau de Cologne 60, Glycerin 4, Soft Soap $\frac{1}{2}$, Rose-water to 500.

Is recommended for acne of the face.—W.W.W.

Sulphaqua Charges are for dissolving in water to produce sulphur baths for use in skin diseases, gout and rheumatism.

Balneum Sulphuratum. St. Th. H. Sulphurated Potash $\frac{1}{8}$ to $\frac{1}{4}$ oz. per gallon.

Furunculosis is treated by a 'bath' of the following :—Sodium Sulphide 1 ounce, Sodium Carbonate 6 ounces, Sodium Chloride 3 ounces.—M.P., June 23, /09, 639.

Pomatum Antipsoricum, F.E. Syn. Helmerich's Pomatum.

Is used for scabies.

Sublimed Sulphur 10, Distilled Water 5, Almond Oil 5, Potassium Carbonate 5, Lard 35. All by weight.

Fr. Cx. has poppy seed oil *vice* almond oil.

Piutanol. *Syn. THIOPINOL.* A soluble Sulphur preparation, stated to contain Sulphur 14, Glycerin 3, Pine Oil 18, and Alcohol 65%. In catarrh of the cervix, particularly chronic endometritis, this combination of terpenes and coniferous oils with soluble sulphur salts has been useful. Hip baths employed; Also in rheumatism, gout, and to supplant ordinary sulphur baths.

Piutanol Ointment.—5 to 10%. In scabies.—Therapist. Oct. 15/09, 105.

SUPPOSITORIA.

Suppositories containing various Medicaments weigh, when prepared with Cacao Butter, 15 to 16 grains. They are preferred with both ends conical shaped so as to pass more easily and be retained by the sphincter muscle.

For export Wax or Spermaceti (5 to 10%) is added. Melting point of mixture must not be higher than 99° F.

For Summer use and when a *large proportion of solid extract* is ordered in the suppository a Cacao Butter basis containing Castor Oil 10%, and White Wax 2½% is advised.—P.J. ii/09, 390, ex. Bulletin of Phey.

Adrenalin $\frac{1}{4}$ th grain in a 30 grain suppository prevents it from melting freely at body temperature.—*Ibid.*

Suppositories of Gelatin (*q v.*) weigh officially 30, 60 and 120 grains.

An improvement in the hæmorrhoidal suppository consists in the **Pessar-Suppository**; this combines the physical supporting and enlarging property of the hard rubber pessary with the lubricating property of a suppository. It consists of a bullet-shaped central cone 4 Cm. long and 1.5 Cm. thick made of animal fat tissue, and an external layer of Cacao Butter and Paraffin Wax. The fat tissue becomes elastic and swells up in a short time on reaching the desired part in the rectum.

TABLETTÆ.

(Compressed Tablets.)

In the preparation of Tablets the material has first to be *granulated*, to make it flow easily from the 'hopper' and to prevent it sticking between the dies and punches of the machine; this is effected by moistening with a little alcohol or water (to which, if desired, a minute quantity of mucilage, diluted about 1 to 4, may be added), rubbing through a suitable sieve (No. 16), and drying *thoroughly* either by very slight heat, or better, by exposure to the atmospheric air if sufficiently dry at the time. The decomposition, melting points or volatility of the chemicals to be compressed must be borne in mind. Salol, Beta-Naphthol, Benzoic Acid, Sulphonal, Trional and Phenacetin should not be heated. To obviate the sticking referred to, lubrication with French Chalk (2%), or spraying with a solution of Soft Paraffin or Cacao Butter in 1 in 6 each Ether and Alcohol, or less of the latter is resorted to in some instances.

There are, however, other methods which are more favoured by some manufacturers. Many of the 'tips' are the results of long experience and careful experiment, and they are jealously guarded as trade secrets.

Substances already in small crystals, *e.g.* Potassium Chlorate and Ammonium Chloride, do not require this treatment. Tablets *to dissolve like lozenges* require half their weight of a mixture of equal parts of Acacia and Tragacanth. Owing to *Incompatibility*, Sodium Bicarbonate and Calomel, Saccharin and Rhubarb, Salol and Camphor, Salol and Thymol, Caffeine Citrate with Acetanilide and Antipyrin, Salicylic Acid and Iron Compounds, Chloral and Alkalis, Mercuric Chloride and Metals, oxidising agents, *e.g.*, Potassium Chlorate and Permanganate with Charcoal, Sulphur, Iodine or Sugar should not be compressed together.

Five or ten per cent. of (potato) starch thoroughly dried is useful to ensure rapid breaking up of the Tablet. Deliquescent compounds should be treated with Gum Acacia or Tragacanth.

Similarly, if the powder is of a very dusty nature the judicious use of a little of these gums or of glucose or 10% Gelatin Solution is an advantage. Fibrous drugs may have 5% Dextrin. Many substances if compressed too hard are liable to cause the tablet to crack—this is particularly the case with Phenacetin and Antipyrin—the least possible amount of pressure should be applied that will produce a permanent tablet.

The majority of 5-grain Tablets are made to weigh $6\frac{1}{4}$ grains with Milk Sugar.

Acetanilide. 1 grain in $1\frac{1}{2}$ grains. Add 5% Potato Starch.

Acid Aceto-Salicylic (Syn. Aspirin). A little French Chalk may be necessary as lubricant.

Aloin as Arsenious Acid, *q.v.*

Alum. Dry thoroughly to remove water of crystallisation.

Arsenious Acid. Sugar of Milk, with French Chalk as lubricant.

Balsams. Mix with 25% Magnesia and evaporate to dryness.

Bismuth Carbonate and Sub-nitrate. Make 5 up to $6\frac{1}{4}$ with Cane Sugar (some use Lactose), adding small percentage of lubricant.

Bismuth Salicylate, as Salicin.

Bismuth and Soda. Bismuth Carbonate 3, Sodium Bicarbonate 2, Lubricant *q.s.*

Caffeine, as Arsenious Acid.

Calomel. Sugar of Milk as diluent.

Cardamoms may have 5% Dextrin.

Cascara. Compress the Extract properly granulated.

Charcoal to have 25% Cane Sugar or Acacia, or Gelatin Solution with French Chalk as lubricant.

Codeine, as Arsenious Acid. *Digitalin*, as Arsenious Acid.

Dover's Powder. $2\frac{1}{2}$ grains in 3 grain tablet.

Effervescent Materials may be granulated separately and mixed in the dry condition.

Ginger may have 5% Dextrin.

Gregory's Powder. Make 5 up to $6\frac{1}{2}$ with Cane Sugar, moistening with Water.

Grey Powder. Needs Sugar and Strong Mucilage.

Guaiacol. Make up with Sugar, adding Water and Lubricant *q.s.*

Ipecacuanha. Make up with Sugar and Water. Some employ 5% Dextrin.

Mercuric Biniodide (for administration *per os*) as Arsenious Acid. *Morphine*, as Arsenious Acid. *Nux Vomica Extract*, as Arsenious Acid.

Oily substances require 2 to 5% Calcined Magnesia.

Opium. Mix with Sugar or Sugar of Milk, using French Chalk as lubricant.

Pancreatin. 5 grains in $6\frac{1}{2}$ grain tablet.

Pepsin. Mix with Sugar, granulate with 60% Alcohol, and use French Chalk as lubricant *q.s.*, 5 grains in $6\frac{1}{2}$ grain tablet.

Phenacetin. Make 5 grains up to $6\frac{1}{2}$ grains with Sugar, 5% Potato Starch, and a little Glucose useful. Lubricant, *q.s.*

Phenazone. Make 5 up to $6\frac{1}{2}$ with Sugar.

Podophyllin, as Arsenious Acid.

Quinine, as Salicin. 2 grains in $2\frac{1}{2}$ grain tablet.

Saccharin with Sodium Bicarbonate, vide *Saccharin*, p. 613.

Salicin. Mix with Sugar, lubricate with French Chalk.

Sulol requires 10% Potato Starch, with Sugar. 5 grs. made up to $6\frac{1}{2}$.

Soda Mint. Sodium Bicarbonate, Peppermint Oil, Acacia, *q.s.*

Sodium Sulicylate. Make 5 up to $6\frac{1}{2}$ with Cane Sugar. Lubricant, French Chalk.

Strychnine as Arsenious Acid. *Sulphonal* as Salicin.

Thyroid. Contain half their weight Desiccated Thyroid Gland made up with sugar and lubricant *q.s.*

Zinc Sulphate for lotions. Remove water of crystallisation.

Stearettes, i.e., Tablets coated so as to be more likely to dissolve in the intestines than in the stomach, vide p. 541.

Tablet Triturates are made in metal or vulcanite moulds which are worked by hand, yielding 50-200 at a time, the sizes ranging between $\frac{1}{8}$ and $\frac{3}{8}$ inch in diameter and $\frac{1}{4}$ inch in depth. The active ingredient is mixed with sugar of milk or plain sugar, the whole being massed together with a little alcohol or alcohol and water.

For Hypodermic Tablets, Sterilised Milk Sugar, or Cane Sugar, is a useful diluent. These are prepared under the strictest aseptic precautions. A little Boric Acid is useful as lubricant. Dried Neutral Sodium Sulphate, Sodium Chloride and Ammonium Chloride are also employed in some instances. Hypodermic Tablets are well made in a Tablet Triturate mould with holes $\frac{1}{8}$ in. in diameter, the plate being $\frac{1}{16}$ inch in depth.

For machinery and other details see P.J. i./02, 46, 64, 84, 151; i./03, 36 (Theobroma and Starch excipient); 42 (Cocoanut Oil excipient), 156, 211 (Theobroma Emulsion), P.J. i./04, 831, ii./04, 244, ii./05, 283, 826, 838, 895.

Note on Disintegration of Tablets.—P.J. ii./08, 276.

For List of Tablets in general demand, see Index.

TEREBENUM. (*Off.*). U.S.

Dose.—5 to 15 minims (0.3 to 0.9 Cc.).

A mixture of dipentene and other hydrocarbons, produced by the action of sulphuric acid on oil of turpentine and distillation. Sp. Gr. 0.862 to 0.866. Should not affect the plane of polarised light. Is colourless, and has an agreeable odour resembling fresh-sawn pine-wood. Boils at 160 to 170° C. U.S.

Soluble about 1 in 7 alcohol 90% ; in all proportions in absolute

alcohol or chloroform, largely soluble in glacial acetic acid. It is not miscible with water, but may be emulsified by mixing it with one-sixth its weight of tragacanth powder, then adding water and shaking well.

Uses.—Terebene is a powerful yet agreeable antiseptic, disinfectant, and deodoriser. The vapour is a useful sedative and antiseptic inhalation in phthisis, *e.g.*, in a respirator, and, administered at the same time in 5-minim doses; useful also in dysentery and in hay fever.

For winter cough, drops may be taken on sugar, and it may also be inhaled.

Terebene may produce albuminuria in gouty kidney disease.—*L.i./95*, 1434; and has caused hæmaturia.—*L.i./04*, 652.

Capsules of Terebene contain 5 and 10 minims each.

Hauftus Terebeni.—*Vic. Park.*

Terebene 10 minims, Mucilage of Tragacanth 1 drachm, Glycerin 1 drachm, Cinnamon Water to 1 ounce.

Pastils, Glycogelatin contain 2 minims.

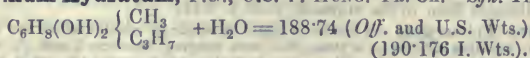
Vapor Terebeni, T.H.

Terebene 40 minims, Light Magnesium Carbonate 20 grains, Distilled water to 1 ounce.

A teaspoonful in a pint of water at 140° F. for a stimulant inhalation. For medicating the antiseptic respirators, 10 drops of a mixture of equal parts, Terebene, Phenol, and Spirit of Chloroform, is often used.

In whooping cough inhalation valuable, and as liniment.—*L.i./09*, 35.

Terpinum Hydratum, P.G., U.S. P. HUNG. FR. CX.—Syn. TERPINE.



Dose.—2 to 6 grains (0.13 to 0.4 Gm.) or more, in cachets, or pills, or suspended.

Prepared by acting during cold weather upon Rectified Oil of Turpentine 4, Alcohol 80% 3, with Nitric Acid 1 in flat dishes. Crystals separate after several days, and are recrystallised from 95% Alcohol rendered slightly alkaline. Yield 12% of the oil taken.—*Caspari.*

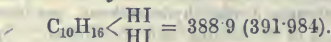
Relationship between Terpin, Terpeneol and Eucalyptol.—*Allen, Vol. II., part 3, '07*, 348.

A derivative of oil of turpentine in prismatic crystals, soluble in water about 1 in 250, 1 in 14 of alcohol 90%, and about 1 in 6 in oils.

Flavoring.—Prescribed as *Linctus Pini Terpin et Heroin* (*q.v.* p. 548), lessens cough; has been used with success in bronchitis, chronic and subacute; it assists expectoration.

Lessens secretion in initial catarrh of phthisis; useful as a hæmostatic in bleeding from lungs. Is also a diuretic.

Terpini Di-iodidum. Syn. *PNEUMOCOCCINE.



Dose.—In pneumonia an intramuscular injection of 2 Cc. has been recommended; after eight hours a further injection if diaphoresis has not been produced. Also given in form of capsule (4 grain) for the diarrhoea of tuberculosis.—*Ph. Notes.*

Terpine di-iodide is neutral to litmus and insoluble in water. Oily solutions

may be sterilised at 120° C. The action of the substance is highly bactericidal—e.g., on the pneumococcus and the tubercle bacillus. It is an energetic vaso-constrictor.

For tuberculosis 1 Cc. injection every 3 days for a month. Weight of tubercular patients said to improve.

For chronic bronchitis 4 to 6 capsules per diem.

Terpinol. *Dose.*—1½ minims (0.1 Cc.) or more in pill, or gelatin capsule. An agreeably aromatic liquid, containing bodies of the composition $C_{10}H_{16} = 135.1$ (136.128 I. Wts.) and $C_{10}H_{18}O = 152.98$ (154.144 I. Wts.), is obtained by the action of dilute sulphuric acid on terpene. Miscible with alcohol in all proportions, but insoluble in water.

It is used for lung affections; if it disorder the stomach, it should be given with meals.

For the use of this body to replace Terpene hydrate in Elixirs and Syrups *vide* page 549.

Terpineol. *Syn.* TERPILENOL. $C_{10}H_{18}O = 152.98$ (*Off.* and U.S. Wts.). (154.144 I. Wts.) A product of fractional distillation of Terpinol. Is used for disguising odour of Iodoform and for scent making (in the name of Artificial Lilac).—P.J. ii./06,377. *Syn.* Cinyl Alcohol. Described—Allen, Vol. II., part 3, /07,347.

Terpinolene.—An optically inactive hydrocarbon boiling at 185 to 190° C. formed from terpineol by action of mineral acids.

Used as an adulterant of foreign Lavender oils—may be suspected if a little on blotting paper gives at first pungent odor and after 3 or 4 hours lilac odor. A large proportion increases alcohol value of the oil. It is being produced in large quantities on the Continent at a cheap rate.—Umney, C.D., ii./09,292.

THEOBROMA.

The seeds of Cacao, *Theobroma Cacao* (*Sterculiaceæ*). When heated and deprived of husk and membrane, these yield cocoa-nibs. The nibs ground, and most of the oil pressed out, produce, when reduced to powder, the best forms of cocoa for use as a beverage.

Chemical and physiological examination of Cocoas, English and Foreign, and of Plasmon Cocoa.—L. i./05,316.

Many cocoas and chocolates contain added alkali.

At the second International Food Congress (1909) it was declared that the use of alkali should be tolerated—the whole question being submitted to an international commission. The use of alkali enables the production of a "cheap" cocoa.

Oleum Theobromatis (*Off.*). *Syn.* CACAO BUTTER.

The concrete oil of the seeds (yield about 45%). Melting at 88° to 93° F., i.e., below the temperature of the body, is much used for suppositories. For substances which lower the melting point of the oil, and for export to hot climates, it is well to add 5 to 10% yellow wax or spermaceti. The final melting point must not be higher than 99° F.

The official melting point is too high; good commercial samples melt between 80° and 86° F. and even lower.

U.S. has saponification value between 188 and 195 also an Iodine value between 33 and 38

Note on Cacao butter and substitutes.—P.J. ii./09,158.

Pasta Theobromatis, Chocolate.

This is made by grinding the nibs into a paste, with sugar and vanilla or other flavouring added; it should contain not more than 50°/o of sugar and about 25°/o of fat (*Oleum Theobromatis*), and be free from gum, added starch, or other admixture.

The author uses chocolate for the preparation of medicated *Tabellæ*. On account of its agreeable flavour and the preservative action of its fat and sugar, it forms a useful basis for administering many medicines. The solvent action of its fat renders it eminently useful for fixing Nitro-glycerin, Erythrol Nitrate, Mannitol Nitrate, Menthol, and alkaloids. For full list *vide* Index—*Tabellæ*.

Theobromina. Ph. Ned.

$C_5H_2(CH_3)_2N_4O_2 = 178.89$ (180.104 I. Wts.). (*See also* p. 196.)

Syn. DIMETHYL-XANTHINE SANTHEOSE.

Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

Alkaloid, about 1 to 2% from the seeds, in white crystalline powder, sparingly soluble in water, alcohol and ether. Caffeine is trimethyl-xanthine. 2% solutions may be obtained with aid of Tri-Sodium Phosphate.

Uses.—As a diuretic, relieves cardiac and renal dropsy, and in angina pectoris, 20 to 30 grain doses spread over 24 hours lessen the frequency and severity of attacks. Given in cachet and pill.

Arterio-sclerosis, a paper on Theobromine and Thyminic Acid as diuretics—in the so-called pre-sclerosis. In the final (mitro-arterial) stage theobromine and digitalis, diminishing the amount of liquids.—Huchard M.P. Jan. 2, '09, 550.

***Aguriu. Syn. THEOBROMINE SODIO-SODIC ACETATE.**

$C_7H_7N_4O_2Na + NaC_2H_3O_2 = 282.23$ (284.52 I. Wts.).

Dose.—10 to 15 grains (0.65 to 1.0 Gm.), up to 45 grains daily in fresh solution.

White crystalline hygroscopic powder soluble 1 in 2 of water and about 1 in 200 of alcohol 90°/o. In dropsy, sciatica and neurasthenia. Is strongly diuretic in action. Not to be given with acid substances, nor with sugar or gum. To be preserved from the air, the CO_2 of which tends to decompose it. Relieves cardiac dropsy.

Theobromine-Sodium Sodium Formate. Syn. *Thephorin.

$C_7H_7N_4O_2Na.HCOONa.H_2O = 286.2$ (238.12 I. Wts.).

Dose.—8 to 15 grains (0.5 to 1.0 Gm.).

A white powder soluble in water; analogous in action with Diuretin. Diminishes coagulability of the blood.

Theobrominæ Aceto-Salicylas. $C_7H_5N_4O_2C_9H_8O_4 = 357.6$ (360.168 I. Wts.).

Dose.—1 to 5 grains (0.065 to 0.32 Gm.). White crystalline powder soluble in alcohol. Has some advantages due to containing the Aceto-Salicylic grouping.

Theobrominæ Sodii Salicylas.—Syn. *Diuretin. THEOBROMINUM NATRIO-SALICYLICUM, P. AUSTR. P.G. IV.; F.E., PH. NED.

$C_7H_7NaN_4O_2 + C_6H_4(OH)COONa = 359.66$ (362.136 I.Wts.). *Dose.*—5 to 15 grains (0.32 to 1 Gm.).

A sodio-salicylic compound containing about 50% of sodium-theobromine in white powder, soluble 1 in 2 in water (a little Sodium Salicylate added will often 'clear' a strong solution). **Flavoring.**—Glyl Lavandulæ, Syl Vanillæ; Syrupus Zingiberis, Extractum Glycyrrhizæ Liquidum. **Uses.**—Is diuretic, without affecting nervous system and causing sleeplessness. For scarlatinal dropsy of children is a safe diuretic. In angina pectoris it lessens the frequency of attacks. It is given for cough. In cardiac failure of granular kidney.—L. ii./o8,519.

Tablets contain 5 grains.

Iodo-theobromine. (*Syn.* Theobromine Sodium-Iodo-Salicylate.)

Dose.—2 to 10 grains (0.13 to 0.65 Gm.).

White powder, containing about 40% theobromine with 22% sodium iodide and 38% sodium salicylate, soluble in water, is a good diuretic and heart stimulant, increasing blood pressure. Useful in cirrhosis of liver and acute nephritis.

Theobromine-Sodium Sodium Iodide. *Syn.* ★Eustenine.

$C_7H_7N_4O_2.Na.NaI=349.55$ (352.016 I. Wts.).

Dose.— $7\frac{1}{2}$ to 15 grains (0.5 to 1 Gm.).

In arteriosclerosis, angina and aortic aneurism.—B.M.J. i./o5,542.

Aniso-theobromine. $C_7H_7N_4O_2.Na.C_6H_4.OCH_3.COONa=373.57$ (376.152 I. Wts.)

Dose.—5 to 15 grains (0.32 to 1 Gm.).? We would advise less initially.

A combination of Theobromine Sodium and Sodium Anisate. Stated to have advantages over Theobromine-Sodium Salicylate.—F.N. 1909.

"Dispnon" = THEOBROMINE-QUEBRACHO TABLETS.

In bronchial asthma, are especially suited in cardiac asthma and angina pectoris.—B.M.J.E. ii o9,47.

★**Euphyllin.** PRIMARY AND SECONDARY THEOPHYLLIN ETHYLENDIAMIN in equal proportions.

Dose.—6 grains (0.4 Gm.) in 25 minims of water, intramuscularly.

$$\begin{array}{ccc} CH_2NH_2.C_7H_7N_4O_2 & CH_2NH_2-C_7H_7N_4O_2 \\ | & + \quad | \\ CH_2NH_2 & CH_2NH_2-C_7H_7N_4O_2 \end{array} = 656.07 \text{ (660.48 I. Wts.).}$$

White crystalline powder easily soluble in water. Intramuscular injection acts as diuretic in uræmia.

Suppositories containing 5 grains, or Enemata containing 8 grains, are stated to be even preferable to above.—M.'o8,209.

Theophylline. DIMETHYL-XANTHINE. (Isomeric with Theobromine).

$C_5H_2(CH_3)_2N_4O_2=178.89$ (180.104 I. Wts.). (*See also* p. 196.) The synthesised alkaloid is sold under the name of ★THEOCIN.

Dose.—3 to 6 grains (0.2 to 0.4 Gm.).

White crystalline powder, soluble 1 in 200 (by experiment) of cold water, and about 1 in 90 of Alcohol (90%). Marked diuretic.

Has been found useful in heart affections attended with symptoms of congestion, and nephritis with dropsy. Tablets weigh 4 grains (0.26

★**Theocin Sodium Acetate.**—This substance is chemically Theophylline-Sodium Sodium Acetate (contracted to 'THEOPHYLLINE SODIUM ACETATE').

$C_5H(CH_3)_2N_4O_2.Na.NaCH_3COO=282.23$ (284.24 I. Wts.).

Dose.—2 to 4 grains (0·13 to 0·26 Gm.) dissolved in water, three or four times daily after meals.

Flavoring.—Glyl Menthæ Piperitæ, Syl Vanillæ; Syrupus Zingiberis, Extractum Glycyrrhizæ Liquidum.

Nausea may be prevented by small doses of Menthol beforehand.—B.M.J. ii./07,560, *e.g.* $\frac{1}{10}$ grain in 15 minims of Tincture of Orange.

One of the Sodium atoms, it will be observed, is in definite chemical combination with the base—the compound is made on the lines of the analogous Theobromine Compounds (*vide supra*)—the method of making Synthetic Theophylline being subject of a patent.

White flocculent powder more soluble than the theophylline alone—**soluble** about 1 in 20. For œdema and dropsy of cardiac origin—B.M.J. ii./07,752; seldom causes unpleasant effects. For excitable neuropathic individuals Paraldehyde may be given simultaneously.

The action of the drug is enhanced by Digitalis.—B.M.J. ii./07,388.

Tablets 4 grains are prepared.

Uropherin.—*Syn.* Lithium-Diuretin.

$C_7H_7LiN_4O_2 + C_6H_4(OH)COOLi = 327·84$ (330·136 I. Wts.). **Dose.**—5 to 15 grains (0·32 to 1 Gm.).

A white powder, soluble 1 in 5 of water. Is a compound of theobromine-lithium and lithium salicylate. A diuretic, with little action on the heart.

Uropherin B. *Syn.* Theobromine and Lithium Benzoate,

$LiC_7H_7N_4O_2H_2O (?) + LiC_6H_5CO_2 = 329·84$ (332·152 I. Wts.).

Dose.—5 to 15 grains (0·32 to 1 Gm.).

White crystalline powder, **soluble** 1 in 5 of water. Diuretic and nerve stimulant. Useful with digitalin for patients who cannot tolerate the Salicylic Acid of the above.—M. Am.

THORIUM.

Th. = 232·42 I. Wts.

Some attention therapeutically has been paid to the radio-activity of uranium and thorium compounds.

Uranium Compounds giving normally both α and β rays may be separated by ether solution into uranium, giving α rays only, and the small amount of uranium X, giving β rays only. There is a state of balance between the amount of uranium X losing its activity and the amount that is regenerated. Uranium freed from Ur. X gradually recovers its power of producing β radiation. Ur. X corresponds to the emanation in the case of Radium. (*Cf.* Graphic Representation, p. 593). *Vide* also Lazarus Barlow, 'Radio-activity and carcinoma.'—B.M.J. i./09,1465,1536.

In somewhat analogous manner, Thorium changes first into Meso-Thorium then to Radio-Thorium, then to Thorium X and a series of other products.

	$\frac{1}{2}$ value
Thorium emits α rays	—
Meso-Thorium emits β rays	7 years
Radio-Thorium emits α rays	2 years
Thorium X emits α rays,	4 days

Thorium precipitated by ammonia gives Thorium and Radio-Thorium (which cannot be separated). The *Solution* (filtrate) contains Thorium X and the Meso-Thorium can be recovered. It has been suggested that the

Welsbach Mantle Manufacturers should collect the active products. Possibly Pitchblende will prove a better source of supply for radio-thorium than the mantles—possibly a cheap though valuable substitute in the future for Radium.—Soddy, B. M. J. i. /09.680, ex "Nature."

Ionium resembles Thorium, but gives no emanation.—Boltwood, Am. J. Sci., 1907. *Vide* also Radium, p. 594.

Carbon from Thorium.—Ramsay, L. i. /09,993.

Thorii Hydroxidum, $\text{Th}(\text{OH})_4 = 300.452$ (I. Wts.) of commerce is usually found to be very active—considerably more so than **Thorium Nitrate**, $\text{Th}(\text{NO}_3)_4 = 480.54 (+4\text{H}_2\text{O}) = 552.524$ I. Wts.).

Thorium is obtained from **Monazite**, occurring on the Brazilian Coasts—also in Ceylon, South Carolina, Queensland, and Southern Nigeria.

Is largely used in making gas mantles. For history and description of Incandescent Lighting see C. D. ii. /07,315.

Soluble in water 1 in 1; in alcohol 1 in 5.

The following organic salts have been prepared for therapeutic use, and are supplied under the brand ***"Thoriac."** The lactate and the sulphocarbolate are soluble in water; the others being insoluble or only slightly soluble compounds, suggest themselves for external employment in the form of dusting powder, pigment, or ointment.

Uses.—It appears probable that the sulphocarbolate will be found of use in intractable skin diseases. The ointment prepared from the oleate has been found of great utility, either alone or in connection with other substances, in old chronic psoriasis, eczema rubrum, and gouty eczema.—Drage. Also in boils and carbuncles well rubbed in it acts remarkably.—W. H. M. See also Thorium Emanation for use by Inhalation, p. 668.

Dose.—Although some of these compounds have not been tried therapeutically, we are of opinion that 1 to 5 grains could safely be given providing the effects be carefully watched, beginning with the smaller amount.

Thorii Camphor-Sulphonas.

$\text{Th C}_{10}\text{H}_{15}\text{O.SO}_3 \cdot 9\text{H}_2\text{O} = 1319.324$ (I. Wts.).

The camphor-sulphonic acid necessary is prepared by acting upon 152 of camphor (in solution in acetic anhydride) with 98 of sulphuric acid, producing, theoretically, 232 of camphor-sulphonic acid. This quantity requires, theoretically, $74\frac{1}{2}$ of thorium hydroxide for saturation. Well defined crystals.

Thorii Cinnamas.

$(\text{C}_6\text{H}_5.\text{CH} : \text{CH}.\text{COO})_4\text{Th} = 820.644$ (I. Wts.).

Thorium cinnamate is made by treating sodium cinnamate with thorium nitrate. It contains approximately 32% ThO_2 . Insoluble in water.

Thorii Ortho-Coumaras.

$\left[\text{C}_6\text{H}_4 \left\{ \begin{array}{l} \text{OH} \\ \text{CH} : \text{CH} . \text{CO.O} \end{array} \right\} \right]_4 \text{Th} = 884.644$ (I. Wts.).

Prepared by double decomposition between thorium nitrate and sodium ortho-coumarate. It occurs as a fine white powder, insoluble in water.

Thorii Glycerophosphas.

Is prepared by double decomposition, and is in the form of a white powder. Thorium phthalate and Thorium camphorate are white powders.

Thorii Lactas.

$\text{Th}[\text{CH}_3\cdot\text{CH}(\text{OH})\cdot\text{COO}]_4\cdot 2\text{H}_2\text{O} = 624\cdot 612$ (I. Wts.).

By interaction of the freshly precipitated hydroxide with lactic acid. It is a crystalline soluble salt, but becomes basic and less soluble on keeping.

Thorii Oleas.

Thorium Hydroxide 300 will interact with approximately 1,120 of oleic acid. A little ether is added to dissolve the oleic acid. The salt is at first pasty, becoming hard ultimately. Suggested for use in the form of an ointment with paraffin basis for eczema.

Unguentum Thorii Oleatis (Drage). Contains 25% Thorium Oleate rubbed into a smooth cream with Almond Oil.

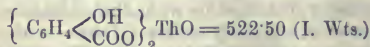
Used with marked success in old chronic psoriasis, eczema rubrum, gouty eczema, and in boils and carbuncles. For the latter to be moderately well rubbed in.

In our knowledge sycosis was cured by its aid with a few applications only.

Thorii Quinas.

This is prepared by treating the hydroxide (freshly precipitated) with quinic acid. Scales are easily obtained. **Soluble** in water 1 in 1 easily, slightly in alcohol 90%.

Thorii Salicylas.—This salt is a basic one in form of white, insoluble powder, apparently having the formula:—



By precipitating thorium nitrate with sodium salicylate. It contains 50% ThO_2 .

Thorii Sulphocarbolas.

Syn. THORIUM *p*-PHENYL-SULPHONATE.

$\text{Th}(\text{C}_6\text{H}_4\cdot\text{SO}_3\cdot\text{OH})_4\cdot 9\text{H}_2\text{O} = 1087\cdot 004$ (I. Wts.).

A well-defined crystalline salt with pinkish shade of colour. Suggested as a radio-active antiseptic. Readily soluble in water, and about 1 in 3 in alcohol 90%; but from both these solutions we find that separation shortly occurs owing apparently to dissociation.

Thorium Emanation for Inhalation.

Produced from Thorium nitrate, 100 Gm. in 400 Cc. Water in a 500 Cc. wash-bottle inhaler, tried for lung diseases. The emanation may have a bactericidal action.

The solution is neutralised with Ammonia added drop by drop stirring the while until the hydroxide gives a faint permanent precipitate. The air space above the solution should be as small as possible in which to collect the emanation.

Mode of use.—The patient takes a long breath through the mouthpiece, then holds his breath whilst counting 12, and then breathes out again. A minute is allowed to elapse for the emanation to collect again before inhaling afresh. Good results have been achieved in chronic or acute laryngitis and in non-tubercular pharyngitis or laryngitis. The Thorium solution lasts a lifetime. The length of treatment a month or more.—Chesney.—Pr. Aug. '09, 233.

Thorium Pads contain a convenient amount of thorium hydroxide, and are made to fit the part affected, *e.g.*, head, spine, &c. These pads are suggested for use in the treatment of nervous diseases.

Thallium Salts have been slightly used in medicine.

Thallium Acetate ($\text{TI C}_2\text{H}_3\text{O}_2=263.024$ I. Wts.) Dose.— $1\frac{1}{2}$ to 3 grains (0.1 to 0.2 Gm.) was tried in syphilis, but is not equal to mercurials; if given an hour before the commencement of a sweat, was found of value in the night sweats of phthisis. Loss of hair has accompanied its use.

THYMOL (*Off.*). FR. CX.

$\text{C}_8\text{H}_8(\text{CH}_3)(\text{OH})\text{C}_3\text{H}_7$, 1: 3: 4, = 148.98 (*Off.* and U.S. Wts.) (150:112 I. Wts.).

Dose.— $\frac{1}{2}$ to 2 grains (0.032 to 0.13 Gm.), in pills with soap and a trace of alcohol, or in oily or aqueous solution.

A Phenol obtained from the oils of *Thymus vulgaris*, *Monarda punctata* (*Labiata*), and *Carum copticum*—*Umbelliferae* (v.p. 736) *Oleum Thymi* is official in U.S., and assayed to contain 20% phenols.

OIL OF THYME. White Cross Congress suggested Spr. Gr. 0.900 to 0.950,—the latter would give a higher percentage of Thymol and Carvacrol than 25. Umney suggests 0.900 to 0.930 and percentage of Phenols not less than 25.—C.D. ii./09,581.)*

In large transparent crystals melting at 111° F., having the odour of thyme and a burning taste.

Soluble 1 in 1,500 of water, 1 in 200 of glycerin, 1 in 8 of alcohol and glycerin, equal parts; soluble in fats and oils, and 8 in 3 of alcohol 90%, and freely soluble in ether, acetic acid and caustic alkaline solutions. Liquifies with Menthol (*q.v.*) Chloral Hydrate, Camphor and Phenol.

Uses.—Externally a powerful anti-parasitic, also for certain stages of eczema and psoriasis (*see* Unguentum) and for burns (*see* Volckmann's solution.) Internally as a vermifuge (especially for ankylostomiasis and for nematoid

* **OLEUM THYMI.** (*P. Off.*)—Oil of Thyme. Distilled from fresh herb *Thymus vulgaris*. **Characters and Tests.**—Reddish brown in colour, having the characteristic odour of thyme and pungent aromatic taste. Sp. Gr. 0.920 to 0.950; O.R., slightly levorotatory (for this test the oil must be redistilled); R.I., 1.480 to 1.495; soluble 1 in 2 of 80% alcohol. It should contain not less than 25% of Phenols (Thymol and Carvacrol) when tested by the process described under '*Oleum Caryophylli.*' (*P. Off.*)

† **Ankylostomiasis.**—The worm producing this disease *Ankylostomum duodenale* is about $\frac{1}{2}$ inch long and of a whitish colour. Its habitat is the small intestine of man, particularly that of the miner. It attaches itself to the mucous membrane, and no fewer than 1,000 of them have been obtained from one patient. The male and female worm are quite different in formation. The eggs produced by the female pass away from the patient—as many as 8,000,000 have been delivered by a sufferer in a single day—and the small thread worm escapes from the egg. Mines afford an excellent hatching place for the young larvæ. The miners have only themselves to blame in the matter. Hygiene and sanitary measures are alone necessary to stamp out the scourge.

A note on Ankylostomiasis.—L. i.06,1246.

Probably is not a blood sucker.—The ænemia it produces is probably due to toxins with a hæmolytic action.—L. i.06,1623.

Thymol not suitable for the old or very young. Eucalyptus oil 30 minims, with castor oil 10 drachms and chloroform 45 minims, better.—L. i.08,102. *c.f. also* 318.

Blood counts in ankylostomiasis in Egypt,—percentage of Eosinophiles small in comparison with European.—L. ii./08,303.

In Ceylon the disease is increasing, being introduced by Coolies from India. The wet zone of the island is more markedly affected than the 'dry.'—L. i./0 61,271.

Life history of the Ankylostomum.—B.M.J. ii./09,779.

Discussion on ankylostomiasis. Anæmia caused is frequently profound, producing ultimate death. **Routine treatment** is milk diet for a day or two, then calomel and saline aperient; following morning Thymol 20 to 30 grains in 4 cachet, repeated twice at 1 hour's interval, with another Saline 2 hours after the last dose.—B.M.J. ii./09,1350.

worms) 10 to 30 grains, followed by a purgative. A powerful antiseptic and deodorant. May colour the urine green. The administration simultaneously with or immediately after a large dose of a solvent of thymol, *e.g.*, alcohol, should be avoided. Is frequently ordered to be inhaled (*see* Vapor).

Use in diabetes and catarrh of the bladder in $\frac{1}{2}$ to $1\frac{1}{2}$ grain doses.—Pr. xxii., 52.

In goitre (*vide* Therapeutic Index) 30 grain doses are given in India 25 cases cured. In one disappeared in 17 days.—L. ii./06., 1574.

Blanchard, of Paris, stated appendicitis was due to certain entozoa, and was preventible by thymol internally. Hope, in an interesting statement of the innocuousness of sewage—the 'liquor humanitatis'—completely refutes the idea.—L. ii./06., 395.

Treatment of tuberculous abscesses by injections of Thymol 1, Camphor 2, Ether 3.—L. i./10, 637.

Liquor Thymol. 1 in 800 of warm water.

This saturated aqueous solution is antiseptic and antiputrefactive. Is used as a gargle.

Mistura-Oleo-Balsamica.—*Syn.* BALSAMUM VITE HOFFMANNI 'Tincture of Life.'

Dose.—1 to 4 drachms in water.

Oils of Lavender, Thyme, Lemon, Nutmeg and Orange Flowers of each 4; Oil of Cloves and Cinnamon $3\frac{1}{2}$ of each; Balsam of Peru $10\frac{1}{2}$; Alcohol 90% to 1,000; allow to stand a few days, then filter.

Ph. Ned. and P. Austr. have similar preparations.

Is used in Africa as a remedy for snake bites. A carminative stimulant.

Ophthalmic Discs of Thymol contain $\frac{1}{1000}$ grain (0.065 milligramme) combined with gelatin.

Pastillus (q.v.) Thymol is prepared, containing $\frac{1}{8}$ grain.

Pigmentum Thymol.

Thymol 1 Ether 10, and Spirit 5, or Thymol 1, Petroleum Oil 18; used as pigments in ringworm of the scalp, whilst acting as parasitocides they dissolve the fat, loosen the hairs, and thus help epilation. $2\frac{1}{2}$ to 5% in a mixture of chloroform and olive oil also used.

Spiritus Thymol.

Dose.—3 to 15 minims (0.18 to 0.9 Cc.).

Thymol 1, Alcohol (90%) to 10; for medicating the wool of antiseptic respirators.

In scabies, where the infection is limited and recent, a 10% solution in alcohol; suitable for short periods.

Thymaglycine. *Dose, per os.*—1 to 2 drachms.

Sodium Benzoate 3, Glycerin 10, Thymol Water 50, Water to 100, Liquor Cocci *q.s.*

As such or diluted is beneficial in rhinitis, pharyngitis, quinsy, to brush the gums, and in gastric and intestinal catarrh.

For spraying into the throat and nostrils, may be diluted 1 to 3 with water. For vaginal irrigation dilute with 20 times its volume or less of water. Colitis treated with an irrigation diluted 1 in 6.—L. i./07, 1642.

To ward off colds douche the nose with Thymaglycine as such or diluted 1 to 3 of water. This simple procedure will create immunity.—L. ii./08, 1661.

Secondary parotitis may occur, due to an ascending infection, in cases of gastric ulcer. Importance of antiseptic mouth washes.—B.M.J. i./09, 1296.

***Glycothymoline.** A proprietary article employed in catarrhal conditions of the mucous membrane of the nose, throat, stomach, intestine, uterus and vagina.

Said to consist of Potassium Carbonate, Sodium Benzoate, Sodium Borate, smaller portions of Sodium Salicylate, Thymol, Menthol, Glycerin and Alcohol, coloured with Cochineal.—Apoth. Zeitung, '07, 167; Am.Jl.Ph., June '07, 277.

Thymolin. Under this name a mixture of Naphthaline 18, Camphor 1, and Thymol 1 is sold.

Volckmann's Thymol Solution.

Thymol 1, Alcohol 20, Glycerin 20. Dissolve and add to water 1,000. Used as a spray and antiseptic lotion, as for burns.

Inguentum Thymol.

L. H. has 20 grains to the ounce of Soft Paraffin.

If is important that the Thymol should be dissolved in the basis by heat to prevent irritation; 10 grains dissolved in an ounce of Soft Paraffin applied to the skin keeps off gnats, mosquitoes, &c. Useful in the later stages of zema and for psoriasis and other skin affections.

Thymol Wool, absorbent, 5%, 1lb. rolls, is used as antiseptic dressings. **Thymol Gauze**, 5%.

Vapor Thymol, T.H.

Thymol 6 grains, Alcohol 90% 1 drachm, Light Magnesium Carbonate grains, Water to 1 ounce. A teaspoonful to a pint of water at 140° F. for inhalation. Stimulant and antiseptic.

Thymol Carbonate.—Syn. Thymotal.

Dose.—5 to 15 grains (0.32 to 1 Gm.).

A nearly tasteless, colourless, crystalline powder. Is not dissolved by the stomach and therefore proves valuable as a remedy for *Ankylostomum duodenale*, common in Italy. May prove useful in obstinate cases of tania and other intestinal worms.

Tablets contain 10 grains.

TINCTURÆ.

Two processes are described for making tinctures:—

(i.) **Percolation.**—The drugs in a suitable state of comminution are moistened with the menstruum, and, after twenty-four hours, percolated with more of the same, until about three-fourths of the required quantity is obtained. The marc is pressed, the expressed liquid filtered, and added to the percolate. The volume of tincture is then made up to the prescribed quantity by adding menstruum, *q.s.*

(ii.) **Maceration.**—The drugs are agitated frequently with the whole of the menstruum, in a closed vessel, during seven days, the liquid strained, the marc pressed, the product mixed with the strained liquid, and the whole filtered, if necessary, without further addition of liquid.

Non-Alcoholic 'GLYCERIN,' or 'AQUEOUS' Tinctures.

Some of these are in occasional demand, but the alkaloidal ones can have the activity, unless a suitable acid be used to ensure their solution. The *lycetracta*, with which we have experimented, should replace them.

Theracal Tinctures, *v. pp.* 91, 182, 219, 410, 452.

For the dispensing of resinous tinctures in mixtures, **Mucilage of**

Acacia* yields a more satisfactory mixture than Tragacanth except in the case of Tinct. Benzoini Co., Jalapæ, Myrrhæ, and Tolu. The Mucilage is best diluted with as much water as possible and the tincture then added.

If Salts be present in the mixture the above rule applies, except in the case of Caonabis, where Tragacanth Mucilage should be used. Tinctura Podophylli requires no suspending agent in the absence of salts, but if any be present Mucilage of Acacia is best used.

Tragacanth Mucilage answers well for suspending Tinct. Jalapæ and Myrrhæ, but is useless for Tinctura Benzoini Co., Quiniæ and Tolu. For Tinct. Benzoini Co. and Tinct. Tolu. the two mucilages combined are best. In the case of a mixture containing 1 drachm of resinous tincture to the ounce, dilute 1 drachm of Mucilage of Acacia with as much water as possible, add the tincture, and lastly add the Mucilage of Tragacanth.

Tinctura Hydrastis, which in absence of salts requires no suspending agent, should have an addition of Mucilage of Tragacanth if salts be present.

Tinctura Lupuli and Tinctura Cimicifugæ require no addition either in presence or absence of salts.—P.J.i./03,706.

Total solids and ash from a number of B.P. Tinctures. Advantage is taken of the fact that equal parts of each Tincture, Benzene, and Amyl Alcohol, mixed together in a suitable measure, cause separation into two layers, the volume of the lower layer working with 3 Cc. quantities of each, being in the case of a 90% tincture nil, 70% 0.8 to 1.1 Cc., 60% 1.9 to 2.1 Cc., 45% 2.4 to 2.5 Cc. Figures for various tinctures are given to provide idea of alcohol value.—P.J.ii./07,738.

TRAGACANTHA (*Off.*) U.S.

Dose.—2 to 10 grains (0.13 0.65 Gm.) or more.

From *Astragalus gummifer* and some other species (*Leguminosæ*), known in commerce as Syrian Tragacanth.

To detect acacia in tragacanth.—P.J. ii./04,453.

Gelanthum (Unna's Jelly).—E.L.

Heat in a steam bath Tragacanth 110 grains, Gum Acacia 30 grains, Gelatin 120 grains, and Distilled Water 10 ounces, for 4 hours; press the paste through muslin, mix well and add Glycerin 6 drachms, heat again in a

* Gum Acacia from *A. Senegal* and other species (*Leguminosæ*) 4, washed in water to remove any adherent dust, dissolved in Water 6. This quantity measures about 8½. About ½ grain of Benzoic Acid in the ounce will keep it.—J.F. Brown, P.J. ii./07,231.

Incompatible with Acacia are Alcohol, mineral acids, Borax, Ferric Salts, most Lead Salts. Bismuth Carbonate should not be suspended with Acacia Mucilage. Tragacanth answers better.

The *Straining of Mucilage* can be well effected by forcing it through muslin by air expansion. A bottle about ½ full of the mucilage is tied tightly over the neck with muslin, thoroughly cooled and then on bringing into a warm situation and inverting, the mucilage will be forced through. When it ceases to drop the process of alternate cooling and heating is repeated. To obtain an absolutely bright mucilage the process might be reversed making the bottle (above)—previously heated—the receiver.—P.J. ii./09,6.

Mucilago Acaciæ, U.S., contains Acacia 34, Lime Water 33, Water to 100. The alkali is a useful addition. **Syrupus Acaciæ, U.S.**, Acacia 10, Sugar 80. Water to 100.

Ghatti Gum is from *Anogeissus latifolia*—used technically; it is of no use for pharmacy.—See also I.C. Add.

water bath for an hour, and add Distilled Water (containing in solution Thymol $\frac{1}{4}$ grain) *q.s.* to 12 ounces.—Phar. Formulas. Used as a basis for various antiseptic and combinations for skin medication.

Glycerinum Tragacanthæ (Off.).

Tragacanth, in powder 1, Glycerin 3. Mix, and add Water 1. Is a useful pill excipient, *v.p.* 538 *et seq.*

Glucantha, G.H. Pill excipient.

Tragacanth 240 grains, Water $\frac{1}{2}$ ounce, Syrup of Glucose 2 ounces.

Linimentum Exsiccans Syn. Bassorin Paste.

Tragacanth 5, Glycerin 2, Alcohol (90%) 10, Water to 100. In the alcohol contained in a wide-mouthed bottle diffuse the tragacanth, and add the water, then add quickly the glycerin, diluted with as much water, and shake well. Alcohol is necessary to keep the preparation. Quickly dries on skin, producing pleasant cooling sensation. May be medicated with any drug.

Bassorin, St. J. H.

No. 1 ('Bassorin') Tragacanth 5, Glycerin 2, Water 93, No. 2 contains Boric Acid 10%; No. 3, Salicylic Acid 5%; No. 4, Chrysarobin 5%; No. 5, Hydro-naphthol 5%; No. 6, Ichthylol 30%; No. 7, Resorcin 30%; No. 8, Precipitated Sulphur 30%; and No. 9, Thioresorcin 5%.

Mucilago Tragacanthæ. (Off.).

Dose.—1 drachm to 1 ounce (3.5 to 30 Cc.) or more.

Improved formula suggested by the writer:—

Alcohol (90%) 120 minims. Put in a 20-ounce dry bottle and add Tragacanth, in powder, 60 grains. Shake till evenly moistened and add Distilled Water *q.s.* to 10 ounces. Shake again quickly to make a uniform mucilage. This keeps much better than mucilage of acacia. One part to 3 of aqueous fluid will suspend heavy powders. *Vide* also resinous tinctures.

Pulvis Tragacanthæ Compositus (Off.).

Tragacanth 1, Gum Acacia 1, Starch 1, Sugar 3.

Dose.—20 to 60 grains (1.3 to 4 Gm.). Is used as last preparation, 10 grains to 1 oz., specially useful for bismuth oxynitrate.

TRITURATIONS, U.S.

General Directions.—Take of the substance 1, Milk Sugar 9. Mix equal quantities first and triturate together, adding more milk sugar from time to time, until the whole is added, and an impalpable powder is produced for the apportionment of minute doses is more accurately effected. May be dispensed with other ingredients in either pills or powders or flavoured and coloured with Pulvis Rosæ Compositus, *q.v.* The only official Triturate is Trituratio Elaterini 1 in 10 U.S. The representative of this in B.P. is Pulvis Elaterini Compositus 1 in 40. The following are useful—

Strength 1 in 10:—

				<i>Dose</i>	$\frac{1}{10}$	to	$\frac{2}{3}$	grains
①	Trituratio Acidi Arseniosi	...	...	...	$\frac{1}{10}$	"	$\frac{2}{3}$	"
②	Trituratio Atropine Sulphatis	...	...	"	$\frac{1}{10}$	"	$\frac{2}{3}$	"
③	Trituratio Cocaine Hydrochloridi	...	...	"	$\frac{1}{10}$	"	$\frac{2}{3}$	"
	Trituratio Elaterini	...	...	"	$\frac{1}{10}$	"	1	"
④	Trituratio Ferri Arsenatis	...	...	"	$\frac{1}{10}$	"	2	"
⑤	Trituratio Hydrargyri Perchloridi	...	...	"	$\frac{1}{10}$	"	$\frac{2}{3}$	"

Ⓢ Trituratio Morphinae Hydrochloridi	Dose 1 to 3 grains
Ⓢ Trituratio Picrotoxini	" $\frac{1}{10}$ " $\frac{2}{5}$ "
Ⓢ Trituratio Sodii Arsenatis	" $\frac{1}{4}$ " 1 "
Ⓢ Trituratio Strophanthi (1 grain = 10 minims Tinct.)	" $\frac{1}{2}$ " $1\frac{1}{2}$ "
Ⓢ Trituratio Strychninae HCl. Nit. vel Sulph.	" $\frac{1}{8}$ " $\frac{1}{3}$ "

Levigations are *strength 1 in 50* :—

Ⓢ Levigatio Aconitinae	Dose $\frac{1}{8}$ to $\frac{5}{16}$ grains
Ⓢ Levigatio Hyoscinae Hydrobromidi	" $\frac{1}{4}$ " $\frac{1}{2}$ "
Ⓢ Levigatio Hyoscyaminae	" $\frac{1}{2}$ " 1 "

TROCHISCI.

Lozenges are officially prepared with five different flavourings. Those with **Fruit Basis** are prepared with Black Currant paste 56 $\frac{3}{4}$, Sugar 439 $\frac{1}{2}$, Gum Acacia 19 $\frac{1}{2}$, Mucilage 35 $\frac{1}{2}$, Water *q.s.*, but are harder than the Fruit Lozenges of commerce—viz., Benzoic Acid ($\frac{1}{4}$ grain), Tannic Acid ($\frac{1}{2}$ grain), Eucalyptus Gum (1 grain), Guaiacum Resin (3 grains), Ipecacuhana ($\frac{1}{4}$ grain), Extract of Krameria (1 grain), and Ⓢ Extract of Krameria (1 grain), combined with Cocaine Hydrochloride ($\frac{1}{20}$ grain).

Simple Basis.—Sugar 496, Gum Acacia 19 $\frac{1}{2}$, Mucilage 35 $\frac{1}{2}$, Water *q.s.* Used in—Catechu (1 grain), Reduced Iron (1 grain), and Santonin (1 grain).

Rose Basis is as above, but with 17 $\frac{1}{2}$ of mucilage, and contains Rose Water to mass. Used in—Compound Bismuth (Carbonate 2 grains), Potassium Chlorate (3 grains), and Sodium Bicarbonate (3 grains).

Tolu Basis contains Tolu Tincture 10 $\frac{1}{2}$, Water 10 $\frac{1}{2}$, Sugar 482, Gum Acacia 19 $\frac{1}{2}$, Mucilage 35 $\frac{1}{2}$, Water *q.s.* Used in Phenol (Carbolic Acid) (1 grain), Ⓢ Morphine (Hydrochloride $\frac{1}{8}$ grain), and Ⓢ Morphine Hydrochloride ($\frac{1}{8}$ grain) with Ipecacuanha ($\frac{1}{2}$ grain).

Orange (Tincture) is used to flavour Sulphur Lozenges (5 grains).

In the index those with 'R' have Rose basis; 'S' have Simple Sugar basis; 'T' have Tolu basis; 'G' have Gelatin basis, and are the commonly sold **Pastils** or **Jujubes** of oval or round shape (the latter are frequently "sugared"). *Vide* also **Pastilli Glycogelatin**.

UNGUENTA.

The principal Official Ointment Bases are :—**Lard**, **Benzoated Lard**, and **Lard with Oleic Acid** (for Alkaloids); **Paraffin Soft (White or Yellow)**, and **Hard Paraffin**, and their combination **Paraffin Ointment (White or Yellow)**; and **Wool Fat (Hydrous)**.

In addition, combinations of **Almond Oil**, **Beeswax (Yellow and White)**, **Camphor**, **Glycerin**, **Oleic Oil**, **Spermaceti**, and **Prepared Suet** are ordered.

Unguentum Simplex (B.P. 1885) was composed of White Wax 2, Benzoated Lard 3, Almond Oil 3.

Lard, simple or benzoated, and pure goose grease are quickly absorbed. Lanolin alone is absorbed very slowly; mixed with a more fluid material, as olive oil, it readily enters the skin. The addition of a small amount of cedar-wood oil to an ointment considerably increases the rapidity of absorption.—Pres. July, 08, 140.

★**Resorbin.**—A penetrating Ointment in various cutaneous affections that frequently resist the usual routine treatment.

A cream (**Resorbin Cream**) is also made.

For other Ointment bases *c.f.* also pp. 88, 89, 715.

URANII NITRAS (*Off.*).

$[\text{UO}_2](\text{NO}_3)_2 + 6\text{H}_2\text{O} = 502.616 \text{ I. Wts.}$

Dose.— $\frac{1}{2}$ to 5 grains (0.032 to 0.32 Gm.) after meals.

Lemon-yellow prismatic crystals. Soluble in water 2 in 1. Taste astringent. Internally with good effect in diabetes, also 2% as throat spray, with caution. Use in tropics.—B.M.J. ii./07, 1061.

Uranium is a constituent of Pitchblende (*v.p.* 590 *et seq.*) to the extent of 40 to 70%. Carnolite from Colorado is a Potassium-Uranium-Vanadate, *c.f.* also pp. 590 *et seq.* also p. 666. Tablets 1 grain (0.065 Gm.) or more. *Dose.*—1 to 5.

Uranii et Quininæ Chloridum.

Dose.—3 to 6 grains (0.2 to 0.4 Gm.) thrice daily.

Yellow crystals, soluble 1 in about 100 of water.

Useful in diabetes and for gout.

Uranii Salicylas.

Dose.—5 to 20 grains (0.32 to 1.3 Gm.).

In reddish powder, is better tolerated than the nitrate.

UREA.

$\text{CO} \begin{smallmatrix} \text{NH}_2 \\ \text{NH}_2 \end{smallmatrix} \text{ or } \text{CH}_4\text{N}_2\text{O} = 59.67 (60.052 \text{ I. Wts.})$

Syn. CARBAMIDE.

Dose.—10 to 60 grains (0.65 to 4.0 Gm.), thrice daily, may be given in a mixture flavoured with lemon syrup. Hypodermically similar amount in sterile water.

Colourless crystals, *soluble* 1 in 1 of water and in alcohol 90% about 1 in $7\frac{1}{2}$.

Urea is synthesised by acting on Phenyl Carbonate [$\text{CO}(\text{O.C}_6\text{H}_5)_2 = 212.47$ 214.08 I. Wts.)] with Ammonia, the products of the reaction being Urea and Phenol. Phenol Carbonate is made by passing Phosgene, *i.e.*, Carbonyl Chloride into dilute Sodium Phenate solution.) Wöhler in the year 1828 succeeded in converting Ammonium Cyanate into Urea; it was the first animal product made by a purely chemical synthesis.

Uses.—Was first used as an antiperiodic and febrifuge in cases of ague. Subsequently as a diuretic in gout and kidney disease, and for phthisis.

For the estimation of urea in urine *see* p. 884.

★**Veronal.**—*Syn.* DIETHYL-MALONYL-UREA. DIETHYL BARBITURIC ACID, P. HELV. P. SVEC. *Syn.* MALONAL. ★**HYPNOGEN**, MALOUREA, DEBA.

$\text{C}_2\text{H}_5 > \text{C} \begin{smallmatrix} \text{CO.HN} \\ \text{CO.HN} \end{smallmatrix} < \text{CO or } \text{C}_8\text{H}_{12}\text{N}_2\text{O}_3 = 182.80 (184.116 \text{ I. Wts.})$

Dose.—5 to 10 grains (0.32 to 0.65 Gm.).

Caution.—The 5-grain dose is quite sufficient for an ordinary case of insomnia. To be dissolved in hot liquid taken at bed-time.

Manufactured by condensing Urea with the Diethyl ester of Malonic Acid. A white crystalline powder melting at 191°C , *soluble* 1 in 145 water at 20°C ., and about 1 in 9 of alcohol 90%, more soluble in hot water, and in alkaline solutions (*ergo* absorption in the intestines); and is also recommended to be given in hot tea. Has a soporific action indicated in nervous restlessness, insomnia and depression, for maniacs and in cardiac troubles. Does not affect temperature or respiration. May cause erythema. Produces sleep without subsequent depression.—Cushny, 192.

In insomnia arising from pain 4 grains may be usefully combined with Atropine Methyl Bromide $\frac{1}{4}$ grain.

Two 32 grain doses of Veronal per rectum in vomiting of pregnancy. Successful, patient slept 12 hours after first dose, gradually recovering from the vomiting fits.—B.M.J. ii./06,1490.

Tablets, 5, $7\frac{1}{2}$ or 10 grains, or in Cachets. (*Caution v. above.*)

Suppositories 4 to 8 grains (0.26 to 0.5 Gm.).

Poisoning by 12 to 14 tabloids each $7\frac{1}{2}$ grains.—B.M.J. ii./09,1154; see also L. i./04,223; B.M.J. ii./04,1679,1736,1784. Dangers of.—B.M.J. i./10,552.

Poisoning by about 60 grains. Apomorphine, Strychnine, Saline, etc., tried.—B.M.J. ii./08,832.

Also by 5 grain Tablets,—apparently 25 taken. Recommendation to place this substance on the Poisons Schedule.—B.M.J. ii./09,1320.

Cannot be used freely without unpleasant and even dangerous effect. The only 'synthetic' of value on the contributor of the article.—B.M.J. i./09,523.

Owes activity to Ethyl groupings—this body is more powerful than the corresponding Methyl Compound, whilst Propional (*infra*) possesses the maximum activity in the group. Often loses its power after it has been given for a time. In this case Trional similarly no longer acts well and *vice versa*.—B.M.J. i./09,554.

Veronal has the peculiar property of counteracting unpleasant effect of Morphine.—L. ii./08,1223.

In delirium tremens Veronal superior to Chloral.—B.M.J.E. i./10,8.

Veronal-Sodium. Syn.*Medinal.

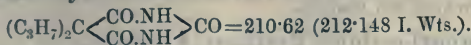
Dose—5, $7\frac{1}{2}$ to 15 grains in a wineglassful of water, 3 to 4 hours after last meal.

White crystals *soluble* 1 in 5 in cold water. Suitable for internal, rectal injection and subcutaneous application, or where rapid action is required. For injection 10% solution (0.5 Gm. in 5 Cc. water) is used. Is stated to be useful where the patient falls to sleep readily, but wakes early and tosses about until the morning. Ordinary Veronal is suitable for the patient who cannot get off to sleep, but sleeps soundly once he is off.

Is stated to be useful in seasickness. Said to act quicker, and with more certainty than Veronal.—M.P.C., Sep. 22,'09,322.

Hypnotic effect of Medinal is best obtained by the use of Suppositories medicated with 0.4—0.5 Gm. Administration by the mouth only, empty stomach.—Pres. 1910,210.

***Proponal.** *Syn.*—DIPROPYL-BARBITURIC ACID.



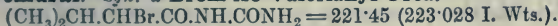
Dose.—2 to 8 grains (0.13 to 0.52 Gm.).

A homologue of Veronal in white crystalline powder, as hypnotic, very slightly soluble in water, more so in Alcohol. It is readily dissolved by alkalis—hence probably acts on reaching the intestinal fluids.—L. i./06. 126; B.M.J.E. i./06, 72. More rapid in some instances than Veronal.

Tablets $1\frac{1}{2}$ grains (0.1 Gm.).

Very narrow margin between therapeutic and toxic dose. *Whilst 5 to 6 grains are hypnotic, $7\frac{1}{2}$ grains approximates danger zone.*—B.M.J. i./09, 554.

***Bromural.** *Syn.* *a*-Brom-iso-Valerianyl Urea.



Dose.—5 to 10 grains (0.32 to 0.65 Gm.).

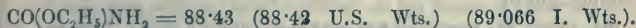
Colourless crystals, soluble with difficulty in water, dissolved by Caustic Soda and precipitated by acids from its solution in alkali. Melting point about 145° C. Contains about 36% Bromine. Is said to induce sleep which commences in from 5 to 25 minutes after taking and lasts from 3 to 5 hours, at the expiration of which natural sleep follows, the action of the drug having ceased in that time.—B.M.J.E. i.07, 75.

Tablets contain 5 grains (0.32 Gm.).

M. '08, 168. gives a number of references to foreign literature to indicate utility of the substance for sleeplessness associated with many diseases.

Owes hypnotic power to hydroxyl groups perhaps and to Bromine in addition.—B.M.J. i./09, 554. Said to be safe and useful.—L. ii./08, 1223.

URETHANE.



Syn.—Ethyl Carbamate, FR. CX., U.S. *Dose.*—10 to 60 grains (0.65 to 4 Gm.).

Colourless prismatic crystals, inodorous, with saline taste.

Incompatible with Caustic Alkalis and with Acids. **Soluble** 1 in 2 of Water; 1 in 1 of Alcohol 90%. FR. CX. states 1 in 1 of Water and 1 in 0.6 of Alcohol (95%).

Uses.—Hypnotic, produces normal sleep, the heart is not affected; especially suitable for children; in cases of delirium tremens, and in acute mania and tetanus.

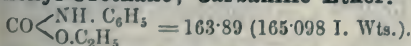
Tablets, 5 grains (0.32 Gm.).

Quinine Urethane. *Dose.*— $\frac{1}{2}$ to 3 grains (0.032 to 0.2 Gm.).

Employed hypodermically, as it is non-irritating.

Is obtained by heating Quinine Hydrochloride 3 with Urethane 15 and Water 3 parts.—P.J. ii./02, 273.

Phenyl-Urethane; Carbanilic Ether. *Syn.* ***EUPHORINE.**



Dose.—3 to 6 grains (0.2 to 0.4 Gm.) thrice daily.

White crystals, slightly soluble in water, freely in alcohol.

An energetic antipyretic and useful analgesic in acute rheumatism, neuralgia, orchitis, and headache.

Methyl-propyl-carbinol Urethane, *Hedonal.

$\text{CH}_3\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}(\text{CH}_3)\cdot\text{O}\cdot\text{CO}\cdot\text{NH}_2$ or $\text{C}_6\text{H}_{13}\text{O}_2\text{N} = 130\cdot16$. (131·114 I. Wts.), *i.e.* Ethyl Carbamate with the Ethylic radicle replaced by the radicle of Methyl-propyl-carbinol $\text{CH}_3\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CHOH}\cdot\text{CH}_3$.

Dose.—15 to 30 grains (1 to 2 Gm.) in cachets or suspended in water.

A white crystalline powder with saline taste, slightly soluble in water more so in dilute alcohol; a hypnotic in neurasthenia and hysteria in women.

30 grain doses an hour before operation as a hypnotic to supplement chloroform anæsthesia.—B.M.J.E. i./05,34. Tablets contain $7\frac{1}{2}$ grains (0·5 Gm.).

Urethane and Hedonal owe their action doubtless to Ethyl groups.—B.M.J. i./09,554.

VALERIANÆ RHIZOMA (Off.) U.S.

The dried rhizoma and roots of *Valeriana officinalis* (Valerianaceæ), collected in the autumn.

Derbyshire Valerian is *Valeriana Mikanii*, Syme.—P.J.ii./04,707.

Fresh Juice of Valerian said to be the best preparation.—L.i./05,1396. It contains 0·015% alkaloid.—L.i./07,900—and glucoside both unstable in composition, hence preparations should be as fresh as possible.

Tinctura Valerianæ, U.S.

Average dose.—1 drachm. 1 in 5 of mixture of Alcohol (94·9% Vol.) and Water in proportion of 750 and 250.

Tinctura Valerianæ Ætherea. P. Austr. and P. Helv.—1 in 5 of Spiritus Ætheris.

Tinctura Valerianæ Ammoniata (Off.) 1 in 5. *Dose*.— $\frac{1}{2}$ to 1 drachm (2 to 3·5 Cc.). U.S. 1 in 5 of Sal Volatile. Is of great value as an antispasmodic and nervine tonic for hysteria.

Flavoring.—Glyl Coriandri, Glyl Menthæ Piperitæ; Syrupus Zingiberis, Extractum Glycyrrhizæ Liquidum, Tinctura Carminativa, Tinctura Lavandulæ Composita.

Mistura Valerianæ Composita, R.F.H.—Tincture of Valerian 30 minims, Fœtid Spirit of Ammonia 20 minims, Camphor Water to 1 ounce.

Fluidextractum Valerianæ, U.S. 1=1 Hydro-alcoholic.

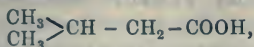
Average dose.—30 minims (2 Cc.). Of brownish colour; represents the full activity of the drug.

Extractum Valerianæ. *Dose*.—1 to 5 grains (0·065 to 0·32 Gm.). Prepared by concentrating the liquid extract.

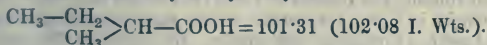
Oleum Valerianæ. *Dose*.—1 to 5 minims (0·06 to 0·3 Cc.). Yellowish in colour. Sp. Gr. 0·94. A carminative in flatulence, also for nerve complaints.

Acidum Valerianicum, FR. CX., P. Helv. *Dose*.—1 to 5 minims (0·06 to 0·30 Cc.), in syrup or in gelatin capsules. Consists principally

of optically inactive Isovalerianic Acid

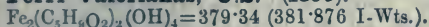


with more or less dextrorotary Methyl-Ethyl Acetic Acid



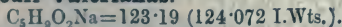
An oily liquid, Sp. Gr. about 0.93. Has been employed in hysteria and nervous diseases.

Ferri Valerianas, U.S. (1890).



Dose.—3 to 15 grains (0.2 to 1 Gm.). A dark red insoluble powder, with slight valerian odour, astringent taste; prescribed in cachets. Is a nervine stimulant and emmenagogue, and is used in anæmia, hysteria, and chorea.

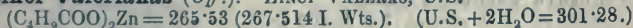
Sodii Valerianas.



Dose.—1 to 5 grains (0.065 to 0.32 Gm.).

In white crystals; used as a nervine sedative in hysteria and mania. N.H.W. has a mixture containing 3 grains, Tincture of Nux Vomica 3 minims, Tincture of Capsicum 4 minims, Water to $\frac{1}{2}$ ounce.

Zinci Valerianas (Off.). ZINCI VALERAS, U.S.



(U.S. + $2\text{H}_2\text{O}$ = 301.28.)
C.R. says formula should be + $2\text{H}_2\text{O}$.

Dose.—1 to 3 grains (0.065 to 0.2 Gm.)

In pearly tabular crystals. Pills 3 grains each are generally kept prepared. Nerve and general tonic, *e.g.* after hay fever, and as prophylactic.

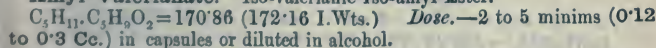
The only drug with any beneficial effect on hay fever—5 grain pill thrice daily or 1 grain with Pilula Galbani Composita 2 grains.—Tilley.

Incompatible.—Acids and metallic salts. (*See also* zinc salts.)

T.H. has a pill of 1 grain with Compound Pill of Asafetida 2 grains.

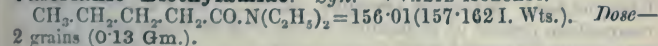
Dose.—1 or 2.

Amyl Valerianate. Iso-valerianic Iso-amyl Ester.



Dose.—2 to 5 minims (0.12 to 0.3 Cc.) in capsules or diluted in alcohol.
A mobile liquid Specific Gravity 0.858. Miscible with Alcohol. Is employed as a sedative and antispasmodic. Has been recommended as gall-stone solvent. In trade is known as 'Apple Essence.'

Valerianic Diethylamide. Syn. ★VALYL-HOECHST.



Dose.—2 grains (0.13 Gm.).

An oily liquid of a somewhat nauseous taste and odour.

Gelatin capsules under the above synonym are in use as a substitute for valerian preparations in nervous and utero-genital affections.

Borneol-isovalerianate. Syn. ★BORNYVAL. A proprietary preparation in capsule form containing 4 grains. A valerian substitute. In cardiac neurosis, hysteria, neurasthenia, etc.

Best taken after meals to prevent eructations.

VERATRI VIRIDIS RHIZOMA.

GREEN HELLEBORE RHIZOMA.

Dose, in powder.—1 to 5 grains (0·065 to 0·32 Gm.).

The dried rhizome and rootlets of *Veratrum viride* (*Liliaceæ*), imported from and official in U.S. Its powder excites sneezing, and it contains the alkaloids Jervine, Veratrine, Veratroidine, and others. The rhizome of *V. album* (*Liliaceæ*) *White Hellebore* emetic, purgative and parasiticide, contains the alkaloids protoveratrine, jervine, rubijervine, and pseudojervine. It possesses similar properties—official in U.S., in addition, under the collective name *Veratrum*. Cardiac, arterial, and nervous sedatives. They are said not to be narcotic, but they lower the pulse, respirations, and temperature of the body; act on the heart as powerful cardiac poisons analogous to digitalis, but are much more rapid in action; do not lower the temperature in health. Useful in puerperal eclampsia.

Eclampsia is well treated by *Veratrum viride*, its efficacy being in relation with its hypotensive action.—B.M.J. ii./o8,811.

For the last mentioned small doses hypodermically said to be valuable, giving chloroform until the veratrum takes effect.—B.M.J. ii./o8,1670.

Veratrum Viride must be distinguished from *Helleborus Niger* (*Ranunculaceæ*), or *Christmas Rose*, which is purgative and emmenagogue and has strong sternutatory properties, and is now little used.

Tinctura Veratri Viridis.

Dose.—5 to 15 minims (0·3 to 0·9 Cc.).

The U.S. Tincture (*average dose*, 15 minims) is 1 in 10 Alcohol 94·9% volume. B.P.C. 1 in 10 of 90%. B.P., 85 1 in 5.

Useful in apoplexy from hæmorrhage or effusion, and for cerebral complications in erysipelas.

Uræmic convulsions checked.—B.M.J.E. i./o3,24.

Fluidextractum Veratri, U.S.

Hydro-alcoholic 1=1. *Average dose*.—1½ minims.

VERATRINA (Off.). U.S.

Syn. CEVADINUM, Ph. Ned. Cevadine Cryst. (Merck) is

$C_{32}H_{49}NO_9 = 586·98$ (591·402 I. Wts.).

Dose.— $\frac{1}{10}$ to $\frac{1}{18}$ grain (0·0009 to 0·004 Gm.).

A mixture of alkaloids, chiefly amorphous veratrine and crystalline Cevadine, from Cevadilla seeds—*Schænocaulon* (*Asagracea*) *officinale* (*Liliaceæ*)—in greyish white masses; powerfully sternutatory; taste bitter and acrid. Veratine amorphe, Fr. Cx. is also a mixture of similar composition, method of preparation is given.—*Max. single dose* $\frac{1}{32}$ grain max. during 24 hours $\frac{1}{6}$ grain approximately.

Nearly insoluble in water; *soluble* 1 in 3 of 90% alcohol; 1 in 6 of ether. It is used as an antipyretic *with caution!* and circulatory sedative in fevers and acute inflammations—resembles Aconitine in its general effects. Large doses cause vomiting and purging; sometimes for neuralgia, spasm, rheumatism and gout. Externally in the form of ointment for neuralgic pains and swellings. Internally and externally, recommended for pruritus.

Is it worth retaining in B.P. or better to replace it with cevadine?—Naylor, P.J., July 28, '06.

Cevadilline and Veratridine are other constituents.

The old depressant treatment by full doses of veratrine is not now so much in vogue.—West, Pr. Apl./08.435.

Ⓐ **Oleatum Veratrinæ, U.S.**

Veratrine 2, Oleic Acid (by weight) 50, Olive Oil to 100. Useful for neuralgia. Too weak, 10% preferable. It is employed as a pigment.

Ⓐ **Unguentum Veratrinæ (Off.).**

Veratrine 1, Oleic Acid (by weight) 4 (1 grain=2 drops); warm gently to dissolve, add Lard 45. Prolonged use may produce rash. Useful for neuralgia and sciatica, rubbed in twice daily. U.S. has Veratrine 4, Almond Oil 6, Benzoated Lard 90.

Ⓐ **Acetum Cevadillæ, E.**

Cevadilla Seeds crushed 10, Methylated Spirit 10, Acetic Acid 18 Water 72. Macerate 7 days. For external use.

* VESCETTES.

* Vescettes are effervescent Salts in compressed form. They are convenient and portable, contain an accurate proportion of the drug (for List of various formulæ see Index), and are directed to be crushed and added to a small quantity of water preferably warm—forming a palatable mode of administering drugs of unpleasant taste. Their effervescence aids assimilation and toleration.

ZINCUM (Off.), U.S.

$Zn = 64.91$ (64.9 U.S. Wts.) (65.37 I. Wts.).

To prepare **Arsenic-free**, melt in a clay crucible and add about 15 grains Sodium to a pound in small bits at intervals. Remove the scum, avoiding iron implements, and repeat in another clean crucible. Granulate by pouring into water when almost solidified.

Incompatibilities of Zinc Salts.—Alkaline carbonates and alkalis in general, vegetable infusions and milk.

Antidotes.—Alkaline Carbonates in warm water, Demulcents, Milk and Egg. Tea and Tannin solutions.

Zinci Acetas (Off.), U.S.

$(CH_3COO)_2Zn, 3H_2O = 235.71$ (237.466 I. Wts.). U.S. with $2H_2O = 217.82$ (U.S. Wts.).

Dose.—1 to 2 grains (0.065 to 0.13 Gm.) as a nervine tonic, 10 grains for an emetic dose.

White crystals with faint acetous odour. Soluble in water 1 in 2.5, about 1 in 40 of alcohol 90%.

Is used occasionally as astringent lotion ($\frac{1}{4}$ to 1%).

Zinc Carbonas (Off.).

$ZnCO_3 \cdot (ZnH_2O_2)_2, H_2O = 339.68$ (342.158 I. Wts.).

'Præcipitatus,' U.S., should yield 72% Zinc Oxide on ignition. These are employed for tender surfaces, and to check perspiration.

Zinci Bromidum, Zinc Bromide, U.S.

$\text{Zn Br}_2 = 223.61$ (223.62 U.S.) (225.21 I. Wts.).

Dose.—2 to 5 grains (0.13 to 0.32 Gm.) in water.

White deliquescent powder. A little dilute hydrobromic acid will make clear solution. Used with success in epilepsy. Incompatible with alkaloids and salts of heavy metals.

In *petit mal*, may prove efficacious in cases where other bromides failed.
—L. i./09.908.

Zinci Iodidum, U.S.

$\text{ZnI}_2 = 316.71$ (316.7 U.S. Wts.) (319.21 I. Wts.).

Average dose.—1 grain (0.065 Gm.).

A white deliquescent powder turning brown on exposure. For cerebral, spinal, and nervous diseases occurring in the third stage of syphilis—also in epilepsy.

Zinci Chloridum (Off.), U.S. $\text{ZnCl}_2 = 135.29$ (135.26 U.S. Wts. (136.29 I. Wts.).

In deliquescent masses soluble 1 in 0.34 of water.

Causticum Zinci Chloridi.

Zinc Chloride 4, Solution of Antimony Chloride 2, Starch 1, Glycerin *q.s.*

Collodium Zinci Chloridi. 1 in 6 of collodion.**Collutorium Astringens, R.D.H.**

Zinc Chloride 1 grain, Zinc Sulphate 1 grain, Water to 1 ounce.

Guttæ Zinci Chloridi, R.O.H. 0.5% and D with Cocaine Hydrochloride 2% (St. Th. H. 0.25).

Guttæ Zinci Chloridi (Aural) G.N.C. Zinc Chloride 4 grains, Glycerin 2 drachms, Alcohol to 1 ounce.

Liquor Zinci Chloridi (Off.). Sp. Gr. 1.530.

Four minims of this solution = 3 grains of solid Zinc Chloride. On diluting, a trace of hydrochloric acid will be necessary to clear it. The U.S. preparation contains 50% Zinc Chloride.

Uses.—A powerful odourless caustic, antiseptic, and anti-putrescent. The Liquor is a strong deodorising antiseptic solution; it is *very poisonous*. Ten grains to the ounce of water may be used as a stimulant lotion to wounds.

Tuberculous joints treated by evacuating pus, etc., and applying Zinc chloride solution 10%.—B.M.J. ii/09,953.

Lupus vulgaris best treated by sharp scraping followed by application of saturated solution of Zinc Chloride to be healed by carbolic Zinc Ointment.—L. ii/08,471.

In the treatment of erosion of teeth is useful to touch painful spots, or the addition of a little to Chloroform-Mastich forms a useful paint.—Smale and Colyer.

Schulze's Chlor-zinc-iodine Reagent for Cellulose.

Dissolve 110 Gm. of Zinc in 300 Cc. of pure Hydrochloric Acid, and evaporate to 150 Cc. (Sp. Gr. about 1.8). Dissolve separately 12 Gm. Potassium Iodide in as little water as possible; add 0.15 Gm. Iodine.

Mix the Solutions, and filter, if necessary, through asbestos.

The solution should have a dark sherry-brown colour.—Bower and Gwynne-Vaughan.

Zinci Citras, Zinc Citrate.

$$[C_3H_4(OH).(COO)_3]_2Zn_3 + 2H_2O = 605.73 (610.222 \text{ I. Wts.}).$$

Dose.—3 to 12 grains (0.2 to 0.8 Gm.).

White powder with metallic taste, not perfectly soluble in water. Used for epilepsy.

Ⓟ Zinci Cyanidum.

$$Zn(CN)_2 = 116.61 (117.39 \text{ I. Wts.}).$$

Dose.— $\frac{1}{10}$ to 1 grain (0.0065 to 0.065 Gm.).

An insoluble white powder, is of value in heart diseases, and resembles digitalis in its effects in that it relieves palpitation and irregularity of action. Antiseptic, not equal to **Mercuro-Zinc Cyanide**, *q.v.*

Ⓟ Zinci et Potassii Cyanidum.

$$Zn(CN)_2.2KCN = 245.97 (247.61 \text{ I. Wts.}).$$

Dose.— $\frac{1}{10}$ to 1 grain (0.0065 to 0.065 Gm.).

Is a soluble cyanide, possessing all the properties of hydrocyanic acid.

Zinci Lactas.

$$(C_2H_4.OH.COO)_2Zn, 3H_2O = 295.59 (297.528 \text{ I. Wts.}).$$

Dose $\frac{1}{2}$ to 3 grains. Max. pro die 10 grains. (Has been used in France up to 3 Gm. for a dose!)—Dorvault.

White crystals soluble 1 in 60 of water. In epilepsy.

Zinci Oxidum, Zinc Oxide (Off., U.S.).

$$ZnO = 80.79 (80.78 \text{ U.S.}) (81.37 \text{ I. Wts.}).$$

Dose.—3 to 10 grains (0.2 to 0.65 Gm.).

Tablets, 2 grains.

Is a good nervine tonic, and is given for nervous debility, migraine hysteria, and to check night sweats.

Mistura Zinci Oxidi, E.L. Zinc Oxide 1 grain, Glycerin 15 minims Water to 1 drachm.

Unguentum Zinci (Off.). Zinc Oxide 3, Benzoated Lard, melted, 17. (U.S. 1 in 5 Benzoated Lard.)

Unguentum Zinci cum Acido Salicylico, Mid. H.

Salicylic Acid 40 grains, Zinc Ointment 1 ounce, Soft Paraffin 1 ounce.

Vaselinum Zinci Oxidi.

Zinc Oxide 1, White Vaseline 9. For surgical use.

Cremor Zinci.

Zinc Oxide 3, White Vaseline 17, Perfume *q.s.* Is much superior to violet powder for nursery use.

Cremor Zinci, St. M.'s H.

Dissolve Lanolin 3 in Olive Oil 8 by heat, sift Zinc Oxide 8 into the mixture and whip up with Lime Water 8.

In acute eczema (drying stage) where there is much redness, this is even superior to Lassar's Paste.—B.M.J. i./09, 1342.

Cremor Zinci et Calaminæ, V.C.H.

Prepared Calamine 1, Zinc Oxide 1, Lime Water 4, Olive Oil 4.

Gelatinum Zinci. Unna's Paste.

Gelatin 4, Water 16, soak 12 hours, then heat to dissolve, and add Zinc Oxide 6, previously rubbed down with Glycerin 12. For use it is melted and applied with a brush to eczematous surfaces. Ichthyol, Resorcin and other medicaments may be added.

V.C.H. (with nearly 1% Ichthyol).—St. J. H., Mid. H., and St. Th. H. are similar, as also GLYCERO-GELATINA OXIDI ZINCICI P. SVEC.: Zinc Oxide (Crude) 30, Glycerin 50, Gelatin 30, Water 90.

Chronic ulcers are treated by Unna's method, especially where there is varicosity, by bandaging from the toes to the knees with gauze and simultaneously pouring the melted paste over the part,—pressure thus results. If necessary a window may be cut over the ulcer for discharge,—useful, but not a routine method.—L. ii./09,1423.

Eczema, scabs of, treated with.—B.M.J.E. i./10,36.

Ulcers of the leg treated by Unna's method of treatment employing this Paste. B.M.J. i./09,463; *vide* also P.J. ii./09,28.

For the inflammation and tenderness in thrombosis paint with Zinc Oxide, Glycerin and Carbolic Acid pigment.—L. i./06,741. The following ointment is in use :—

Zinc Oxide 5, Kaolin 1, Benzoated Lard 14. A soft form consists of equal parts of Prepared Chalk, Zinc Oxide, Linseed Oil and Lime Water.

Pasta Zinci cum Amylo, St. M.'s H.

Zinc Oxide, Starch, Vaseline, Lanolin, of each equal parts. For intertrigo and disordered perspiration.

***Pellanthum** (containing 20% Zinc Oxide) is a special preparation and is cooling and soothing for irritable surfaces.

Compounds are Ichthyol, 3%, 5%, 10%; Ichthyol, 10%, with Resorcin 5%; Salicylic Acid 1% and 2%; Liquor Carbonis Detergens 10% and 15%; Huile de Cade 5%; Phenol 2% with Menthol 2%.

Vernissum Glyco-Gelatin, "Zinc Varnish," W. H. has Gelatin 3, Zinc Oxide 3, Glycerin 5, Water 9. To this may be added 10 of Precipitated Sulphur, or 5 to 10 of Ichthyol.

Lassar's Paste for Eczema. Zinc Oxide 24, Starch 24, Salicylic Acid 2, Vaseline 50.=**Pasta Zinci Compositi, U.C.H.**

In acute eczema when weeping, has wonderful effect.—L. i./09,966.

In chronic eczema when the discharge has abated to some extent, this paste exerts a blotting action.—B.M.J. i./09,1342.

In irritating conditions the acid may be omitted. It may be retained and increased in amount where there is less inflammatory reaction and where much scaling has occurred.—B.M.J. i./09,1342.

Pasta Carbonis et Zinci.

Soak Gelatin 16 in a portion of the total Glycerin required, (20) and a portion of the water, (50 in all required) for 12 hours. Make a paste of Boric Acid 6, Zinc Oxide 6, and Charcoal 18 with remainder of liquids, and mix and heat on water bath, pour into suitable vessel to set.

For leg ulcers the Charcoal is a useful addition. Boric Lotion fomentation should first be carried out to clean the ulcer. If tending to be sluggish Red Lotion helps.—B.M.J. i./09,899.

Linimentum Zincicum Compositum P. Svec. Salicylic Acid 1, Zinc Oxide 300, Olive Oil 750, Lime Water 750.

(P) Pilula Zinci cum Belladonna, T.H.

Zinc Oxide 2 grains, Extract of Belladonna $\frac{1}{8}$ grain. *Dose.*—1 or 2 at bedtime.

Pulvis Zinci et Amyli. Zinc Oxide 1, Starch 2.

Zinci Permanganas. $\text{Zn}(\text{MnO}_4)_2 \cdot 2\text{H}_2\text{O} = 336.75$ (339.262 I. Wts.).

Almost black crystals, readily soluble in water.

For urethritis, absence of irritation marked, 1 grain in 8 ounces (= about 1 in 4,000), as eye wash 1 in 1,000 to 1 in 2,000.

For pyorrhœa alveolaris and oral sepsis as mouth wash it is very useful. 'Solubes' $\frac{1}{4}$ grain each to make 2 ounces of solution.

'Collapsubes,' with catheter attachment, of Zinc Permanganate in Soft Paraffin; strength 1 in 2,000 for use in chronic gonorrhœa.

Zinc Oxy-Phosphate is employed as a dental filling. It is supplied in the form of dried powdered zinc oxide in various colours, with the 'liquid,' which consists of phosphoric acid. These are mixed intimately prior to use as a flooring when not too near the pulp.

Zinc Oxy-Sulphate. This filling consists of the 'powder,' which is calcined zinc sulphate and zinc oxide and the 'liquid,' a mucilage of acacia.

Fletcher's Artificial Dentine is similar.

Zinc Oxy-Chloride. For dental use. The 'powder' consists of zinc oxide and the 'liquid' zinc chloride solution. Mix thoroughly. Sometimes used as a root-filling and for sensitive dentine. Will irritate a live pulp.

Zinci Salicylas.

$\text{Zn}(\text{C}_6\text{H}_4\text{.OH.COO})_2 + 3\text{H}_2\text{O} = 390\cdot57 (393\cdot498 \text{ I.Wts.}).$

Dose.—1 to 5 grains (0·065 to 0·32 Gm.).

White crystals soluble in water 1 in 24, and in alcohol 1 in 2·5. As dusting powder in skin affections, and may be combined with gelatin (*v. Gelatinum Zinci*). Internally is sometimes a substitute for the valerianate.

Zinci Sulphas (*Off.*). U.S. $\text{ZnSO}_4\cdot7\text{H}_2\text{O} = 285\cdot41$ (*Off.* and U.S. Wts.) (287·552 I.Wts.).

Dose.—1 to 3 gr. (0·065 to 0·2 Gm.) tonic; 10 to 30 gr. (0·65 to 2 Gm.) emetic.

FR. CX. Max. single dose 15 grains, max. during 24 hours the same.

Soluble 1 in 0·65 water at $59\cdot5^\circ \text{F.}$, P.J.i./02,552.

Collyrium Adstringens Luteum, P. Austr. (1906.) Ammonium Chloride 2, Zinc Sulphate 5, Distilled Water 890; dissolve and add Camphor 2, dissolved in Diluted Spirit (Sp. Gr. 0·895) 100. Then add Saffron 1. Digest 24 hours and filter. As an astringent lotion is used for conjunctivitis.

Diplobacillary infection of the eye (*Morax Axenfeld bacillus*) is quickly cured by zinc salts.—Axenfeld. B.M.J. ii./08,738.

Chlorosis can be rapidly cured by emetic of 20 grain doses for 6 to 8 days, in the morning fasting, of zinc sulphate. Stated to be a certain and quick cure. Iron sulphate (common) originally given by an old dame.—B.M.J. ii./08,1145. Somewhat drastic treatment!

Clorosis has been treated by various methods of removing fluids from the body.—B.M.J. ii./09,1668. *c.f.* Caffeine p. 197.

Muco-purulent ophthalmia treated with 0·5% zinc sulphate and 1% Boric Acid lotion alternately with boric acid ointment.—B.M.J. i./09, 1220

Lotio Rubra, U.C.H. Zinc Sulphate 2 grains, Compound Tincture of Lavender 12 minims, Water to 1 ounce.

'Solubes' Zinci Sulphatis are prepared, coloured red, equivalent to 2 and 10 ounces respectively of the above lotion.

'Solubes' Zinci Sulphatis et Aluminis contain 10 grains of each, coloured, for dissolving in a pint, more or less as required, of warm water.

'Collapsubes' of Zinc Sulphate 1 grain in 1 ounce of gelatin basis are for gleet and gonorrhœa.

Lotio Sulphatum

Zinc Sulphate 30 to 40 grains, Alum 30 to 40 grains, Ferrous Sulphate 20 grains, Copper Sulphate 2 grains, Water 8 ounces. For gleet 0.25% of each salt is termed by B.P.C. **Injectio Sulphatum**. For gonorrhœa and leucorrhœa **Injectio Zinci Sulphatis** (B.P.C.) is 0.75%.

Ophthalmic Discs contain $\frac{1}{350}$ grain Zinc Sulphate, and $\text{Ⓢ} \frac{1}{350}$ grain each Zinc Sulphate and Opium, respectively.

Ⓢ Ophthalmic Discs of Zinc Sulphate $\frac{1}{350}$ grain with Atropine $\frac{1}{350}$ grain are also prepared.

Points of Zinc Sulphate are moulded for intra-uterine use. **Points** of equal parts Zinc Sulphate and Alum, and of Copper Sulphate are also made.

Zinci Stearas, U.S.

A fine white powder, yielding 15.5% of Zinc Oxide. Contains a small proportion of palmitate. Manufactured on same lines as Zinc Oleate, *q.v.*, employing Curd Soap *vice* Hard Soap.

Unguentum Zinci Stearatis, U.S.

Zinc Stearate and White Petrolatum equal parts melted together and stirred until cold.

ZINGIBER.

(*Off.*) U.S., P. Austr., Ph. Ned.

Dried rhizome (scraped) of *Zingiber officinale* (*Scitamineæ*). *Average dose.*—15 grains (1.0 Gm.) U.S.

Fluidextractum Zingiberis, U.S. 1=1, alcoholic. *Average dose.*—15 minims

Syrupus Zingiberis. (*Off.*)

Ginger 1, Alcohol 90% *q.s.* to 2 by percolation, add Syrup *q.s.* to 40. *Dose.*— $\frac{1}{4}$ to 1 drachm (1.8 to 3.5 Cc.).

Pulvis Aromaticus, U.S. *Average dose.*—15 grains.

Saigon Cinnamon 35, Ginger 35, Cardamom 15, Nutmeg 15.

Gingerin. *Dose.*— $\frac{1}{4}$ to 1 grain (0.016 to 0.065 Gm.), in a pill or much diluted with spirit.

The treacle-like oleo-resin of ginger made by percolation with ether or acetone (U.S.) and subsequent evaporation. Added to purgative pills to prevent griping.

May be estimated by extracting with ether.—P.J. ii./09, 159.

Tinctura Carminativa, B.P.C.

Dose.—2 to 10 minims.

Cardamom Seeds, bruised, 7, Essence of Ginger 6 (B.P. 1885), Oil of Cinnamon, Oil of Caraway and Oil of Clove of each 1. Macerate the Cardamoms in Alcohol (90%) 75 for a week, decant, express, and dissolve the oils in the mixed tinctures, adding Alcohol (90%) *q.s.* to 100.

Tinctura Zingiberis Fortior, Essence of Ginger, B.P.C.,

Ginger 1, in Alcohol (90%) 2. *Dose.*—5 to 20 minims.

Tinctura Zingiberis (*Off.*) *Dose*.—30 to 60 minims. 1 in 10 Alcohol 90%. (U.S. 1 in 5 Alcohol 94.9%.)

German pharmacists favour the following—pour on Ginger coarsely powdered 1, boiling water $1\frac{1}{2}$; when cold, add Spirit $3\frac{1}{2}$, and make a tincture.

Tinctura Cinnamomi Composita P.L.

Dose—20 to 40 minims (1.2 to 2.4 Cc.).

Cinnamon Bark 16, Cardamom Seeds 8, Long Pepper 5, Ginger 5, Alcohol 60% 640. Macerate seven days.
'Hippocras.'

Dose.—As required. Ginger, Gloves, Mace, Nutmeg, Galangal, of each 1 drachm, Cinnamon 2 ounces, White Wine $1\frac{1}{2}$ gallons, Sugar 40 ounces, Digest 3 days. Stomachic and antispasmodic.—From an old medicine book.

SUPPLEMENTARY LIST OF DRUGS.

Abrus Precatorius (*Leguminosæ*) Jequirity Seeds, Prayer Beads, Jumble Beads, Gumchi (Hindi), Indian Licorice, of scarlet colour contain abrin a poisonous principle. Infusion 8% R.O.H. produces violent ophthalmia when applied to the conjunctiva. Jequiritol is a glycerinated solution to produce artificial inflammation.

Dose.—It is prepared in several strengths. One to 2 drops of the 'No. 1' are placed in the eye, followed next day by the stronger if no inflammation. When this has been reached and allowed to subside doses are continued until the reaction occurs again.

In conjunctival trachoma frequently no reaction occurs until the No. 2 Solution is used. The first inflammation having somewhat subsided, after a few days the eye may be subjected to a higher dose of Jequiritol. In a measure, as the inflammatory reactions become more marked, the immunity of the eye is found to increase until finally even the last doses fail to have any effect upon the organ. After the subsidence of the inflammation the doses of Jequiritol are raised step by step at intervals of 4 to 6 days, and the inflammation is renewed as often as this is possible or necessary for the removal of trachomatous infiltration, pannus, corneal opacity, &c. In the event of the inflammation being excessively violent 24 hours after the administration of Jequiritol, a few drops of the Jequiritol Serum is used.

Jequiritol Serum (Roemer—made on Behring's Serum principles) for controlling the inflammation obtained is used in strengths corresponding to the Jequiritol. The Serum is used either locally, *i.e.*, in the conjunctival sac or by subcutaneous injection—the former usually suffices.

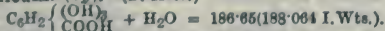
It is not effective as drops in the eye; should be given subcutaneously. Like all other sera it is more efficacious in the lymph stream.—L. ii./08, 558.

An efficacious means of exciting an inflammatory attack of limited duration, frequently employed in cases with pannus with good effect. One application of the strongest form usually sufficient, never found the Antiabrie Serum (*Jequiritol Serum*) to control the inflammation necessary.—B.M.J. ii./09, 976.

The *fresh root* as an antidote for snake poison, has been praised, for use in the West Indies. Enquiry made by us did not confirm the information. The plant grows freely in certain of the islands. It is not used for the purpose in India so far as we can gather.

The *leaves* contain a sweet principle which has been identified as glycyrrhizin.—C.D., i./09, 873.

Acidum Gallicum. (*Off.*) (P. Helv.)



Dose, 5 to 15 grains. Crystals or crystalline powder of brownish colour. Soluble in water about 1 in 100, in glycerin 1 in 12, in alcohol 90% 1 in 5. Properties and uses similar to Tannic Acid, *q.v.*

Acidum Malicum. *Syn.* Hydroxysuccinic Acid. $C_2H_3(OH)(COOH)_2 = 133.04$ (134.048 I. Wts.). *Dose*, 1 to 5 grains. White deliquescent crystals soluble in water 1 in 1, and in Alcohol 1 in $1\frac{1}{2}$. Has been used as throat spray in diphtheria, and other throat affections. Possesses properties similar to Tartaric Acid in a modified form. It is chemically allied to Succinic Acid. In phthisis much larger doses—up to 2 drachms have been given.

Acidum Meconicum. $C_7H_4O_7 \cdot 3H_2O = 252.17$ (251.08 I. Wts.). White crystals slightly soluble in water. Forms soluble salts with Opium Alkaloids. It occurs in good opium to extent of 5 to 8%. Has little or no physiological action. Apparently only contains 2 Carboxyl groups, though triatomic. Salts are of variable composition.—P.J. ii./05,548.

Acidum Osmicum. $OsO_4 = 254.9$ (I. Wts.).

Syn. OSMIUM TETROXIDE, HYPEROSMIC ACID. *Dose*.— $\frac{1}{8}$ grain. Max. dose $\frac{1}{10}$ grain.

In waxlike yellow crystals. Its vapour is intolerably pungent. Soluble slowly about 1 in 50 of water. It is poisonous and a powerful oxidizing body. *Liquor*, 1% (in water). *Dose*.—2 to 10 minims, hypodermically. This is used in microscopy; fat and medullary matter are blackened by it.

This and Potassium Osmate 1% solution in 2 to 10 minim doses have been injected hypodermically (painful) for neuralgia, for strumous glands, goitrous swellings, sarcoma, and cancer; also sciatica and muscular rheumatism, and given internally in epilepsy.

Liquor Acidi Chromo-Aceto-Osmici (Flemming's Strong Solution). Mix Glacial Acetic Acid 100 with Osmic Acid 8 in water 400, and Chromic Acid 15 in water 1,500. Cancerous growths have been treated: 8 Cc. injections at edge of tumour, or 1 Cc. just beneath its surface. Also for fixing, in histology.

① **Aconitum ferox**, renamed *A. spicatum*. (According to Holmes *A. laciniatum* is the probable source of Nepal Aconite).—Root, called *Bish* or *Bikh* in India. Contains Bishaconitine, virulently poisonous. It is the analogue of pseudaconitine. It is permissible to administer in dose $\frac{2}{3}$ of that of Aconitine from *A. Napellus*.—C.D. ii./05,478. It is in bolder roots than the official and these are horny in fracture. Internally, relieves neuralgia and acute gout, and externally a valuable liniment for chilblains. ② *Tincture*, 1 in 8 of 90% alcohol. *Dose*, 1 minim hourly. Botanical descriptions of poisonous and non-poisonous Indian Aconites.—P.J. i./03,63.

③ **Aconitum Fischeri**.—Produces Japanese Aconite Root, of which much has at times been imported. It is also said to come from Kamschatka. It is very pungent, and yields Japaconitine (P.J. 1894,813) v.p. 88. *A. japonicum*, with yellowish white flowers, has been identified as a variety of *A. Lycotomum*.

Aconitum heterophyllum.—Root, known as *Atis* or *Atees*, or *Jadbar* in India, is neither poisonous nor antipyretic, but is tonic, and possibly aphrodisiac in action. It contains a large quantity of starch. *Dose*, in powder, 5 to 20 grains; of tincture, 1 in 8 of 90% alcohol, 10 to 60 minims.

Adeps.—*Syn.* ADEPS SUILLUS, AXUNGIA, Ph. Ned. Adeps Lotus P. Dan.

The purified fat of the hog, *Sus scrofa* (Linn.).—from the 'flare' or 'omentum'; contains 60% triolein, v. p. 617 (sold when separated by freezing and pressure as 'Lard Oil'). The remainder is palmitin and stearin. Soluble in ether 1 in 22, hardly soluble in alcohol.

Adeps Induratus is for use in the tropics. The liquid constituent is removed to a great extent by pressure.

Adeps Benzoatus (*Off.*) made with 3% Benzoin. That of P.G. is prepared with 1% Benzoic Acid—effectual and easier to use. To be avoided as a basis for eye ointments.

Adonis vernalis (P. Austr.).—Contains a hygroscopic glucoside Adonidin, which resembles Digitalis in its action, but is said not to be cumulative. *Dose*, in powder, 3 to 6 grains; of infusion 1 in 40, 4 drachms; of Adonidin, $\frac{1}{4}$ to $\frac{1}{2}$ grain daily. Is a cardiac tonic and diuretic.—Successful use; disappearance of throbbing headache, perspiration, and dyspnoea; sedative, but little diuretic, raises arterial tension.—L. ii./88,1012. Relieves præcordial pain in mitral and aortic regurgitation; urine increased and coloured yellow.—L. i./89,596; ii./91,505

B.M.J. ii./92,1156. Use with bromides for epilepsy.—L. ii./94,1298; P.J. ii./95,391; B.M.J.E. i./98,44. Adonidin is rapid and certain in action. Tincture.—Leaves and Stalks employed 1 in 10. Dose, 10 to 30 minims.

Adonidin is a local anæsthetic and suitable for use in ophthalmology. In chronic glaucoma, iritis, and irito-cystitis 1% solution has been used, 3 drops relieve pain. Even suitable as anæsthetic in operating on cataract.—M./98,122.

Æsculus Hippocastanum.—Horse-Chestnut. Tincture of Seeds 1 in 10 proof spirit for painful hæmorrhoids. Dose, 10 minims night and morning. Also emmenagogue.—P.J. ii./96,79. A liquid extract has been used, painted on or rubbed in in rheumatism and neuralgia. Powder and Tablets sold under the name of **★Antiarthrin** are said to contain an extract of the plant and Salicin for use in rheumatism. **Kastanol.**—Extractum Hippocastani Liquidum with 8% camphor; used in rheumatism.—(Austria.) Ph. Notes.

Argyresein $C_{54}H_{86}O_{24}=1110\cdot26$ (1118·688 L. Wts.), is the principle to which anti-hæmorrhoidal action is due.—P.J. i./09,645.

Æsculin. $C_{15}H_{16}O_9\cdot\frac{1}{2}H_2O=364\cdot39$ (367·152 I. Wts.), a glucoside, soluble in water, to which 2 to 3% of Sodium Carbonate is added, also soluble in alcohol. Solutions have a blue fluorescence, and have been used similarly to Quinine in X-ray and Finzen light treatment (*q.v.*). Dose, 1 to 5 minims of 5% solution. "**Conules Ephedrin Comp. ★Setterie**" are rectal suppositories for use in hæmorrhoids, and are stated to contain the active principle of the suprarenal gland with **Æsculin** 1 grain.

Æthusa Cynapium.—Fool's Parsley, Lesser Hemlock. Contains a small amount of volatile alkaloid, with the properties of Conine; calculated as hydrochloride constitutes 0·0003% of the entire fresh herb. A larger proportion, under favourable conditions, may be produced leading to poisonous properties. It also contains a volatile oil, 0·015% of the entire fresh plant and resin 0·8%. Has narcotic properties.

Garden Parsley (*Petroselinum sativum*) contains no alkaloid.—L. ii./05,617; P.J. ii./05, 548; C.D. ii./05,268.

Agar-Agar.—Japanese Isinglass. Is in membrane-like strips, consisting of the dried jelly of *Gelidium corneum*, a sea-weed. Another variety comes from Borneo. In boiling water 200, forms on cooling, a transparent jelly, suitable for invalids. It has little nutritive value but is useful for treating constipation. Teaspoonful doses occasionally of the dry substance in coarse powder sprinkled in little moist food, *e.g.*, stewed apples, act as mild aperient in that it softens the feces, but should be employed with caution as it may possibly cause obstruction.—See *Cascara Jelly, &c.* It is used in preparation of culture media for bacteria (*q.v.*); also for finishing calicoes, silks, &c. Agar is obtained from many other species of *Gelidium*.—Botanical Treatise by Holmes.—P.J. ii./06,319.

Agaricus Albus.—*Syn.* Polyporus Officinalis, Boletus Laricis, Fungus Laricis (P. Austr.), Polypore de Mélése (Fr.Cx). Purging Agaric. Dose, 10 to 30 grains. Light, spongy pieces. Large doses purgative, small ones astringent for night sweats, diarrhœa, and to diminish bronchial secretion. Tincture 1 in 10 of 60% alcohol. Dose, 20 to 60 minims. Extract.—Dose.— $\frac{1}{2}$ to 2 grains. Prepared by exhaustion with 60% Alcohol, yield is about 6%.

Not to be confused with the fly agaric, *Amanita Muscaria*, which contains **① Muscarine**. Various substances have been identified with the name Muscarine, at least three, with the formula $C_5H_{15}NO_3=136\cdot18$ (137·13 I. Wts.). The original Muscarine was found by Schmiedeberg and Koppe, and had the composition $(CH_3)_3N < \begin{smallmatrix} CH_2CH(OH)_2 \\ OH \end{smallmatrix}$. This was obtained from the *Amanita Muscaria*.

The second Muscarine was made by the action of Nitric Acid on Choline HCl.

A third designated Iso-Muscarine made by Bode and E. Schmidt had the composition $(CH_3)_3N < \begin{smallmatrix} CH(OH) \cdot CH_2(OH) \\ OH \end{smallmatrix}$. This was made by the action of

moist Silver Oxide on an addition product of Neurine and Hypochlorous Acid.

A fourth was prepared by Fischer, and contained one H_2O less, and hence was called Anhydro-Muscarine.

Muscarine is almost insoluble in Chloroform and Ether, but is easily soluble in water and alcohol. It has an action on the heart, being a muscular poison. It cannot be extracted from the fungus by any of the usual solvents, *i.e.*, Petroleum, Benzene, Chloroform, Ether, &c. It can, however, be prepared by

precipitation by means of Potassium Mercuric Iodide, or better with Mercuric Chloride or Bismuth Potassium Iodide—in the two latter instances quantitatively.—Abstracted from "Lehrbuch der Intoxikationen," Kobert page 1223, *et seq.* Also 619 and 1183.

Out of two natural Muscarines and 1 synthetic, Waller at London University found the *synthetic* (Muscarine Hydrochlor.) to be the only *active* one. Muscular contractility was nearly abolished by 15 minutes immersion in 1 in 1,000 solution (in 0.6% Sodium Chloride).

The antagonism of Muscarine by Atropine can be demonstrated. For details of best method of procedure, *vide* Phys. Proceedings, Nov. 21, 1903.

A liniment for gnat bites was found to contain Muscarine and caused poisoning.—P.J. i./09, 11; L. i./09, 562.

Acidum Agaricum, Agaricin P.G., Helv. and Jap. and Dan.

$C_{14}H_{27}(OH) \begin{matrix} \diagup COOH \\ \diagdown COOH \end{matrix} + H_2O = 317.84 \text{ (320.256 I. Wts.)}$, Laricic Acid. *Dose*— $\frac{1}{2}$ to $\frac{1}{4}$ grain is given to restrain the sweating of phthisis. Bismuth and Lithium Agaricinate are described.—F.N., 1906, 15.

Agrimonia Eupatoria (*Rosaceæ*).—Common agrimony. Mild astringent.

Elixir Agrimonie Compositum (Lunan). A special preparation of agrimony, rhubarb, toad-flax (*Antirrhinum Linaria*) barberry, caraway, chamomile, dandelion, parsley is in demand in incipient appendicitis; stated to avert an operation, and in any condition of the stomach and alimentary canal likely to produce inflammatory symptoms. *Dose*, 1 drachm in water thrice daily; as hepatic stimulant; mild astringent. **Mistura Agrimonie Composita**. *Dose*, $\frac{1}{2}$ ounce thrice daily is of similar composition.

Alchemilla Arvensis (*Rosaceæ*). Parsley Plant. Small annual plants with green flowers. Is superior to buchu in some instances. Infusion of leaves 1 in 10. *Dose*, 1 to 2 ounces.

Aletris Farinosa, B.P.C.—Star Grass (Colic Root). From the rhizome of this are prepared a Fluid Extract with diluted alcohol, U.S. (1890, 1=1) *dose*, 5 to 15 minims, and a Cordial or Elixir (B.P.C. containing Liquid Extract of Aletris 25, Liquid Extract of Liquorice 6, Simple Elixir 45, Water to 100), *dose* $\frac{1}{2}$ to 1 drachm, are used as uterine tonics. **Extractum Aletridis Liquidum**, B.P.C. 1 = 1 by percolation with Alcohol 45%.

***Alginoid Iron**. *Syn.* ***ALGIRON**.—*Dose*, 2 to 15 grains. Alginic Acid from seaweed is combined with iron, forming an insoluble brown powder containing about 11% of iron. Does not constipate; is given for anæmia. Pills and pellets are prepared. Also compound pills, Algiron 2 gr. with Extract Cascara $\frac{1}{2}$ gr.; with (C) Cascara Extract $\frac{1}{4}$ and Nux Vomica Extract $\frac{1}{2}$ gr.; (D) with Arsenic $\frac{1}{100}$ grain; (E) with Arsenic $\frac{1}{100}$ grain and Strychnine $\frac{1}{100}$ grain; (F) with Quinine 1 grain and Strychnine $\frac{1}{20}$ grain; and (G) with Nux Vomica Extract $\frac{1}{2}$ grain and Zinc Valerianate 1 grain. **Cupri Alginas**. *Dose*.— $\frac{1}{2}$ to $\frac{1}{4}$ grain. A green powder. Used in lupus, leprosy, cancer and anæmia.—B.M.J. i./06, 1464.

Allium.—Garlic. U.S. (1890). The bulb of *Allium sativum*. *Dose*, $\frac{1}{2}$ to 2 drachms. Useful in cases of dilated bronchi with fetid expectoration; expectoration lessened and fetor disappeared.—Clinical Journal, Jan. 24, 31, 1894. Juice.—*Dose*, 10 to 30 minims. Extract=insipissated juice. *Dose*, 4 to 10 grains. Pill contains 4 grains extract. Syrupus Allii Aceticus, U.S. (1890) 1 in 5. *Dose*, 1 to 4 drachms. In pulmonary phthisis it often diminishes cough and often expectoration ceases, lessens night-sweats, improves appetite, weight is gained and sleep becomes regular under its continued use. In bronchiectasia.—B.M.J. i./06, 83. The juice to allay nervous vomiting.—H.

Allium Porrum.—The common leek. Constituents, *see*.—L. ii./07, 167.

The Oil (Allyl Sulphide) is excreted, when given *per os*., through the lungs and skin—not apparently by the kidney. It has no solvent action on Uric Acid. **Oleum Allii Essentiale**. Principal constituents $C_6H_{10}S_2$ and $C_6H_{12}S_2$, $C_6H_{10}S_3$ &c., but no Allyl Sulphide $(C_3H_5)_2S = 113.28$ (114.15 I. Wts.). Stimulant, expectorant and stomachic. In chronic bronchitis, pneumonia, nervous affections, also in cholera, tuberculosis, hysteria, &c. Allyl Sulphide can be made by interaction of Alcoholic Potassium Sulphide with Allyl Iodide. *Dose* of either $\frac{1}{2}$ to 1 minim (2 minims of the 'Essential Oil' have been given.—W.H.M. in capsule or mixture.—M. Am.

Alnus Glutinosa.—The common Alder. *Uses.*—Astringent and tonic. Contains about 26% of Tannin. *Liquid Extract* 1 = 1 of the bark. *Dose*, 10 to 30 minims. Made by percolation with 45% Alcohol. Set aside the first portion, percolating ($\frac{1}{3}$ of the whole), and continue percolation with remainder of the Alcohol, concentrate and add to reserve portion. Was recently advocated in cancer. A Liquid Extract of the leaves, prepared by boiling with water and adding Alcohol *q.s.* to preserve, has also been used.—*Medical Mag.*, May 1907. In 140 cases of cancer pain, cachexia, and exhaustion diminished.

Alstonia constricta, I.C.Add.—Bark used in Australia as a febrifuge. *Dose*, in powder, 5 grains. A crystalline alkaloid, Alstonine or Chlorogenine, $C_{21}H_{20}N_2O_4, 3\frac{1}{2}H_2O = 424.09$ (427.236 I. Wts.), has been isolated from it. Tincture, 1 in 8 Alcohol 60%. *Dose*, $\frac{1}{4}$ to 1 drachm. Should be less, 5 to 20 minims. Influenza well treated by Tincture, 10 minim doses.—*L. i./01, 399*; *P.J. i./01, 362*, *vide also* I.C. Add. Three other alkaloids exist in it. A mild diaphoretic. The dose in I.C. Add. said to be too large—twice too much. When prescribing the tincture that of *A. constricta* should be specified.—*L. i./03, 375*.

Alstonia scholaris, I.C. Add.—Dita Bark, from India and the Philippines, contains amongst others an alkaloid, Ditaine, *syn.* Echitamine, $C_{22}H_{28}N_2O_4 = 381.42$ (384.244 I. Wts.), and the milky juice of the tree forms a substance resembling gutta-percha. Tincture, 1 in 8 Alcohol 60% *Dose*, $\frac{1}{4}$ to 1 drachm.—*P.J. i./01, 362*, *vide also* I.C. Add.

Very useful in chronic diarrhoea and advanced stages of dysentery.—Ghosh

Althæa. U.S. Marshmallow, dried root of *Althæa officinalis*, Linné (*Malvaceæ*) from second year's growth and deprived of the periderm. Contains Asparagin, *q.v.* Is mucilaginous and used in pill making to give 'body' and support.

Amadou.—Oak agaric, Surgeons' agaric, Touchwood. *Polyporus fomentarius* L. A fungus prepared with alkali and nitre, in light brown elastic pieces employed as a mechanical hæmostatic. It is included in P. Austr. under the name *Fungus ignarius*.

Amphicome Emodi, 'Kaur.' The root and stems of an Indian plant (*Bignoniaceæ*). A cold infusion of $\frac{1}{2}$ ounces in fever for 4 or 5 days. Infusion with catch in gonorrhœa, also powder internally for children, with pepper and Kaehur (*Hedysyrium spicatum*), for boils and pimples.—*P.J. ii./07, 506*. The name Kaur is also given to *Pterorhiza Kuroa q.v.*

Anylum (Off.), from common wheat (*Triticum Sativum*), maize (*Zea Mays*) and rice (*Oryza Sativa*) The structure of the starch grain (first paper) by Kraemar.—*Am. Jl. Ph.*, May 1907, 217.

Lenz found that the large grains of Rye starch in a hanging-drop of solution of Sodium Salicylate 1 to water 11, swelled up in an hour and more markedly in 24 hours at ordinary temperature. Only a small proportion withstand the action. Wheat starch shows the same in only very few of the large grains. Only a few grains of other starches, maize, rice, potato, arrowroot, etc. swell up.—*Int. Cong.*

Anacardium occidentale.—Cashew Nut. The pericarp of this contains a vesicating oily liquid, which consists of 10% of Cardol (to which the vesicating properties are due), and 90% of Anacardic Acid, $C_{22}H_{32}O_3 = 341.66$ (344.256 I. Wts.). The oil has been used in leprosy, ringworm, ulcers, corns, and internally as a vermifuge. Tincture, 1 in 10 Alcohol 90%. *Dose*, 2 to 10 minims. *Anacardii Folia* are in Ph. Ned. The Marking Nut, from *A. Officinatum*, possesses similar properties.

Anchusa Officialis (*Boraginaceæ*) Alkanet, causes the heart to stop in Austole, it yields 5 to 6% red amorphous resin "Alkannin," and contains two red substances of acid nature, has some relationship to action of Curare.—*q.v.* *L. i./06, 974*.

Andrographis, I.C.Add, *q.v.* *Vide also* Ghosh. 236.

Anethi Oleum (*P. Off.*)—Distilled from fruit of *Peucedanum graveolens*. Pale yellow, darkening on keeping, odour resembling caraway oil. Sp. Gr. 0.900 to 0.910 [*Off.* 0.905 to 0.920]; O.R., +70° to +75° [*Off.* +70°]; R.I., 1.483 to 1.485; Soluble 1 in 3 of 90% alcohol. *Note.*—By specifying *Peucedanum graveolens*, the oil of Indian fruit (*P. Sowa*) is excluded. Some normal distillates of dill-fruit have a lower Sp. Gr. than 0.905, but, since the oil is for medicinal purposes and the carminative principle is carvone, a high proportion of the latter should be

ensured by the minimum Sp. Gr. limit suggested. A high Sp. Gr. should put the analyst or user on his guard for admixture with caraway oil.—Umney. Brewis regretted to see upper limit of gravity lowered as some of the better oils have quite a high Sp. Gr. Similarly O.R. might reach higher than $+75^{\circ}$.

Anhalonium Lewinii.—Mescal Buttons, the fruit of this is eaten by the Mexican Indians to produce intoxication accompanied by visions. Effects due to alkaloids, ① Anhalonine, $C_{12}H_{15}NO_3=219.50$ (221.13 I. Wts.), and ② Mescaline, $C_{11}H_{17}NO_3(?)=209.59$ (211.146 I. Wts.). ③ Mescaline is the principle to which the peculiar visual hallucinations are due.—Pr. lxi.71. Effects of Mescal.—P.J. ii./99,357.

Anhalonium Williamsii contains an alkaloid ④ Pellotine. ⑤ Pellotine Hydrochloride, $C_{11}H_{13}NO(O.CH_3)_2HCl=271.60$ (273.63 I. Wts.), has been used as an hypnotic in dose of $\frac{1}{2}$ to $\frac{3}{4}$ grain, internally and injected.

Anisi Fructus (Off.), U.S. (cultivated fruits). Anise. Dried ripe fruit of *Pimpinella Anisum*, Linn. (*Umbelliferae*). Contains **Oleum Anisi (Off.)**, which is also distilled from the Star Anise (*Illicium verum*, N.O. *Magnoliaceae*). Dose, $\frac{1}{2}$ to 3 minims. Aromatic and carminative. Colourless or yellowish oil congealing between 10° and $15^{\circ}C$. Sp. Gr. at $20^{\circ}C$., 0.975 to 0.980. **Aqua Anisi (Off.)**.—Anise Fruit 1 pound, Water 2 gallons. Distil $\frac{1}{2}$. **Spiritus Anisi (Off.)**.—1 in 10 in Alcohol 60%. Dose, 5 to 20 minims. **Oleum Anisi**.—(P. Off) Oil distilled from fruit of *Pimpinella Anisum* or of *Illicium verum*, the latter being that used almost entirely in this country. Sp. Gr. at $20^{\circ}C$., 0.975 to 0.990 [(Off.) same], rising on keeping; O.R., -0° to -2° ; R.I., 1.552 to 1.553. Congeals when stirred at about $10^{\circ}C$. [(Off.) 10° to $15^{\circ}C$.], and should not melt again below $15^{\circ}C$. [(Off.) same]. At least 80% should distil between 225° and $235^{\circ}C$. Soluble, 1 in 3 of 90% alcohol. **Anethol (P. Austr., Ph. Ned., P. Belg., P. Jap.)**, $C_{10}H_{12}O=146.98$ (148.096 I. Wts.). The stearoptene from the Anise Oils melts at $20^{\circ}C$., B.-Pt. $230^{\circ}C$. Soluble in Alcohol 90% 1 in 3 approximately. Dose, $\frac{1}{2}$ to 2 minims.

The two varieties of the oil are practically identical.

Anthemis nobilis.—Chamomile Flowers (*Compositae*), (Off.). U.S. Tonic, aromatic, stomachic, emetic in large doses. In addition to official Extract, Infusion, and Oil, a Tincture, 2 of single fresh flowers in Alcohol (90%) 3, and Water 1, is used for summer diarrhoea of children. Dose, 3 to 10 minims. **Oleum Anthemidis (P. Off.)**.—Distilled from the flowers of the Roman chamomile. Sp. Gr. 0.905 to 0.915 [(Off.) same]; O.R., $+1^{\circ}$ to $+3^{\circ}$; R.I., about 1.445; Soluble in less than its own vol. of 90% alcohol. See also P.J. ii./08, 622, 683.

Anthoxanthum odoratum.—Sweet Vernal Grass. Flowers develop odour of coumarin on drying. Tincture, 1 of fresh-flowering herb in 10 of 40 O.P. spirit (making allowance for the moisture the plant contains). Dose, 2 to 6 minims, internally and diluted as a nasal lotion for hay fever.

Apis Mellifica.—The Honey Bee. A Tincture—Dose 1 minim hourly, is prepared, which is said to have decided effect in relieving urticaria.—Leonard & Christy's Dict. Mat. Med., p. 43. See also Acid Formic.

Arachis Hypogæa (Pea Nut, Ground Nut, Goober Nut).—The seeds of the plant form the 'pea nuts' of commerce. Have dry, brittle envelope and yellowish-white kernel. Very rich in a non-drying oil (40%). Ground down employed as cake for cattle. Very nutritive.—Ghosh.

Arbutin, $C_{12}H_{16}O_7+\frac{1}{2}H_2O=279.02$ (281.136 I. Wts.).—A crystallized glucoside obtained from the leaves of *Arctostaphylos Uva-ursi* (*Ericaceae*) U.S. (Fluidextractum 1=1 Glycerol-hydro-alcoholic), Bearberry, and other ericaceous plants. It is given for chronic cystitis and vesical catarrh, in dose of 5 to 15 grains with sugar; is not poisonous. Liquid extract of Uva Ursi leaves, dose, 20 to 40 minims, is preferable, the Infusion (Off.) has 1 ounce to 1 pint of boiling water. Antiseptic; also as vermifuge for dogs 60 to 100 grains. Arbutin, given *per os*, is partly decomposed with formation of Hydrokinone, but most of it is absorbed by the kidneys.—Dixon.

Busserole Fr.Cx.=*Uva Ursi Folia*.

Infusum Uvæ Ursi Concentratum, B.P.C. by b. process p. 398. Dose.— $\frac{1}{2}$ to one drachm.

* **Cellotropine**, Arbutin-Benzoin-Ether, $C_6H_4.OC_6H_{11}O_5$. $OCOC_6H_5=373.33$

(376·18 I. Wts.), $\frac{1}{2}$ to 1 Gm. (= 1 'teaspoonful') thrice daily, or even up to 5 Gm. in phthisis.—F.N. 1906,54. Cf. P.J. ii. /07,85.

Areca, Semen Arecæ, P.G. iv. Betel Nut. B. P. Add. 1874.—From *Areca Catechu* (*Palmaceæ*). *Dose*, 1 to 4 drachms. Is astringent, and is used as a vermifuge, especially for dogs; is also used as a masticatory and added to dentifrices. Contains several alkaloids, the most active being **Arecoline** (about 0·1 $\frac{1}{10}$). $C_8H_{13}NO_2$ = 153·98 (155·114 I. Wts.), a liquid which forms a crystalline soluble **hydrobromide** P.G. iv., Fr. Cx. P. Helv., P. Hung. $C_8H_{13}NO_2 \cdot HBr$ = 234·33 (238·0·2 I. Wts.). Fr. Cx. gives maximum single dose 0·0005 Gm. $\frac{1}{10}$ grain approx., and maximum daily dose 0·0015 Gm. ($\frac{1}{10}$ grain), approx. Its physiological action is allied to that of pelletierine and pilocarpine. Taken internally, causes vomiting and diarrhoea.—B.M.J.E. ii./90,15. Is sialogogue and diaphoretic.—B.M.J.E. ii./95,99. Arecoline resembles physostigmine as a myotic, 1% solution suitable.—P.J.ii./95,39; M.C. Nov./97,151; Y.B. 1898,368; B.M.J. i./99,82. Serviceable in glaucoma. By some considered the best myotic, "Ocular Therapeutics."—M.P. Aug./1905

Cancer occurring in the mucous membrane of the cheek apparently connected with chewing of a quid of betel leaf, areca nut, slaked lime, and tobacco leaf.—B.M.J., ii/08,1428.

Tenaline, a liquid specialty, used in veterinary practice; is an efficient vermifuge. *Dose*, 1 minim for each pound of the weight of the dog.—B.M.J.E. i./98,35.

Asafetida (Off.).—Gum resin obtained by incision from the root of *Ferula Fatida* and probably other species. B.P. requires not more than 10% ash, and not less than 65% soluble in alcohol 90%: 20% Ash and 40% Alcohol-soluble would be preferable. Coat pills first with mucilage and afterwards with Pill Varnish to cover the odour—not with silver, which would blacken. Nerve stimulant, relieves hysteria, flatulence of typhoid, and enteritis. **Emulum Asafetidæ**, U.S. **Asafetida 40**, Water to 1,000. **Enema Asafetidæ**, L. H. Tincture of Asafetida, $\frac{1}{2}$ ounce. Starch Enema to 4 ounces. **Tincture (Off.)**, 1 in 5 Alcohol 70%. *Dose*, $\frac{1}{2}$ to 1 drachm. U.S. 1 in 5. *Average dose*, 15 minims. **Flavoring**.—Syl Menthae, Piperitæ, Syl Limonis, Syl Coriandri; Syrupus Zingiberis not much good. **Liquor Antihystericus**.—*Dose*, $\frac{1}{2}$ to 1 drachm. On the Continent a mixture is used of Camphorated Spirit of Ether and Asafetida Tincture equal parts.

For notes on analysis of Asafetida see Allen, vol. ii., part 3, '07,211.

Threatened appendicitis. Flatulent distension often remarkably improved by moderate dose of castor oil combined if necessary with enemata of Turpentine and Asafetida. Marked change in iliac swelling often effected.—B.M.J. i./09,1235.

Asclepias cornuti (A. syriaca).—Is diaphoretic and diuretic. Tincture, 1 in 10. *Dose*, 5 to 40 minims.

Asclepias incarnata.—White Indian Hemp rhizome. Is a speedy, potent, and reliable diuretic.—Pr. xliii.141. Tincture, 1 in 10. *Dose*, 5 to 40 minims.

Asclepias tuberosa.—Pleurisy Root. Is expectorant and diuretic. Tincture, 1 in 10. *Dose* 5 to 40 minims.

Asparagin. Syn. ALTHEIN. Amido-Succinic Acid Amide. $C_2H_3(NH_2)(COOH)(CONH_2)$, H_2O = 149·04 (150·10 I. Wts.). *Dose*—1 to 2 grains. White crystals, having a slight acid reaction. May be obtained from *Asparagus officinalis*, and the roots of liquorice, belladonna, &c. Soluble 1 in 50 of water, also in acid and alkaline solutions. Insoluble in absolute alcohol and ether. An aqueous solution dissolves freshly precipitated mercuric oxide, and is recommended for hypodermic injection in syphilis.—*Vide* Hydrargyri Asparaginas. Has decided diuretic effect. For cardiac dropsy and chronic gout one grain is given three times a day.

Avena Sativa.—Tincture of the oat in 20 minim doses recommended to relieve pruritic condition induced by eruption in dermatitis.—Fox, Photog. Atlas of Diseases of Skin, vol. ii., p. 66.

Balanites Roxburghii (Zygophyllaceæ). An Indian Plant—the unripe fruit is anthelmintic and purgative.—N.S.D.

Balsamum Gurjunæ.—Gurjun Balsam Wood Oil. *Dose*, $\frac{1}{2}$ to 2 drachms.

A greenish fluorescent balsam from the trunk of the growing tree *Dipterocarpus turbinatus* and other species of this genus; imported from the East Indies. Has aromatic odour and taste, and has been used as an adulterant of copaiba. It is not completely soluble in either ether or alcohol. Used with success for gonorrhœa, and as a liniment for leprosy; also in emulsion with lime-water, which is given freely internally. As an expectorant, given with malt extract.—L. i./90,962. To test for *vide* Copaiba.

Balsamum Peruvianum. (Off.) U.S. Dose, 5 to 15 minims. From trunk of *Myroxylon Pereiræ*, U.S. *Toluifera Pereira* (Leguminosæ). A viscid liquid insoluble in water, soluble in chloroform, absolute alcohol, and glacial acetic acid; slightly in ether and petroleum benzine. Contains Cinnamon and Cinnamic Acid. Sp. Gr. between 1.135 and 1.150. "Synthetic" Balsam, recently placed on the market, may be detected by shaking 2 Gm. with 10 Gm. of Petroleum Spirit. Evaporate the Petroleum Solution on a water bath, dry on same 10 minutes, cool, and add three drops Nitric Acid 1.33. Mix. Peru balsam gives a golden yellow colour. Inhalation of a few drops of vapour 1 in alcohol 2 in a little hot water useful in pharyngitis. As a dressing in war; may be left on wounds, if aseptic, for 20 days if necessary.—L. ii./04,1807. Scabies satisfactorily treated with a paint of Balsam 3, Glycerin 1.—B.M.J. i./07,744; M.P., Jan. 30, 07, p. 134. But test for albumin in urine both before and during treatment. Sometimes serious.—B.M.J. i./07,972. **Balsamum Lanolinatum.**—Lanolin 5003, Vaseline 2,000, Balsam Peru 12, Otto 4.—Ph. Notes (Denmark). C.X. has **Unguentum Balsami Peruviani**.—Peruvian Balsam 1, Lard 9. **Lotio Balsami Peruviani.**—MacNaughton Jones uses as application to the hair (excellent in alopecia) a preparation of Peru Balsam 1 drachm, Spirit of Rosemary 1 ounce, Tincture of Cantharides 4 drachms, Pilocarpine Nitrate 2 grains, Almond Oil 1 ounce. This is applied at night, and washed off next morning with a borax and spirit lotion. Peru, Tolu Balsam and Storax compared.—Allen, vol. ii., part 3, 07, p. 55.

Recommended for use in dentistry.—C.D. i./10,152.

Balsamum Tolutanum. (Off.) Dose, 5 to 15 grains. Obtained from the trunk of *Myroxylon Toluifera* (N.O. Leguminosæ). Recently prepared is soft, but becomes brittle in cold weather. Soluble 1 in 1 alcohol 90%. A minimum standard of 30% total aromatic acids, of which $\frac{2}{3}$ is combined, is suggested by Mann. **Syrupus Tolutanus.** (Off.) Dose, $\frac{1}{2}$ to 1 drachm. Boil balsam $1\frac{1}{2}$ ounces with water 1 pint half an hour, make up to 16 when cold, filter and dissolve sugar 2 lbs. on water bath. Should weigh 3 lbs. **Tinctura Tolutana** (Off.) 1 in 10 alcohol 90%. Dose, $\frac{1}{2}$ to 1 drachm. **Syrupus Tolutanus** U.S. is Tincture of Tolu (1 in 5 of Alcohol 94.9% vol.) in 5 parts, Sugar 82, Magnesium Carbonate 1, Water to 100 s.a.—See also Allen, vol. ii., part 3, 07, p. 55.

Baptisin. Dose, 1 to 5 grains. An extractive from *Baptisia tinctoria*, in small doses a laxative, in large doses a cathartic. Tincture 1 in 10 of Alcohol 60%. Dose.—5 to 30 minims.

Barii Chloridum.—**Barium Chloratum**, P.G. $\text{Ba.Cl}_2\cdot 2\text{H}_2\text{O} = 242.54$ (244.322 I. Wts.). Dose.—1 to 1½ grains. Max single 3 grains or 9 grains per diem. Colourless crystalline plates, with bitter saline taste. Soluble 1 in 2½ of water. Solution is destructive to bacteria. Incompatible with sulphates, phosphates, tartrates and carbonates.

Mostly used for analytical purposes, but is of value as a heart tonic; has alterative properties; has been tried for syphilis and scrofula. Also 1% solution as eye wash in scrofulous inflammation. Varicose veins are treated by internal use, and applied locally over the distended vessels.—H. In the form of **Barium Water** (*vide* Mineral Waters) it has also been much used for glandular swellings. Antidote.—Sodium Sulphate.

Barii Nitras. $\text{Ba}(\text{NO}_3)_2 = 250.56$ (261.39 I. Wts.) and **Barium Acetate** $(\text{CH}_3\text{COO})_2\text{Ba} = 253.56$ (255.418 I. Wts.) may be employed officially in place of the chloride for testing.

Bassia Longifolia. Mowrah Seeds from India contain a large quantity of oil used in making soaps. The residue after expressing the oil was found to contain a Glucoside 'Mowrin.' This yields 'Mowric Acid.' The parent substance has laking effects on blood corpuscles when suspended in saline solution.

Both Mowrin and the acid have a digitalis-like action on the heart when injected.—B.M.J. ii./09,541; P.J. ii./09,364.

Beberinæ Sulphas. *Syn.*—Buxine and Pelosine. Probably a mixture of Sulphates of Beberine, $C_{36}H_{42}N_2O_8$, and Nectandrine, $C_{40}H_{46}N_2O_8$. *Dose*, 1 to 10 grains; if in a mixture a little Aromatic Sulphuric Acid covers its bitterness. It is in scales, and is prepared from the bark of *Nectandra Rodiæi*, Bebeeru bark. It is freely soluble in water. Beberine Hydrochloride is in reddish brown scales. Use, antipyretic and tonic as Quinine; valuable for menorrhagia.

Berberinæ Carbonas $C_{20}H_{17}NO_4 \cdot H_2CO_3 + 2H_2O$ (Schmidt) = 429.97 (433.194 I. Wts.). or + 5H₂O. *Dose*.—2 to 5 grains (0.13 to 0.32 Gm.).

Although contained in Hydrastis and Calumba, is obtained principally from the bark of *Berberis vulgaris* and other species of Barberry. In bitter yellowish crystals, insoluble in water. Its salts, the Hydrochloride, Phosphate, and Sulphate, are bright yellow in colour, and soluble in water, the hydrochloride about 1 in 400, the phosphate 1 in 12, and the sulphate 1 in 150. *Dose* of each:—2 to 6 grains. Given for indigestion, diarrhoea, malaria, and sickness in pregnancy. Berberis Berries (Baies) are official in Fr. Cx. as ingredient in Electuaire diascordium.

Berberis Aquifolium is official in U.S.

Fluidextractum Berberidis. U.S. average dose.—2 Cc. (30 minims). By hydro-alcoholic percolation.

Bixæ Folia. Ph. Ned. (*Bixaceæ*). The leaves of *B. Orellana*. Annatto is obtained from the seeds.—N.S.D. p. 242.

Blepharis Capensis.—This South African plant is recommended as a remedy for anthrax. Tincture, 1 in 8 of 90% Alcohol. *Dose*.—16 minims (1 Cc.) every three hours; gradually lessened, as the drug is an active one.—P.J.i./98,140. Recommended in snake bites and insect bites, also for toothache.—P.J. ii./00,63.

Boldoa fragrans (*Peumus Boldus*). *Dose*, 1 to 3 grains in cachet or capsule. The leaves, from Chili and Bolivia, resemble those of Sweet Gale (*Myrica Gale*), but are more aromatic. In dyspepsia, liver affections, rheumatism, and as a diuretic for atony of the bladder. Boldine, an alkaloid, has hypnotic and slight local anæsthetic properties. Boldoglucin is a glucoside with similar action. *Dose*, 3 grains.—B.P.C. Tinctura Boldoæ, 1 in 5 of 90% alcohol. *Dose*, 10 to 20 minims.—B.M.J. ii./85,1134; i./88,918. A useful drug for hepatic diseases, especially painful ones. The inhabitants in South America take half a litre of strong decoction in the day.—B.M.J.E. ii./07,72.

Bonduc Nut.—The Seeds of *Cosalpinia bonducella* are used in India as a tonic and febrifuge—generally mixed with black pepper for the purpose.—I D.C.; ex. P.J. ii./09,337.

Ⓢ **Brucine**, $C_{23}H_{26}N_2O_4 + 4H_2O = 462.85$ (466.292 I. Wts.). *Dose*, $\frac{1}{3}$ to $\frac{1}{2}$ grain. An alkaloid from *Strychnos Nux Vomica* seeds—small white acicular crystals, with bitter taste. Very soluble in Alcohol and Chloroform. Its salts are soluble in water. Like Morphine it gives a red colour with nitric acid (*see* Water Analysis), which Strychnine should not. It is said to possess only $\frac{1}{3}$ of the physiological power of Strychnine. For epilepsy the Ⓢ Hydrochloride, $C_{23}H_{26}N_2O_4 \cdot HCl = 427.52$ (430.696 I. Wts.), has been given as liquor, same strength as Liquor Strychninæ, in 10 minim doses increased until $\frac{1}{4}$ a grain is reached. Ⓢ **Brucine Sulphate** $(C_{23}H_{26}N_2O_4)_2 \cdot H_2SO_4 = 880$ (886.542 I. Wts.) + Aq. White crystals soluble 1 in 80 in water. For Dixon's results of comparison with strychnine, *vide* p. 652.

Bryonia. *Syn.*—*Vitis alba*; White Bryony.

Tinctura Bryoniæ, B.P.C.—From bruised fresh roots of *Bryonia alba* or *B. florea* (*Cucurbitaceæ*) a tincture is prepared corresponding in strength to 1 of dried root to 10 of alcohol (60%). *Dose*, 1 to 10 minims (0.06 to 0.6 Cc.) or more. Useful in pleurisy. Relieves the pain and allays the cough. In large doses it is an active cathartic, used for dropsy. It also checks metrorrhagia. The fresh plant applied to the skin will cause vesication. It contains a bitter principle, cathartic and diuretic, soluble in water and alcohol.

Buphane Disticha, *B. toxicaria* (*Amarylhidaceæ*). Kaffir In—Cwadi. A familiar plant on the South African veldt. Root bulbous, standing half out of the ground. Flower head, fleshy pink in colour, becomes detached, and is blown over the veldt to disseminate the species. The bulb coats employed as a protective after circumcision by the natives. Stated to contain Aconitine.—Oliver, C.D. i.'08,140.

Cajuputi Oleum (*P. Off.*).—Distilled from leaves of *Melaleuca Leucadendron* and other species. Sp. Gr. 0·919 to 0·930 [*Off.* 0·922 to 0·930]; O.R., not more than -20. R.L., 1·460 to 1·467. Ten Cc. mixed in a freezing mixture, with 4 to 5 Cc. of phosphoric acid (Sp. Gr. 1·750), and pressed in a piece of fine calico between folds of blotting paper under a strong press, and the pressed cake decomposed by water in a 25 Cc. measure, should yield at least 4·5 Cc. of cineol.

Calendula Officinalis (*Compositæ*). U.S. Dried florets. Dose, 15 grains, Tincture B.P.C., 1 in 5 Alcohol 90% (U.S. 96% Alcohol). Dose, 5 to 20 minims. Applied to wounds, and is given in amenorrhœa. It has diuretic and stimulant properties.

Calumba (*Off.*). U.S. Dried root, sliced, of *Jateorhiza Calumba* (*Menispermaceæ*). Non-astringent tonic for simple debility and indigestion. Can be given with Salts of Iron. Infusion 1 in 20 (cold water); Concentrated Infusion v.p. 398 Tincture 1 in 10 Alcohol 60% (U.S. 1 in 5). Might be made with 45% alcohol.—P.J. ii/09,142. *Flavoring* Glyl Aurantii Amari (double dose), Glyl Lavandulæ; Syrupus Aurantii Amari. **Fluidextractum Calumbæ**. U.S., 1=1 Hydro-alcoholic percolate. Dose, 30 minims. Is represented in I. C. Add. by *Coscinum fenestratum* (false Calumba Root), g.v.

Cambogia (*Off.*), U.S., P. Austr. Dose, $\frac{1}{2}$ to 2 grains. FR. Cx. Gomme Gutte. Yellow Gum Resin from *Garcinia Hanburii* (*Guttiferae*) growing in Siam. A powerful purgative. May cause severe griping. Will expel tapeworm. Is rarely now given alone.

Canella Alba. Wild Cinnamon (*Magnoliaceæ*) contains Aromatic Oil Stomachic.

Cannabis Sativa (*Urticaceæ*). Russian hemp-seed, oil-free (extracted by Benzine) has been used in form of decoction, strength 100 Gm. in 1 litre, heated gently and evaporated (without boiling) to 250 Cc. 35 to 50 Cc. of the resulting liquor are given to children in the food. The dried hemp seed freed from oil contains 1·50% Phosphorus in organic combination as against 10% before the fat is removed. Children are said to greatly improve under the treatment.—B.M.J.E. ii/07,27.

Emulsio Semen Cannabis.—10% in water. Used as a potion against gonorrhœa, two glasses daily. Has slight sedative properties.—(Russia) Ph. Notes.

Carapa Guiniensis and other species of *C.* (*Meliaceæ*).—The oil from the fruit is termed 'Crab Oil,' and is poisonous to insects—Invaluable to travellers it is smeared on the body or clothing. It is held in very high esteem by the blacks in Demerara and other neighbouring parts as a purgative. Contains an alkaloid. It is solid below 20° C.—Ph. Notes.

Carbo Animalis. Animal Charcoal. B.P., 1885, U.S., as also **Carbo Animalis Purificatus**—by means of hydrochloric acid. **Carbo Ligni**, U.S. Wood Charcoal. Dose—60 to 120 grains. Made by burning wood, e.g. willow, to red heat with access of as little air as possible. In cachets or as charcoal biscuits as an absorbent in distension of the stomach, e.g., in dyspepsia. Is antiseptic, and is used externally as a poultice to foul ulcers. Cocoa Nut Charcoal has been employed by Dewar owing to its remarkable powers of absorbing gases to improve high vacua.

Carbonis Bisulphidum (*Off.*). *Syn.* Carbonei Disulphidum, U.S. CS₂=75·55 *Off.*, (76·14 I. Wts.) (75·57 U.S. Wts.). A clear liquid with characteristic odour, Sp. Gr. 1·288 to 1·269. Very slightly soluble in water, but readily in Alcohol, Ether and Chloroform and the fixed and volatile oils. Dissolves Phosphorus, Sulphur and Rubber with avidity. Is poisonous, but has been employed in treatment of phthisis.

Acute poisoning by, respirations very slow (about 12 per minute). Expiration deep, prolonged and blowing; heart not much affected, but pulse weak.—Amer. Med., May 27/05; M.A., 1906,12.

In tuberculosis, inhaled, useful, has no disagreeable after effects. Is parasiticide. In fibrinous pneumonia small doses with water useful.—B.M.J.E. ii./06,68.

Carbonis Tetrachloridum.— CCl_4 =152.67 (153.84 I. Wts.). A heavy, volatile, and mobil-chloroform-like liquid, has a pleasant pungent, quince-like odour if pure. Sp. Gr. 1.56. The vapour inhaled relieves hay-fever. Employed locally, sprinkled on piline or lint covered with American oiled cloth, it quickly relieves neuralgic pains. Has been used as, but is not a successful anæsthetic (proportion of deaths stated to be 1 in 20,000—B.M.J. ii./09,243). Has been used as a substitute for petroleum as a dry shampoo, but is dangerous.—B.M.J. i./07,1709.

It is still largely used for this purpose by hairdressers. A death occurred on July 12, '09 owing to inhalation of the vapour. At the inquest it was stated that 14 tons of the Tetrachloride had been used without previous serious result. Medical evidence was to effect that death was due to sudden heart failure from degeneration of the muscles, and possibly partly to the condition of status lymphaticus, and also possibly accelerated by inhaling Carbon Tetrachloride.—B.M.J. ii./09,243.

Status lymphaticus may have been a factor in the case. The writer of the letter believes that the deceased did not breathe any Carbon Tetrachloride at all. He attributes death to lymphatism plus effect of shock. Experiments to prove.—L. ii./09,1703.

Charge of manslaughter will be made in any future case.—B.M.J. ii./09,1303.

Waller has determined the relative toxicity of Chloroform and Carbon Tetrachloride. The toxicity of the latter is considerably greater than Chloroform (has about double the toxicity) and that of the hairwash in question greater still—it contains an appreciable quantity of Carbon Bisulphide in addition. It is dangerous to envelope the head in a cloud of Carbon Tetrachloride. Its vapour is about 5 times heavier than air, so that notwithstanding fanning it must fall on the face of the person operated on.—L. ii./09,369.

Suggestion for inclusion as a poison.—L. ii./09,662,1163.

Experiments determined that 2% of Carbon Bisulphide added to Carbon Tetrachloride increases its toxicity by 33%, and though Carbon Tetrachloride acts less rapidly than Chloroform it is more deadly. Muscles recovered in the case of Chloroform but not in the case of Carbon Tetrachloride.—Phys. Lab. Lon. Univ. L. ii./09,1163.

Cardamomi Semina (Off.). Dried ripe seeds of *Elettaria Cardamomum* (*Scitamineæ*). The seeds should be removed from their pericarps when required for use. Given in atonic dyspepsia. Contained in *Pulvis Aromaticus*, U.S. *Tinctura Cardamomi Composita (Off.)*. Dose, $\frac{1}{2}$ to 1 drachm. Cardamom Seeds 125, Caraway Fruit 125, Raisins freed from seeds 1,000, Cinnamon Bark bruised 250, Cochineal 63, Alcohol 60% 10,000. *Tincture*, U.S., 1 in 5 Alcohol (48.9% vol.). Compound *Tincture*, U.S. Cardamom 25, Saigon Cinnamon 25, Caraway 12, Cochineal 5, Glycerin 50, Alcohol (48.9% vol.) to 1,000. Compound Cardamoms *Tincture* is incompatible with Alkaloidal salts, Bismuth mixtures, Sodium Bromide.—P.J.i./05,218.

Carminum.—Red colouring matter, containing about 50% Carminic Acid, $\text{C}_{22}\text{H}_{16}\text{O}_{10}$ —379.27 (382.144 I. Wts.), prepared from the cochineal insect—*Coccus Cacti* (*Hemiptera*), the dried fecundated female insect reared on *Nopalca Coccinifera* and other species of *Nopalca*. The sun-dried insects, if killed by sulphur or carbonate fumes, are silvery colour and designated "silver grain," owing to deposit of wax on the surface. If killed by hot water and dried artificially the "black grains" are produced. It is insoluble in water, but entirely soluble in aqueous ammonia. Is used to colour toilet preparations and for staining in microscopy.

Carmalum. Carminic Acid 1, Ammonia Alum 10, Distilled Water 200. Heat to dissolve. Cool and filter. Suitable for staining after osmic acid, c.f. Mayer's Carmalum. *Liquor Carmini.* Carmini 1, Distilled Water q.s. to moisten, Strong Solution of Ammonia 1, dissolve, and add Water 10. Used to colour toilet preparations, &c. *Tinctura Cocci (Off.)* 1 in 10 Alcohol (45%). Dose, —5 to 15 minims. Might be made with 30% Alcohol.—P.J. ii./09,14.

Liquor Cocci, Liquid Cochineal. Cochineal (not bruised), Potassium Carbonate, of each 1, Distilled Water 8. Heat in water-bath for half an hour; gradu-

ally add Acid Potassium Tartrate 1, stir well, continue the heat, and add Potash Alum (in powder) 1; heat five minutes more, strain through absorbent wool, and pour over contents of strainer sufficient Distilled Water to make strained product measure 8; when cold add Chloroform $\frac{1}{2}\%$ by volume. As indicator in titrations the official tincture may be used. Suitable for titrating alkaloids with mineral acids, the alkaloids giving the same colour as mineral alkali.—P.J. ii./08 194.

Carui Oleum.—Caraway Oil. *Dose*, $\frac{1}{2}$ to 3 minims. Distilled from fruits of *Carum Carui* (*Umbelliferae*) (content up to 7%). Colourless or yellowish oil. Sp. Gr. 0.910 to 0.920. No normal Caraway Oil has Sp. Gr. less than 0.910 Umney.—C.D. ii./09, 580. **Oleum Carui.** (*P. Off.*). Distilled from caraway fruit and rectified. Sp. Gr. as above; O.R. $+75^{\circ}$ to $+82^{\circ}$; R.I., 1.487 to 1.497. Soluble in equal vol. of 90% Alcohol and 1 in 10 of 60% Alcohol. When fractionally distilled from a Wurtz flask at the rate of 1 drop per second, at least 50% should distil above 200° C. **Oleum Cari.** U.S. Sp. Gr. 0.905 to 0.915 at 25° C. Soluble in equal volume of Alcohol, and in 3 to 10 volumes of 80% Alcohol. O.R. $+70^{\circ}$ to $+80^{\circ}$.

Carvonum, P. Austr. *Syn.* Carvol. $C_{10}H_{14}O=148.98$ (150.112 I. Wts.). A yellowish or colourless liquid prepared from the oil has Sp. Gr. 0.960–0.964. Soluble 1 in 2 diluted alcohol.

See also Allen, vol. ii., part 3, '07, p. 380, for method of determination, &c.

Caryophylli Oleum.—Clove Oil (*Off.*) *Dose*, $\frac{1}{2}$ to 3 minims. Colourless to brownish oil. Sp. Gr. not below 1.05. Distilled from the flower buds of *Eugenia Caryophyllata* (*Myrtaceae*). U.S. specifies 80% Eugenol, v.p. 705, Assay method given. Sp. Gr. 1.033 to 1.06 (Schimmel, Am. JI. Phcy., June 1906, 25). Aromatic carminative. Given with advantage both internally and injected hypodermically in phthisis. A most satisfactory disinfectant for the hands (said to be even more efficient than perchloride), catheters, catgut, &c.—P.J. ii./06, 553.

Ph. Ital. requires at least 85% Eugenol.

Many fall below 1.05 in Sp. Gr. Umney says, nevertheless Eugenol figure should not be less than 80%.—C.D. ii./09, 580.

Oleum Caryophylli. (*P. Off.*) Sp. Gr. 1.047 to 1.070. R. I. 1.528 to 1.540; Soluble in 1 in 3 of 70% Alcohol. An alcoholic solution yields a blue colour with test solution of Ferric Chloride. If 10 Cc. of the oil be heated on a water-bath in a flask with neck graduated in tenths of 1 Cc., and well shaken with 100 Cc. of a 5% aqueous solution of Potassium Hydroxide and allowed to stand, the uncombined oil driven into the neck should measure not more than 2 Cc., showing the presence of at least 80% Eugenol.

Cascarilla (*Off.*). Dried bark of *Croton Eluteria* (*Euphorbiaceae*), in quills 1 to 3 inches or more long, and about $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, or in small curved pieces. Contains Resin and 0.5 to 3% Volatile Oil, also the bitter principle cascarillin (best extracted by Acetone—Naylor, P.J., July 28, 06), together with resin and tannin. Aromatic tonic. **Infusum Cascarillæ** (*Off.*), 1 in boiling distilled water, 20. Infuse 15 minutes. **Tincture** (*Off.*), 1 in 5 Alcohol 70%, might be 60% Alcohol.—P.J. ii./09, 142. *Dose*, $\frac{1}{4}$ to 1 drachm.

Casimiroa edulis (*N. O. Rutaceae*). This Mexican plant has hypnotic and analgesic properties. Liquid Extract in doses of 1 to 2 dr. has been given producing sleep in 2 to 3 hours.—L. ii./09, 561.

Cassia Beareana. A native Ceylon remedy for fever, blackwater fever, and malaria.—L. i./02, 282; i./03, 190, 796.

A liquid extract, 1 in 1 is prepared. *Dose*, 30 to 60 minims, well diluted with water.

Cassiae Oleum. See *Cinnamomi Oleum*.

Cassia Fistula, U.S. *Average dose*, 1 drachm (4 Gm.). Dried cylindrical brown fruit 20 mm. in diameter and 25 to 50 cm. long, mild aperient.

Cassia Montana.—Leaves of, not satisfactory as a substitute for Senna.—I.D.C.

Cassiae Pulpa (*Off.*). *Dose*, 1 drachm to 2 ounces, from pods of *Cassia Fistula* Linné (*Leguminosae*), French (*Casse en Batues*), mild aperient.

Castor, P. Austr. and Helv. Dried preputial follicles and secretions from the Beaver, *Castor Fiber* (*Rodentia*), in brown pieces. To contain not more than 40%

insoluble in hot alcohol. Stimulant and antispasmodic. Is given in dysmenorrhœa as tincture 1 in 20. Dose, $\frac{1}{2}$ to 1 drachm, suspended in water, with Mucilage of Acacia, or the tincture may be evaporated and equivalent of these doses given in capsule form. See also *Mistura Morphine et Phenazoni Composita*.

Fr. Cx. describes the two commercial varieties Canadian and Russian.

Guttæ Castorei Compositæ containing Tincture of Castor 1 ounce, Compound Chloroform Tincture 4 drachms, Compound Tincture of Lavender 1 ounce, Spirit of Camphor 4 drachms, Spirit of Nitrous Ether 1 ounce. A teaspoonful in water for nervousness or sleeplessness.—B.M.J. i./09, 691. There is some mistake as to the quantity of guttæ in the reference—but as written by us the dose is safe.

Catechu (Off.). Syn. *Catechu Pallidum*. Dried extract of leaves and young shoots of *Uncaria Gambir* (*Rubiaceæ*). Gambir, U.S., is the dried extract from *Ourouparia Gambir* (*Rubiaceæ*). Soluble in water to the extent of about 50%. Astringent in diarrhœa. Dose, 5 to 15 grains. **Pulvis Catechu Compositus (Off.)** contains Catechu 4, Kino 2, *Krameria* Root 2, Cinnamon Bark 1, Nutmeg 1. Dose, 10 to 40 grains; Tincture 1 in 5. Alcohol 60% with Cinnamon 1 in 20. (*Tinctura Gambir Composita*, U.S.—Average dose, 1 drachm; 1 in 20 Diluted Alcohol with Saigon Cinnamon 1 in 40.) **Trochiscus Catechu (Off.)** U.S., contains 1 grain. For relaxed throat.

Caulophyllin. Dose.—1 to 4 grains. Resinoid from root of *Caulophyllum thalictroides*—blue cohosh, pappoose, or squaw root. Stated to contain an alkaloid, has diuretic diaphoretic, anthelmintic properties, emmenagogue, and antispasmodic. It appears to exert a direct influence on the uterus. Liquid Extract N.F. 1=1. Dose, 8 minims. Examination of the fruit of.—P.J. ii./08, 550.

Cedri Ligni Oleum chiefly from *Juniperus Virginiana* (*Conifereæ*; family *Cupressinæ*) yields a stearoptene Cedrene Camphor $[C_{15}H_{26}O = 220.53$ (222.203 I. Wts.)] and an oleoptene Cedrene $C_{15}H_{24} = 202.65$ (204.192 I. Wts.) the odor of which is distinct and stronger than the Camphor, and taste finally peppery. Oil largely used in perfumery, also, in a thickened form by concentration in vacuo, in microscopical work with oil immersion lenses. **Paraffinum Liquidum, Off.** is also used for this. It has a refractive index, slightly lower than Cedar Wood Oil, but owing to non-volatility it is excellent for the purpose.—Rowntree, JI. Path. & Bact. 1908.

Cedrus Atlantica. The essential oil distilled from the wood. Syn. **Libanol.** Sp. Gr. 0.9517. $n_D^{20} = +48^\circ$ at 20° C. Soluble 1 in 3 to 4 of Alcohol 90%. 200 cases of blemorrhœa well treated with the oil instead of with Santal Wood Oil. Results equal in all respects to those obtained by other balsamic preparations.—F.N. 1909. Capsules contain 8 minims. Dose.—Up to 6 per diem p.c. Said to be useful in phthisis, bronchitis and skin affections. Ointment 25% with Vaseline basis.—N.S.D.

Cepa-Coballo. Probably found throughout South America. The infusion is taken freely and frequently as a diuretic. A fluid extract is prepared. (River Plate.)—Ph. Notes.

Cera Alba (Off.) is Yellow Wax (*Cera Flava*) from the honeycomb of *Apis Mellifica* (*Hymenoptera*) of both M.Pt. $61-64^\circ$ C., bleached. To detect paraffin char with Sulphuric Acid, which completely oxides the wax—leaving the paraffin unchanged—this may then be extracted with ether. Paraffin lowers the M.Pt. A solution in carbon tetrachloride suggested to spray the hands to form a coating for surgeons' use prior to operation.—L. ii./07, 934.

C.R. 1908 (q.v.) suggests new monograph for *Cera Flava*.

Cereus (Cactus). **Grandiflorus (Night-blooming Cereus).**—Used in asthenic conditions of heart, and dropsy.—B.M.J. i./90, 70. Liquid Extract (imported), 1=1. Dose, 1 to 10 minims. Tincture, fresh flowers and young stems 1, alcohol 4. Dose, 2 to 10, increased to 30 minims. A cardiac tonic, free from cumulative or narcotic action, most valuable in functional disorders, palpitation in dyspepsia and Graves' disease, and the milder forms of angina.

Considered superior to *Digitalis*. Does not irritate the stomach, is non-cumulative, increases muscular motor energy, raises arterial tension, and strengthens pulse.—Med. Rec., June 3, 1905.

Action on the heart was found to be slight and uncertain. No alkaloid has yet been isolated.—L. i./07,753. Almost no action.—M.A. 1908,12.

Pillets, a specialty recommended as a cardiac tonic, are said to contain $\frac{1}{100}$ grain. Cactina, obtained from *Cactus mexicana*. Botanical description, cardiac action doubtful.—P.J. ii./07,174. 539,574.

Cactin or Cactina stated to be quite inactive even in doses 100 or 1000 times those directed.—P.J. ii./08,164.

Cetaceum, Spermaceti (Off.). White unctuous crystalline substance (M. Pt. 46—50° C.), obtained principally from the head of the sperm whale, *Physeter Macrocephalus*. Consists chiefly of Cetyl Palmitate, $C_{15}H_{31}CO.O C_{16}H_{33}=476.83$ (480.512 I. Wts.). Soluble in chloroform 1 in $1\frac{1}{4}$ and in Ether about 1 in 7. Is contained in Cold Cream, *q.v.* Unguentum Cetacei (Off.). Melt Spermaceti 5, with White Wax 2, and Almond Oil 18 (by weight), add Benzoin $\frac{1}{2}$, stir and continue heating two hours. Strain and stir until cold. Cetaceum injected warm (40° C.) the night before the operation on thin-walled cysts, after tapping and washing out with warm water.—B.M.J. i./06,154. More suitable as an addition to theobroma suppository mass than wax, which should not be used beyond 10% addition.—C.D. ii./04,498.

C.R. 1908 *q.v.* suggests new monograph.

Blanc de Baleine, (Fr. Cx.)=Spermaceti.

Æthol or Æthal.—Cetyl-Alcohol, $C_{16}H_{33}OH=240.44$ (242.272 I. Wts.), in crystals from Spermaceti. Is recommended for dermatological use, rubbed on the skin it becomes unctuous; is mixed with boric acid, under the name of *Boreyl*.—P.J. ii./09,344b; ii./00,586.

Cetraria Islandica (Discomycetes or Discolichenes), Iceland Moss, was at one time used as a "Throat remedy," in form of decoction, jelly, or lozenge, and was Official in the British Pharmacopœia 1835; it might well find a place in some of the Throat Pharmacopœias. The moss contains Cetrarin 3%, Lichenin, $C_{12}H_{20}O_{10}=321.72$ (324.16 I. Wts.) 45%, Amylaceous Fibrin 36%, Gum 4%, Non-crystallisable Sugar 4%, Water and Salts (inorganic) 8%. Lichenin is a starch-like body which has been shown to consist of two elements soluble in hot water,—one of which is also soluble in cold water. The bitter tonic principle Cetrarin $C_{18}H_{16}O_8$ (Schmidt) =357.42 (360.128 I. Wts.) is extracted by hot water, and gives the characteristic taste to the decoction. *Dose*, 2 to 4 grains. A white micro-crystalline powder, soluble in alcohol, slightly so in water and ether. Recommended as a bitter tonic and laxative in constipation of chlorosis and anæmia. Lichenoids composed of Iceland Moss lubricate and soothe the mucous membrane of the throat. They are intended to be slowly dissolved in the mouth, and are suitable in inflammatory and excitable states of fauces and oropharynx, especially to speakers who suffer with dry mouth and throat. As a sialogogue they are excellent correctives in pyrosis.—B.M.J. i./06,629.

Charrua Root.—Stated variously to be stomachic, astringent, for gonorrhœa and as emmenagogue. (River Plate).—Ph. Notes.

Chekan.—The leaves of *Myrtus Chekan*. Are aromatic and expectorant; are used in chronic coughs and bronchitis. *Dose*, of fluid extract, $\frac{1}{2}$ to 3 drachms.

Chelidonium Majus.—GREATER CELANDINE.—The yellow milky juice is an old remedy for warts and opacities of the cornea. The freshly-expressed juice preserved by $\frac{1}{2}\%$ by volume of chloroform has been much used as a remedy for cancer, given internally in dose of 10 to 60 minims, and in some cases with striking results. A fluid extract (*Dose*, 10 to 30 minims) from the dried plant is used for parenchymatous injection into diseased tissue, and, diluted, as a lotion. An alkaloid, Chelidonine, $C_{20}H_{19}NO_5.H_2O=368.42$ (371.178 I. Wts.), has been isolated, melting at 135° C., forming a Hydrochloride, $C_{20}H_{19}NO_5.HCl=386.73$ (389.63 I. Wts.) and a Sulphate ($C_{20}H_{19}NO_5)_2.H_2SO_4=798.42$ (804.41 I. Wts.) in minute yellowish granular crystals; have been used as morphine substitutes in cancer. *Dose*, 3 grains twice a day.—P.J. ii./01,317,361.

Chenopodium Anthelminticum, Linné (Chenopodiaceæ). Contains a Volatile Oil, Official in U.S. *Average dose*, 3 minims. For round worms, 10 minims on sugar or in emulsion has also been tried with good results in ascarides, giving 0.25 to 0.5 gram in sugar and water, and following this in an hour or two with a dose of castor oil. The treatment may be repeated after a day's interval. The

fresh plant contains chenopodine, an alkaloid. Liquid Extract 1=1. Dose, $\frac{1}{2}$ to 1 drachm.

Chimaphila.—U.S. Pipsissewa. Average dose, 30 grains (2 Gm.). Dried leaves of *Chimaphila umbellata* (Ericaceæ). Fluidextract, U.S., Hydro-alcoholic percolate 1=1. Dose, 30 minims (1.8 Cc.). A stimulating diuretic in cardiac and hepatic dropsy.

In diabetes mellitus bold doses of the Liquid Extract thrice daily are stated to cause complete cessation of glucose elimination. Activity as diuretic probably due to Arbutin.

Chirata.—*Swertia Chirata* (Gentianaceæ). Entire plant. Bitter tonic without Tannic Acid given in indigestion for anorexia and torpid liver with constipation. Dose of powder, 20 grains. Fluidextract, U.S. Average dose, 15 minims. Tincture (Off.) 1 in 10 Alcohol 60%, Dose, $\frac{1}{2}$ to 1 drachm. Might be made with Alcohol 45%.—P.J. ii./09,142. Infusion (Off.) 1 in 20. Dose, $\frac{1}{2}$ to 1 ounce.

Chlorophyll.—The green colouring matter of plants extracted by firstly ether then alcohol—in which latter the chlorophyll is soluble, leaving the waxy matter behind. Supplied commercially in solid extract and liquid form.

Chloroxylon Swietenia.—East Indian Satin Wood is usually referred to this plant; yields the alkaloid Chloroxylonine which has produced dermatitis in sawmills. Some specimens are more active than others.—Holmes, P.J. ii./09,295.

Chondrus Crispus (Gigartinaceæ). U.S. Irish Moss. Carrageen, Ph. Ned., P. Belg. Employed as decoction, Moss $\frac{1}{2}$ ounce, Water $1\frac{1}{2}$ pints boiled down to 1 pint. Flavoured with a little sugar and lemon juice. Demulcent and nutritive. Contains about 60% Carbohydrate, 7% Proteid, and 10% more or less of ash.

Cicuta Virosa (Umbelliferae). Water Hemlock, Cowbane, or Wild Parsley. Contains Cicutoxin, a substance giving rise to convulsions by action on the spinal medulla.

Cimicifugæ Rhizoma (Off.), U.S. Dose.—15 grains. The rhizome and rootlets of *Cimicifuga racemosa*, *Actæa racemosa* (Linn.), black snakeroot or black cohosh. Indigenous to the United States and Canada. Contains the resinoid Cimicifugin, also a small quantity of Isoferulic (hesperetic) Acid and a trace of an alkaloidal body.—P.J. ii./09,154. Dose.—1 to 6 grains in pill. Preparations of this drug are useful in chronic rheumatism where one part of a tendon, muscle, or articulation is painful, or where the disease is traceable to previous affection; also in lumbago, sciatica, pleurodynia, chorea, and amenorrhœa; also as a tonic and antispasmodic, and to excite contraction of the uterus. Liquid Extract (Off.) 1=1 of Cimicifuga exhausted with 90% alcohol, 75% better.—P.J. ii./09,142. Dose.—5 to 30 minims. Fluidextract, U.S. 1=1 Average Dose.—15 minims (1 Cc.). U.S. has also (powdered) extract (Dose 4 grains), made by concentrating the fluidextract, powdering, and adding powdered glycyrrhiza, so that 1 of extract = 4 of drug. Tincture. (Off.) Syn. TINCTURA ACTÆÆ. 1 in 10 of 60% alcohol. U.S. 1 in 6 alcohol (91.9% vol.). Dose.—3 to 60 minims or 5 minims every hour. Flavoring, Syl Vanilla, Syl Rosæ; Syrupus Aromaticus.

Cinchonidinæ Sulphas.— $(C_{19}H_{22}N_2O)_2H_2SO_4 \cdot 3H_2O = 735.08$ B.P., 735.05 U.S., 740.525 (I. Wts.). (From alcohol crystallises with $2H_2O$.) Dose.—1 to 10 grains. In silky white needles from mother liquor of Quinine Sulphate. Soluble 1 in 60 of Alcohol, 1 in 100 of water (more so with a little acid). In intermittent fevers, malaria, and neuralgia.

Cinchonidine Salicylate, $C_{19}H_{22}N_2O \cdot C_6H_4OH \cdot COOH = 429.06$ (432.24 I. Wts.) is useful as a tonic and antiperiodic in neuralgia, rheumatism, sciatica, &c., 5 grains every 2 hours in pills or cachets.

Citronellæ Oleum (Genuine from Ceylon Government) gave the following figures.—Sp. Gr. at 15°C, 0.884. Optical rotation -3.3, Citronellal 36%, Geraniol 41%. Schimmel's Test. Turbid solution.—C.D. i./06,355. For latest work on, see P.J. ii./08,623. Citronella Oil with Carbolic Acid acts admirably in driving off mosquitoes. (Osairo).—Ph. Notes.

The tse-tse fly has marked repugnancy to the plant.—L. i./09,701, c.f. trypano-

somiasis. It has been tried (L. ii./99,1197) and has lost its reputation—the odour of the oil is not given off without bruising the plant.

Citronellol and Citronellal described, see Allen, vol. ii., part 3/07, p. 327, *et seq.*, also 387.

Cocillana (*Guarea Rusbyi*). The bark of a South American plant, stated to equal ipecacuanha in expectorant properties and to be, in addition, tonic and laxative. Syrup of Cocillana Compound a specialty. Each drachm containing Tincture of Cocillana 5 minims, Tincture of Euphorbia Pilulifera 15 minims, Syrup of Wild Lettuce 15 minims, Compound Syrup of Squill U.S. 3 minims, Cascarin 1 grain, Heroin Hydrochloride $\frac{1}{2}$ grain, Menthol $\frac{1}{100}$ grain. *Dose*.— $\frac{1}{4}$ to 1 drachm.

Cochlearia Armoracia, fresh Horseradish Root. (*Armoraciæ Radix*, *Off.*) Sialogogue, stomachic, and slightly diaphoretic. Yields pungent volatile oil on moistening or rasping. Used as *Spiritus Armoraciæ Compositus* (*Off.*).

Collinsonia Canadensis.—The root of this, commonly known as stone-root or knob-root, Heal-all, Hardhack, in America, has been employed in gravel and other urinary affections. Is an antispasmodic in flatulent, infantile, and biliary colic, and locally in lax conditions of the uvula, pharynx, and vocal cords. Tincture, 1 in 10 of alcohol 60%. *Dose*, $\frac{1}{4}$ to 2 drachms. Liquid Extract, 1 in 1. *Dose*, 1 to 2 drachms. Suppositories containing 20 to 30 grains of the powder are also used. Has also been employed in cancer of stomach and cystitis. The early colonists in America probably used the fresh root for 'the liver.' The tincture is said to be really useful—something of the Podophyllum effect without griping.—C.D. April 13, 1907. Under the name ★*Helalin*, Liquid Extracts are prepared containing, in addition, Cascara, and Pepsin as hepatic stimulants. *Dose* of each 1 drachm.

Coorchi or Kurchi (from Assam) is antidyenteric. A Liquid Extract 1 = 1 and Tincture 1 in 10 have been made.

Copal.—See *Mastich*.

Copalchi.—Under this name from time to time barks have been imported usually referred to (a) *Croton pseudochina* if in small quills resembling pale Cinchona with flavour of Cascarilla, or (b) if in large quills with thick cork-like epidermis to *C. suberosus*, as adulterants of or substitutes for Cusparia, Cascarilla, and Cinchona. Aromatic tonic used in Mexico. Infusion 1 in 40. *Dose*, 1 to 2 ounces thrice daily.—*c.f.* Pereira, vol. ii., part 1, p. 415, and P.J. I., vol. xiv. p. 319.

Coptis Teeta (*Ranunculacæ*).—This plant grows in Assam. It is stated to contain as much as 8% Berberine. It is used for its tonic properties. Fluid extract in dose of 0·3 to 3 Cc. *pro die* in malarial and other fevers.—Ph. Notes (Italy.)

The rhizome under the name **Mamiran** is used in Sind for inflammation of the eyes. There are several species. A complete account of same has been published. *Vide* P.J. ii./99,671.

Coriandri Fructus.—*Dose*, 20 to 60 grains (1·3 to 4 Gm.). Dried ripe fruit, *Coriandrum sativum* (*Umbellifera*). Aromatic and carminative. *Oleum Coriandri*.—*Dose*, $\frac{1}{2}$ to 3 minims (0·03 to 0·18 Cc.). Sp. Gr. 0·87 to 0·885. This limit in gravity is right.—Umney, C.D., ii./99,580. *Oleum Coriandri* (*P. Off.*).—Sp. Gr. as above; O.R. + 8° to + 14°; R.I., about 1·463 to 1·467; Soluble 1 in 3 of 70% alcohol. Is contained in official preparations of rhubarb and senna to prevent griping.

Coronilla varia.—An aqueous extract of the leaves and flowering tops is used as a remedy in many cardiac affections. It possesses the great advantage over digitalis and strophanthus that it does not derange the digestive functions. *Dose* of extract is 1½ grains (0·1 Gm.) three or four times daily.—P.J. ii./98,661. The active principle Coronilline lessens frequency of the pulse, kills by cardiac paralysis.—B.M.J.E. ii./98,55. Tincture 1 in 8, by percolation. *Dose*, 30 to 60 minims.

Corydalis cava or *C. tuberosa*.—HOLLOW-ROOTED FUMITORY.—The root, known as *Radix Aristolochiæ*, possesses antiperiodic properties, and has been given as an emmenagogue and anthelmintic, as well as in syphilitic, scrofulous and

cutaneous affections, in dose of 10 to 30 grains. The bases Corydaline $C_{22}H_{27}NO_4 = 386.48$ (369.233 I. Wts.), Bulbocapnine $C_{19}H_{19}NO_4 = 322.75$ (325.162 I. Wts.), Corycaine $C_{23}H_{23}NO_6 = 406.15$ (409.194 I. Wts.), Corybulbine $C_{21}H_{25}NO_4 = 352.57$ (355.21 I. Wts.), Corytuberine $C_{19}H_{25}NO_4 = 328.75$ (331.21 I. Wts.), and Corydine have been obtained from the root. *Berichte*, 25, 2411; *P.J.* i./97, 465, *ex Proc. Chem. Soc.*, 179, 101; *Archiv.* 1898, 236. Five other alkaloids have since been isolated by Gadamer.—*C.D.* ii./or, 632. Further results Schmidt.—*P.J.* ii./06, 517.

Dehydrocorydaline, which W. H. M. prepared from Corydaline, has been found as a natural base in *C. Ambigua*.—*Archiv. Ph.* '08, 246, 387; *P.J.*, ii./08, 258.

Corydalis (Aristolochia) Cymbifera.—In Mexico as snake bite remedy. Is analgesic. Guaco includes this and other plants.—*M.A.* 1908, 6.

Crocus, Saffron (Off.). The dried stigmas and tops of the styles of *Crocus sativus* (*Iridaceæ*) Linn. Moisture not more than 12.5%, Ash 7%.—*P.G.* Moisture 12%. White Cross Congress wanted 15%.—*C.D.* ii./09, 580. Every filament should give a blue colour on placing in Sulphuric Acid.—Mann. It is a curious old delusion that saffron tends to bring out the rash of measles. Tincture (*Off.*) 1 in 5 Alcohol 60%, might be made with 45%.—*P.J.* ii./09, 142.

Cucumis (Sativus).—Cucumber.—The juice of the fruit is in French Codex to prepare Unguentum Cucumeris—*Syn.*—*Fr.* POMMADE AUX CONCOMBRES. Cucumber Juice 1,200, Lard 1,000, Veal Suet 600, Balsam of Tolu in Alcohol 900/o. *q.s.*, 2, Rose Water 10. Is a cooling ointment, used like cold cream.

Curara. *Syn.* CURARE, CURARI, URARI, WOURARA, WOURALI. *Dose.*— $\frac{1}{16}$ to $\frac{1}{4}$ grain. The South American Indian arrow-poison, produced from species of *Strychnos* and other plants (*Loganiaceæ*). A blackish-brown dry extract, with bitter taste; contains some resin, but is nearly all soluble in water.

Two varieties of Curare are said to be made, one from the fresh bark of the branches of *S. Gubleri*, strong (for larger animals) and the other (weak, for small birds, &c.), from *S. toxifera*.—*P.J.* ii./06, 381.

Antidotes.—(There is no tetanus—poisoning is not like that of Strychnine.) Artificial Respiration, Stimulants—brandy, hot gin, sal volatile freely. Ligature if wound; this may be cautiously loosened and tightened again to admit a little of the poison at a time to the system. Wash the wound.—Murrell.

This and Curarine have been given hypodermically and in hydrophobia for strychnine poisoning. For tetanus, a case cured.—*L.* ii./04, 831. **Hypodermic Injection** 10% (was 5 grains in 1 drachm), *B.P.C.*

Dose.—1 to 6 minims (0.06 to 0.35 Cc.).

Use recently boiled distilled water *q.s.* to form a thin paste, transfer to a funnel plugged with absorbent wool, and gradually add water *q.s.* **Hypodermic Tablets** contain $\frac{1}{16}$ grain of Curare.

Curarina. $C_{19}H_{25}N_2O = 296.05$ (298.228 I. Wts.). Another formula:— $C_{19}H_{23}N$. *Dose.*— $\frac{1}{16}$ to $\frac{1}{4}$ grain (?). This, the active principle of Curare, is a powerful poison, in yellowish powder soluble in water and alcohol. Researches on Curare.—*P.J.* 1890, 893, 471; *L.* i/91, 46.

Cydoniæ Vulgaris Semina resemble apple pips. They contain in the epithelium a gum—Cydonin—about 20% of the weight of the dry seeds. One part of the seeds, rubbed in a cloth to free them from dirt, with 40 of water, yields a thick jelly-like mass used as mucilaginous agent in toilet preparations. Mucilage of quince is official in some Pharmacopœias, the strength varying from 1 in 25 in the Anstr., to 1 in 100 in the Belg. The strength of 1 in 50 of cold water or rose-water is the one generally preferred. Macerate with the cold water for from $\frac{1}{2}$ to 2 hours, and strain without expression. Decoction of quince is a similar preparation made by boiling for ten minutes. Glycerin, Carbolic Acid, Boric Acid, Salicylic Acid, Sodium Benzoate, or other preservative is necessary. Such 'Creams' are Medicated with Witch Hazel, Borax, or Tincture of Benzoin. Irish Moss Decoction, 1 in 30 is similarly employed.—*C.D.* i/09, 565.

Cynoglossum Officinale, Hound's-tongue (*Boraginaceæ*). Has demulcent properties. Often acts similarly to Curare.—*L.* i/06, 974.

Cypripedium, U.S.—*Dose*, 15 grains. Dried rhizome and roots of *C. hirsutum* and *C. parviflorum* (*Orchidaceæ*) In nervous affections, hysteria, hypochondriasis

and epilepsy. **Cypripedin.**—*Dose*, 1 to 3 grains. The dried extract of *Cypripedium pubescens*, Ladies' Slipper.

① **Cytisine**, $C_{11}H_{14}N_2O = 188.77$ (190.132 I. Wts.). *Syn.* Ulexine. Is an alkaloid obtained from *Cytisus Laburnum*. It is also present in *Ulex europæus*—the common furze. ② **Cytisine Hydrobromide**, a freely soluble salt. *dose*, $\frac{1}{10}$ to $\frac{1}{2}$ grain, has diuretic properties. It benumbs the tongue. The Glucoside contained in small dose produces hyper-excitability. Mild doses feeble cardiac tonic—diuretic.—*L.i/08,39.*

Dammar as used in this country for varnish making and for microscopic work is the East Indian Dammar from *D. Orientalis*.—It occurs in small yellow resinous pieces somewhat larger than wheat. It is partially soluble in alcohol and soluble in chloroform.

Delphinium Bicolor, from North America, and **D. Scopulorum** from Mexico, resemble Curare in action.—*L. i/06,974.*

Dictamnus Fraxinella. Bastard Dittany (*Rutaceæ*) Root used. See Gray's Supplement, 259.

Doradilla.—Popularly used as an emmenagogue. Infusion about 10°/. *Dose*, 100 to 150 grams at a time. Grown in the Province of Cordoba (Argentina). (River Plate).—*Ph. Notes.*

Dragon's Blood.—Resin from *Dæmonorops Draco* is the chief ingredient in mahogany varnishes. Distinguishes Benzine from Benzene, *c.f.* p. 246. *v.* also Allen, vol. II., part 3, '07, 186.

Drosera rotundifolia.—The leaves of Sundew (*Fr. Cx.* entire plant). Have been recommended for chronic bronchitis, asthma, whooping-cough, and to ease the cough of phthisis. Tincture, 1 in 10 of proof spirit. *Dose*, 5 to 10 minims. *Fr. Cx.* 1 in 5 alcohol 60%.

Echinacea Augustifolia, "Black Sampson." The root, powdered, is given in doses of 10 to 30 grains for strumous and syphilitic ailments, to promote the healing of ulcers, and is employed in blood-poisoning in all its forms. In these it is a powerful stimulant to the nerve centres. Also in uræmia.—*M.A.* 1906, 16. In the bites of snakes and insect stings the freshly scraped root is applied.

Echium Vulgare (*Boraginaceæ*) Vipers' bugloss has some relationship to Curare in action, causes same symptoms as alkanet *q.v.* with more hyperæsthesia and greater weakness of the muscles.—*Vide. L. i/06,974.*

Emblicæ Fructus. *Dose*.—One, two, or more as required. The fruit preserved in syrup, or crystallised in sugar, of *Myrobalanus emblica*, *Emblica officinalis*, Nelli, or Nilcanam. Used in India to excite the appetite, and taken after meals for atonic dyspepsia. In the fresh state, the fruit consists of a fleshy, acidulous pulp enveloping an angular nut. A mild purgative beneficial for children. **Confectio Emblicæ**.—The preserved fruit. *Dose*.—1 or 2 teaspoonfuls. Also prepared Crystallized (dry). *Dose*.—One, two, or more.

Black or Chebulic Myrobalans. **Terminalia Chebula** (*Combretaceæ*). *I.C.* Add (*q.v.*). The dose of the powder ranges from a few grains to 2 dr. Dried mesocarp of the fruit is employed—astrigent in action. Is used as a collyrium in catarrhal ophthalmia, also as ointment to the eye. It is a valuable styptic. Is purgative in large doses ($\frac{1}{2}$ to 2 dr.), but may constipate after purging. Reduces albumin and blood in the urine, and is said to have similar action on glucose.—*Ph. Notes. c.f.,* also *B.M.J.* i/07,327. The natives employ this in perineal injuries caused during child-birth, eczematous sores and prolapsus ani—as gargle and dentifrice in spongy gums, and as injection in diarrhœa, internally stomachic and cholagogue.

Entada Scandens (*Leguminosæ*). The Pods and Seeds are used roasted as substitutes for Coffee. Stated to have purgative properties, but this is not confirmed.

Equisetum Arvense, *P. Austr.* 'Cat's Tail.' The sterile shoots contain Equisetic Acid, said to be identical with Aconitic Acid.

Erigeron Canadense.—Fleabane. The oil distilled from this herb is official in U.S. *Dose*, 5 to 30 minims. Capsules contain 5 minims, and a Liquid Extract of the leaves is prepared. *Dose*, 30 to 60 minims. The plant has astringent and hæmostatic properties, especially in uterine, urinary and nephritic affections.

dysuria, strangury, also used in hæmoptysis and epistaxis. The fresh herb may yield 0.5% of the Essential Oil, which on keeping will deposit resin and crystals.

Eucalypti Gummi. (Off.). *Syn.* RED GUM. *Dose.*—2 to 5 grains in pill.

An exudation from *Eucalyptus rostrata* (*Myrtaceæ*), and other species, imported from Australia. From 80 to 90% of it is soluble in cold water, almost entirely soluble in Alcohol (90%). Used in diarrhœa, and relaxed throats, and for its astringent properties generally *e.g.* the liquid extract injected for epistaxis and as hæmostatic.

To be distinguished from the common Australian or Botany Bay kino, said to be principally from *E. resinifera* (*Myrtaceæ*). The latter is very resinous and little soluble in water, was made official as **Kino Eucalypti**, in I.C. Add. *q.v.*

Decoction. *Dose.*—2 to 4 drachms, 1 in 40. Boil and strain. Used as gargle and for diarrhœa. **Liquid Extract, B.P.C.** *Dose.*—30 to 60 minims in water. **Eucalyptus Gum 25**, Distilled Water 65. Dissolve by constant shaking, strain and add Alcohol 90% 10 and water *q.s.* to 100. A styptic. **Insufflation** 50% in starch. A powerful astringent in hæmorrhage and relaxed conditions of the larynx and trachea. **Suppository**, 5 grains in each with cacao butter (pressed dry). **Syrup**, Liquid Extract of Eucalyptus Gum 5, Sugar 3. Dissolve. *Dose*—30 to 60 minims. **Tincture**, 1 in Alcohol (90%) 4 by maceration. *Dose.*—20 to 40 minims. 1 to 7 of water as an astringent gargle.

External hæmorrhage of any form could probably be stopped by local use of this tincture combined with internal use of Calcium Chloride. It is exceedingly useful in dental work, and to cuts caused by accidental injury.—*B.M.J.* ii. '08, 81. **Trochisci (Off.).** Contain 1 grain in each, with fruit paste.

Trochisci Eucalypti Compositi.

Potassium Chlorate 2 grains, Cubeb Powder $\frac{1}{2}$ grain, Eucalyptus Gum 1 grain. With fruit paste, and are marked C.E. Useful in congested and relaxed throats, especially when mucous secretion is arrested.

Eugenol. U.S.—Eugenio Acid, $C_{10}H_{12}O_2$ or $C_6H_8(OH)(OCH_3).C_3H_5, 4:3:1 = 162.86$ (Off. and U.S. Wts.); (164.036 I. Wts.).—A colourless oily liquid (B.Pt. 251° to 253°C.), darkening on exposure, obtained as an oxidation product of oil of cloves. It has a strong clove odour, and is a powerful antiseptic and antiputrescent. Is employed by dentists. Caused reduced sensibility of mucous membrane, but not complete anaesthesia. Useful with wool fat in eczema.—*Th. Gaz.* May 1889, 344. Is also in P. Austr. with Sp. Gr. 1.072–1.074. Acetamide of Eugenol; crystalline, non-caustic and antiseptic; has been used as a local anæsthetic.—*L.* ii./q2, 1350.

Eumenol is said to be the fluid extract of a Chinese root, Tang-kui, is given to check profuse menstruation; contains a volatile oil. *Dose*, one drachm three times a day, before the periods.—*B.M.J.E.* ii./or, 68.

Eupatorium, U.S. *Average dose*, 30 grains (2 Grm.). Dried leaves and flowering tops of *Eupatorium perfoliatum* (*Compositæ*) Linné. Tonic and diaphoretic; in large doses, emetic and aperient. Employed in dyspepsia, and the infusion (1 in 20. *Dose*, 1 to 4 ounces or more) has been given for tapeworm. **Fluid extract**, U.S., 1=1. *Dose*, 30 minims.

K. Dieterich communicated a paper on the sweetening agents contained in *E. Rebaudianum* from Paraguay, which is called Honey Yerba, and is used for sweetening ordinary Paraguay Tea. He obtained crystalline Eupatorin from same, 150 times sweeter than sugar. Of glucosidal character, is N. free, and soluble in water. It is more particularly contained in the leaves. Rebaudin is another constituent, amorphous, and even sweeter. The plant is unfortunately not available in sufficient quantity at a cheap rate to think of producing the sweet substance commercially. It is suggested, however, to use the leaves, powdered, for sweetening foods.—*Int. Cong.*, 1909; *v.* also C.D. I./o9, 473.

Fœniculi Fructus (Off.). Fennel. Dried ripe fruit of *Fœniculum Capillaceum*, *Umbellifera* (cultivated) (U.S. *P. vulgare*), contains Volatile Oil. Congealing point not below +5° C.—U.S. White Cross Congress suggested +2. *Dose*, 5 to 15 minims. (U.S. average 3 minims.) Sp. Gr. not below 0.960. Constituent anethol, aromatic. Given to infants in form of **Aqua Fœniculi (Off.)** (1 in 10) in the same manner as Dill Water.

Fœniculi Oleum (P. Off.). From the fruit of *Fœniculum vulgare*. *Characters and Tests.*—Nearly colourless or pale yellow, with characteristic odour and pungent taste. Sp. Gr. 0.960 to 0.990; O.R., +6° to +26°; R.I., 1.525 to 1.534. Sol. in an equal vol. of 90% alcohol. The melting-point after solidification should not fall below +4° C.

Fœnugreek. *Trigonellæ Fœnu-græci Semina (Leguminosæ).* The herb is largely grown in India and Egypt. Contains large proportion of mucilage and about 5% oil. Chief use, veterinary. An Egyptian preparation, *Helba*, is made from Fœnugreek Seeds—when soaked they swell into a pasty condition like a pudding—in Cairo this is hawked in the streets, and the cry of 'Helba' is a familiar one. A medical man goes so far as to call it the Quinine of Egypt—it prevents fever, and is valuable in many ways. It is stated to be comforting to the stomach. Stomach complaints in the Cairo district are common—supposed to be due to the water, but more likely from colds and chills. The seeds may be ground to powder and swallowed in about 1 or 2 teaspoonful doses. Or the seeds infused in water for a few hours and the supernatant liquor employed. Or a handful of the seeds is soaked in a basin of water for from 12 to 24 hours, then removed and placed in an unglazed flower-pot (which has been previously kept under water $\frac{1}{2}$ hour) and allowed to sprout during 3 or 4 days. When the plant has grown to about 2 inches it is ready for use. It is eaten raw along with the seeds. This sprouted remedy is best and most employed. It has been tried in diabetes.—Geo. H. Stephenson, Cairo.

Frangula, U.S. *Rhamnus Frangula Bark (Rhamnaceæ).* Buckthorn. Black Alder or Alder Buckthorn; should be 1 year old. Contains Frangulin, Emodin, etc. Cathartic especially for hæmorrhoids and chronic constipation. Liquid Extract B.P. 85 and Fluid extract U.S. 1=1. Dose, 1 to 4 drachms. Common Buckthorn in this country is *R. catharticus*.

Fucus Vesiculosus (Fucaceæ). Bladder or Sea Wrack. Preparations of this, being rich in iodine, bromide, and chlorine salts, have had reputation for reducing corpulence. Extract, B.P.C. Exhaust the drug in No. 20 powder with alcohol 45% and evaporate. This contains about 3% of Iodine. (Fucus vesiculosus may contain as much as 0.21% of Iodine. The yield of extract is about 1 from 15.) Dose, 3 to 10 grains before meals, in pills, with althæa. Liquid Extract, B.P.C. 1 in 5 Alcohol 45%. Dose, 1 or 2 drachms before meals. It is recorded a lady lost 20 lb. in 9 weeks when taking the liquid extract; and a gentleman 8 lb. in 6 weeks; another 8 lb. in 3 weeks, without bad results.

Galanga (Zingiberaceæ). Indian Root, China Root in 2 varieties: 'large' from *A. galanga*, Willd., and 'small' *A. officinarum*. Dose, 15 to 30 grains. Aromatic tonic. See p. 687.

Galbanum (Off.). Dose, 5 to 15 grains (0.32 to 1 Gm.) Gum resin from *Ferula Galbaniflua (Umbellifera)* and other species. Expectorant and stimulant. **Pisula Galbani Composita (Off.).** Dose, 4 to 8 grains (0.26 to 0.52 Gm.). Galbanum 1, Asafetida 1. Myrrh 1, Syrup of Glucose q.s. If kaolin be substituted for the glucose, powdering the myrrh, mixing the kaolin with the galbanum and asafetida, a good mass is produced.—C. D. ii./05,953.

Galega officinalis, or goat's rue, has a reputation as a galactagogue when given to nursing women. An extract is prepared. Dose, 5 to 10 grains. **Tephrosia virginiana** is also known as goat's rue, but is not the drug intended for use.

Galium Aparine.—The plant Cleavers or Goose Grass. Is acid, astringent, and diuretic. Has been used in dropsy, jaundice, scrofulous scaly eruptions, epilepsy, and obesity. Succus Galii, dose, 1 to 2 drachms; and Extractum Galii, 5 to 20 grains. For psoriasis.

Galla (Off.), U.S. Dose, 7½ grains. Excrescences on *Quercus insectoria (Cupulifera)*, caused by deposition of eggs of *Cynips Galla Tinctoria (Hymenoptera)*. Astringent. Contain Tannic and Gallic Acids. Unguentum Gallæ (Off.), 1 to 4 Benzoeated Lard.

Garcia Nutans (from Trinidad). Has drastic, cathartic and laxative properties according to dose. To be employed with caution. Cash. P.J. ii./08,351,403.

Gentianæ Radix (Off.), U.S.—Dried rhizome and roots of *Gentiana Lutea (Gen-*

ianaceæ). A bitter tonic. Yields 30 to 40% of Aqueous Extractive.—P.J. ii./04, 475. This is largely used as a pill excipient. Gentian (P. Jap.) is 'Ryutan.'

Infusum Gentianæ Compositum (*Off.*). *Dose*, $\frac{1}{2}$ to 1 ounce. Gentian Root 12 $\frac{1}{2}$, Bitter Orange Peel cut small 12 $\frac{1}{2}$, Fresh Lemon Peel, cut small, 25, Distilled Water boiling 1,000. For dispensing purposes it is convenient to fill strong half-pint bottles, plug the necks well with cotton wool, stand in suitable pan and heat to boiling point 10 minutes and allow to cool. So prepared, will keep for a week and more, and the flavour is not impaired by over-heating. **Infusum Gentianæ Aromaticum**. Brompton H. Gentian Root 2 ounces, Lemon Peel 6 drachms, Orange Peel 3 drachms, Boiling Water 1 gallon. **Tinctura Amara**. P.G. iv. Gentian Root 3, Centaury Root 3, Orange Peel 2, Orange Berries 1, Zedoary Root 1, Diluted Alcohol (67 to 69% volume) to 50. **Mistura Gentianæ Alkalina**. Brompton H. Sodium Bicarbonate 15 grains, Dilute Hydrocyanic Acid 3 minims, Aromatic Gentian Infusion to 1 ounce. **Fluidextractum Gentianæ U.S.** 1=1 by Diluted Alcohol. *Dose*, 15 minims (0.9 Cc.). **Elixir Gentianæ Acidum**. Martindale. *Dose*.—1 to 2 drachms in a little water. Concentrated Compound Infusion of Gentian 20 minims, Taraxacum Juice 10 minims, Dilute Phosphoric Acid 2 $\frac{1}{2}$ minims, Sherry 20 minims, Glycerin 7 $\frac{1}{2}$ minims.

Geranium Maculatum (*Geraniaceæ*), U.S.—Cranesbill root, is a powerful astringent; contains about 16% of tannin; used in diarrhoea, and locally in relaxed conditions of the mucous membranes. Geranin, a dried extract, is given in dose of 1 to 5 grains. Fluidextract, U.S., 1=1 Glycero-alcoholic percolate. *Average dose*, 15 minims.

Glaucium Luteum.—Yellow-horned or Sea Poppy. 1 drachm of Liquid Extract in glycosuria gave good results. Hæmoglobin and red corpuscles increased considerably.—P.J. i./00, 91; i./00, 222. The alkaloids Glaucine, Protopine, $C_{20}H_{17}NO_5 = 349.54$ (351.146 I. Wts.), and Chelerythrine, $C_{21}H_{17}NO_4 = 341.57$ (347.146 I. Wts.), are present.—Y.B. P. 1902, 86.

Glycogen [$C_6H_{10}O_5$]_n.—A body allied to starch. *Dose*, $\frac{1}{2}$ to 2 grains (0.1 to 0.15 Gm.) It occurs in the liver, blood, horse-flesh, &c. It is said to be changed at death into glucose, maltose, and isomaltose; said to improve nutrition.—L.ii./03 345.

Gnaphalii Flos, P. Belg. (*Antennaria dioica*, L.). White or purple flowers. Is used as poultice, and given in diarrhoea.

Gokhru.—The prickly fruit of *Pedalium Murex*. A remedy for nocturnal seminal emissions, incontinence of urine and impotence. Is rich in mucilage. An infusion 1 in 10 of boiling water (stand 2 hours). Half a pint is a daily dose. Should be freshly made. **Liquid Extract** 1=1, made with Alcohol 90%—*dose* 20 to 60 minims. Burra Gookeroo is believed to be identical with *Pedalium Murex* fruit. It is used similarly in India, though by some it is identified as *Tribulus lanuginosus* (*Zygophyllaceæ*). **Guaycura** (*Statice brasiliensis*). Emme-nagogus (?) Infusion, taken freely. Astringent. For dysentery.—Ph. Notes, River Plate.

Gugul. This name is somewhat loosely applied in the Bombay market to the product of *Boswellia serrata* and of the Indian Balsamodendrons—the latter, however, being distinguished as Mhaisa-gugul. The gugul tree, *B. serrata*, is common in Khandesh, Loonawara and other neighbouring territories. It resembles in appearance dried Canada Balsam, but has an odour nearer to Olibanum. It is not a regular article of commerce, being consumed in North and Central India. *Vide* Dymock's "Materia Medica of India." Also Ph. Notes.

Hæmatoxyli Lignum. Logwood (*Off.*) U.S. The unfermented heart-wood of *Hæmatoxylin campechianum* (*Leguminosæ*). Of sweetish astringent taste. The fermented chips used by dyers are deep red in colour, have lost the sweet taste, and the hæmatoxylin is oxidised to Hæmatein, $C_{16}H_{12}O_6 = 297.84$ (301.096 I. Wts.)

Preparations of logwood, colour the fibres and urine red, and stain linen.

Incompatible with acids and lime water. Certain metallic salts (notably iron) produce blue colour; mercuric salts, brown. **Decoction** (*Off.*). *Dose*.— $\frac{1}{2}$ to 2 ounces (15 to 60 Cc.). Logwood 50, Cinnamon Bark 8, Water 1,200. Boil 10 minutes. Final product 1,000. A remedy for diarrhoea and some forms of urinary hæmorrhage. **Liquid Extract**, B.P.C. 1=1. *Dose*.— $\frac{1}{2}$ to 2 drachms (1.8 to 7 Cc.) **Extract**. U.S. An aqueous extractive completely soluble in water. *Average dose*.—15 grains.

Hæmatoxylin. $C_{16}H_{14}O_6 + 3H_2O = 353.48$ (356.16 I. Wts.). Usually in yellowish granular crystals, slowly soluble in water, easily in alcohol. Alcoholic Solution 02% is used as indicator—yellow in acid and purple in alkaline solution. Also for staining in microscopy, v. pp. 873, 874.

Hæmol and Hæmogallol.—These two products of the reduction of the colouring matter of the blood are used for chlorosis. The former is a blackish powder and the other reddish. *Dose* of each, 2 to 8 grains in cachet, thrice daily. **Hæmogallol Tablets** 0.25 Gm. **Ⓐ Arsen-Hæmol.**—Hæmol with 1% of arsenic. *Dose* 1½ grains gradually increased. **Bromo-Hæmol.** *Dose*, 30 grains in cachet. **Phorxal** is an albuminoid Phosphorus and Iron preparation in powder and tablet form.—Ph. Notes.

***Halviva.**—**KREAT-HALVIVA.** *Dose*, 5 to 30 minims. A liquid sold as a nostrum, prepared from Kreat, or Kariyat, an Indian plant. This name is in India applied to two plants, *Ophelia Chirata* and *Andrographis paniculata*. A tonic quinine substitute in malaria and debility.

Heliotropin, $C_6H_5\left(\overset{O}{\curvearrowright}CH_2\right)COH = 148.92$ (150.048 I. Wts.).

Syn. Piperonal, a Methylene derivative of Protocatechuic Aldehyde, when pure is in shining white flaky crystals with Coumarin odour, slightly soluble in water, freely in alcohol, much used in perfumery. Usually manufactured by oxidation of safrol with chromic acid.—P.J. ii./06, 377. See also, for further details, Allen, vol. ii., part 3, '07, 114.

Helonias dioica.—False Unicorn Root. Is used in colic and in atony of the generative organs; also employed as an abortifacient.

Hemidesmi Radix.—Dried root of *Hemidesmus Indicus* (*Asclepiadaceæ*). Indian Sarsaparilla. Was known as *Smilax aspera*. Antisyphilitic properties. Infusion 1 in 10. Employed in kidney affections.

Henna. *Lawsonia inermis* (*Lythraceæ*). The powdered leaf is employed as a hair dye, usually in conjunction with indigo e.g. the following:—Apply a paste of Henna 1, Indigo 2, for varying periods according to the shade required—one hour for light brown. 1½ hours for darker—should be tried experimentally before use.

It is employed internally and locally in jaundice, leprosy, and skin affections.—B.M.J. ii./08, 124. N.S.D.

Herniaria glabra and **H. hirsuta** (*Caryophyllaceæ*). P. Austr. Contain Saponin, Methyl-umbelliferone (herniarin), and a minute amount of the alkaloid paronychine. Employed in bladder affections.

Horde-nine. *p.*Oxy-phenyl-dimethyl-amine. $C_{10}H_{15}NO$. Alkaloid obtained from barley in the process of malting. *Dose* uncertain, but 1 Gm. doses have been given to a sucking child. Suggested in hyperchlorhydrosis, enteritis, and diarrhoea.—Int. Cong. 1909, C.D. i./09, 873.

Hydrangea (*Saxifragaceæ*). Elixir of Lithia and Hydrangea. *Dose*, 1 to 2 drachms. A proprietary preparation stated to contain in an ounce Lithium Salicylate 12 grains, Lithium Benzoate 12 grains, Hydrangea root 240 grains. A diuretic, diaphoretic, and antilithic preparation for use in gout and rheumatism. A decoction of the plant is stated to have been used with advantage by the Cherokee Indians.—N.S.D.

Hydrocotyle asiatica, Ph. Ned. Water Pennywort. This umbelliferous herb is used in India for specific skin diseases, scaly eruptions, and ozæna as an alterative and diuretic, in 4 to 10 grain doses internally; is added to lard as an ointment, also to poultices, and used as snuff in ozæna. Contains 15% of a volatile aromatic oil named Vellarine.

Hydroxylamine, $NH_2OH = 32.82$ (33.034 I. Wts.), is formed by the action of nascent hydrogen on nitric acid. It is supplied in solution. Its strong reducing properties suggested its use in tinea and psoriasis. It is a strong antiseptic. Does not stain the skin. The **HYDROCHLORIDE**, $NH_2OH.HCl = 69.01$ (69.50 I. Wts.), is in large hygroscopic crystals, with an acid taste and reaction, freely soluble in water. Solution 1 in 1,000 of equal parts of glycerin and alcohol or ointment with adeps lanæ, successful in lupus, ringworm, and parasitic sycosis. The first few applications (by friction) do not produce smarting, but later ones may.—B.M.J. i./03, 545.

Hydroquinone. *Syns.* QUINOL, HYDROCHINON (German). *Dose*, $\frac{1}{2}$ to 5 grains $C_6H_4(OH)_2$ 1: 4=109.22 (110.048 I. Wts.). An isomeride of Resorcin $C_6H_4(OH)_2$ 1: 3, and Pyrocatechin 1: 2. May be prepared from quinic acid by dry distillation, but is principally obtained as a derivative of coal tar. *Soluble* 1 in 20 of water, also in alcohol about 1 in 4, and ether. It possesses stronger antiseptic and antipyretic properties than Resorcin, also resembles carbolic acid. Is used as a photographic developer, *q.v.* Qualitative reactions of Pyrocatechin. *P.J.* i./07, 208, 430.

Hyraceum. Stated to be the dried uropoietic excretion of *Hyrax capensis*, the rock rabbit or coney ('Klipdass,' Dutch) of South Africa. The substance is made into a tincture which enters into many Dutch household remedies. It contains about 3% Ether soluble fat, and gives off Ammonia on heating with alkali. Its action therapeutically is probably due to the Ammonia content. *Klipzweet*, *q.v.*, is a distinct substance. It contains Manganese, which Hyraceum samples did not.—*P.J.* ii./09, 632.

Hysterionica. *Syn.* *Aplopappus Baylahuen* (*Compositæ*) *Remy*. From Chili. Recommended in malarial and chronic dysentery, flatulent dyspepsia, and diarrhoea. *Liquid extract.* *Dose*, 5 to 15 minims.—*N.S.D.* 1394.

① **Ibogaine.** $C_{22}H_{36}N_2O_2$ = 800.72 (806.588 I. Wts.). An alkaloid recently obtained from the Iboga (*syn.* aboua, or oboucte or liboka) (*N.O.* Acanthaceæ) *Tabernanthe Iboga*, Baill., a plant growing in West Africa, particularly the Congo. In certain districts it is rare and commands a high value. The blacks claim exciting and aphrodisiac properties for it. It has also strong sustaining powers. Too large a dose may produce tetanus and convulsions. The plant has been used with some success in sleeping-sickness. Ibogaine is extracted by making a mash of the powdered root with milk of lime, drying, extracting with ether, and subsequently treating that extractive with 10 per cent. sulphuric acid. The alkaloid and its salts taste somewhat like cocaine. The base is soluble 1 in 28 alcohol 95 per cent. at 15° C. Insoluble in water. Melting-point 151° C. Its solutions are levorotatory. In solution the substance oxidises, but keeps well in crystalline form. As an anæsthetic ibogaine does not seem equal to cocaine or stovaine, but is a good stimulant of the central nervous system in small doses. It exercises a very strong action on nutrition, augmenting respiratory changes, and the processes of assimilation and rejection. It is a muscular tonic, notably a nerve tonic and a heart tonic. ② **Ibogaine Hydrochloride** $C_{22}H_{36}N_2O_2.HCl$ = 836.91 (843.056 I. Wts.) occurs in white crystalline scales, soluble 1 in 50 water at 15° C., 1 in 1.5 alcohol 95 per cent. at 20° C. Solutions 1 in 50 will crystallise out in the winter. The alkaloid would appear to be valuable in all cases in which, following on an infectious disease, or owing to malnutrition, the patient suffers from nervous depression—in la grippe, anæmia, and heart affections generally. *Dose* of Ibogaine Hydrochloride 0.01 to 0.03 gram ($\frac{1}{2}$ to $\frac{1}{4}$ grain) per diem in *Dragees* each containing 0.005 gm. ($\frac{1}{2}$ grain) *i.e.* 2 to 6 *pro die*.—Abstract from original of A. Landrin.

Ichthyocola (P. Belg.). *Isinglass*. The swimming bladder of certain species of the sturgeon and hake; dried and sliced into thin pieces. About drachms to the pint of warm water forms a jelly. Is used for refining wine, added to milk to prevent formation of tough curds difficult of digestion. *Solution* (*Off.*). 1 in 50 of warm water. *Isinglass Plasters* on Muslin, 8 inches wide, yard rolls (also 11 inches by 5 yards). Also Tapes, $\frac{1}{2}$, $\frac{1}{4}$ and 1 inch, 10 yard lengths. Also *Isinglass* on Silk, 7 inches wide, flesh-coloured, black and white, are made. *P. Jap.* gives method of making Court Plaster—"Emplastrum Adhæsivum Anglicum."

Inula Helenium (*Compositæ*).—Elecampane. Root contains Inulin allied to starch, and Helenin. *Dose*, $\frac{1}{2}$ to 2 grains (0.016 to 0.13 Gm.) a stearoptene, in white circular crystals, insoluble in water, but freely so in alcohol. Is antiseptic, used in ozæna, keeps off insects, and internally for phthisis, malarial fevers, infantile and catarrhal diarrhoea; checks bronchial secretion. Inulin, from this and from Dahlias and Helianthus the same.—*P.J.* ii./04, 335. **Extractum Inulæ liquidum** 1=1. *Dose*, 10 to 60 minims. **Extractum Helenii** (solid) is official. *P. Ned.*

Ipomœa purpurea. *Syn.* *I. congesta*. *Convolvulus purpureus*, *Pharbitis Hispida*. (*O.* *Convolvulaceæ*. (Common Morning Glory.) Stems and roots in S. Africa,

under name i-jalapa, used by natives as purgative. Aerial stems contain 4.8%. Resin, of which 15.5% was Ether soluble. This and the alcohol soluble portion of the crude resin was markedly purgative in Gm. doses given to a dog. Suggested use medicinally.—Am. Jl. Ph., June, 08, p.251.

Jacaranda Lancifoliata, and other species (*Bignoniaceæ*) under the name Caroba, or Carobinha in South America. The leaves are used in syphilis; contains aromatic resin but no alkaloid.—B.M.J. i/85,327. Dose, 15 to 30 grains Liquid Extract 1 = 1, Dose, 15 to 60 minims.

Jambul. Dose, powdered, in cachet, 5 to 30 grains. *Eugenia Jambolana* (*Syzygium Jambolanum*) Seeds. Syn. (in India) **Jaman**; have been used in diabetes; contain a glucoside Antimellin. The seeds should be fresh even if taken as such, or to form Liquid Extract 1=1. Dose, $\frac{1}{2}$ to 2 drachms. Said to be contained in Diabene and in Djocat. The entire fresh fruit has been used. Mash 200 Gm. with 2 litres of water. Keep it warm, and give 100 Cc night and morning. This quantity lasts 10 days.—B.M.J.E. ii./04,36. Cortex *Syzygii* is official in Ph. Ned. Reduces the Sp. Gr. of the urine and quantity of sugar, but prolonged use is attended by gastric troubles.—B.M.J. ii./07,1054.

Juglandin.—An extractive prepared from the inner bark of the root of *Juglans cinerea*, the North American butter-nut; is an hepatic stimulant and cathartic Dose, 2 to 5 grains in pill. **Spiritus Nucis Juglandis**, distilled from *Juglans regia*, the common European walnut, is an antispasmodic and for checking sickness of pregnancy. Dose, 1 to 4 drachms. **Folia Juglandis** are in P. Austr.; also in P. Belg. (and Fluid Extract) and P. Helv. Walnut hair dye. Bruise green Walnut shells 16 ounces, with Alum 2 ounces, in a mortar, add Rose Water 4 ounces, macerate 4 days, strain and press. To every 3 ounces of expressed liquid add 1 ounce Eau de Cologne or other alcoholic perfume.—B.M.J. ii./08,124.

Juniperi Oleum (Off.), U.S. Oil distilled from fruit of *Juniperus Communis* (*Conifera*). Sp. Gr. 0.865 to 0.890 at 15.5° C., also frequently lighter. Soluble when fresh 1 in 10 of 90% Alcohol. O.R. -3° to -12°. Possibility of 2 distinct classes of oils.—P.J. ii./07,131. A wide range of Sp. Gr. and solubility 1 in 20.—P.J. ii./07,66. **Oleum Juniperi (P. Off.)**. Oil distilled 'and rectified.' Sp. Gr., 0.862 to 0.890, increasing with age. O.R., as above; R.L., 1.472 to 1.488; Soluble (when freshly distilled) 1 in 4 of 95% alcohol, becoming less soluble with age. **Spiritus (Off.)** U.S. 1 in 20. Dose, 20 to 60 minims. **Spiritus Juniperi Compositus**, U.S. Average dose, 2 drachms. Oil of Juniper 8, Oil of Caraway 1, Oil of Fennel 1, Alcohol (U.S.) 1,400, Water to 2,000. Terpeneless and Sesquiterpeneless Juniper Oil is stable and soluble in comparatively weak alcohol. **Rob Juniperi**, Ph. Ned. Juniper Berries 3, Water 9. Infuse 12 hours, and dissolve Sugar 10. Evaporate to honey consistence. **Vinum Diureticum**, P. Helv. Dose, $\frac{1}{2}$ to 1 ounce. Juniper 15, Squill 10, Orange Peel 10, Absinthe 5, Angelica 5, Sweet Flag 5, Dry Southern Wine 1,000.

Allen, vol. ii., part 3, '07, p. 426, may also be consulted for examination of this oil.

Kauri Gum. A resin obtained from *Dammara Australis* in Australia and New Zealand. **Dental Compo.** Contains Kauri Gum. This is used for taking impressions of the mouth and teeth for plate preparation. **Directions.**—Place the cake of Compo in moderately warm water for about two minutes or so to soften—do not employ boiling water. The Compo should be kneaded with the wet fingers until it has hardened somewhat; by this proceeding the Compo becomes almost cool. The Tray should be warmed for a short time before placing the Compo into it. The surface of the Compo is then smoothened with the hand, a little vaseline is rubbed on the surface, and the tray is held for a second or two over a Bunsen flame. It is very important that the surface of the Compo should be heated in this way before inserting into the mouth. After inserting wait for 2 to 3 minutes. On removal, place the tray bearing the impression in cold water.

Kava - Kava, I.C. Add. — Root of *Piper methysticum* (*Piperaceæ*), from the Polynesian Islands. Is used by natives as a sialogogue and to make a fermented drink. Contains an essential oil, two resins, and about 1% of a neutral crystalline principle, Kavahin or Methysticin, $C_{16}H_{18}O_5 = 287.96$ (290.144 I. Wts.), allied to Piperin and Yanguanine, melting at 156°, $C_{10}H_{14}O_3 = 174.74$ (176.064 I. Wts.).—C.D. ii./05,1052. Further information on the resins, see Archiv de Pharm.—246, 5,338; or C.D. i./08,168. Is a bitter tonic, with agreeable taste, stimulates the

nervous system, and is diuretic. Has been found useful for gonorrhœa, gout, and cystitis. Extract, hydro-alcoholic. *Dose*, 5 to 10 grains. Liquid Extract, 1 in 1, or alcohols 90 and 45%. *Dose*, 30 to 60 minims. Pill = 3 grains extract. *Dose*, 1 to 3 or 4. Infusion, 1 in 320. *Dose*, $\frac{1}{2}$ pint. Though more palatable than, is not equal to copaiba or santal oil. Is a local anæsthetic to tongue and eye.

Kino (Off). U.S. *Dose*, 5 to 20 grains. The dried juice from trunk of *Pterocarpus Marsupium* (Leguminosæ). In brown pieces or powder. Bitter and astringent. Partly soluble in water, almost entirely in alcohol 90%, nearly insoluble in ether. Astringent for diarrhœa, and as *Trochisci* for relaxed condition of the throat. Its powder is also insufflated to check epistaxis. **Tincture (Off).** 1 in 10 of a mixture of Glycerin, Alcohol, and Water. U.S. 1 in 20 with Glycerin 3 in 20. *Dose*, 30 to 60 minims. This gelatinises, due to an enzyme in the drug. Instead add Kino 2 to Boiling Water 10, and keep at 100° C. 12 hours. After cooling add Alcohol 10 and set aside 12 hours. Kino is a cheap source of Tannin.—P.J. ii./03,702. **Incompatible** with mineral acids and alkalis and with substances precipitable by the tannin it contains.

Klipzweet. This is found as an 'exudate' underneath overhanging rocks in certain parts of S. Africa. Contains Manganese and about 16% ether soluble fat. It is made up of wax, honey, waste products of a hive, as well as other secreta and excreta of animals. It is a distinct substance from Hyraceum. *q.v.* —P.J. ii./03,632.

Koromiko.—These herbs, *Veronica salicifolia* and *V. parviflora*, imported from New Zealand, are used there and in China as a remedy for chronic dysentery and diarrhœa. Tincture, 1 in 5 of proof spirit. *Dose*, $\frac{1}{2}$ to 1 drachm. *V. elliptica* (Forst.). Another New Zealand species used; a cultivated plant in certain parts caused poisoning. —P.J. i./09,639.

Krameria Radix. Rhatany Root (Off). The dried root of *Krameria argentea* (Para) and *K. triandra* (Peruvian). (U.S. has also *Savanilla Rhatany*, i.e. from *K. Lima* (Polygalacæ).) Both contain about 8% of a tannin. Astringent in relaxed throat, also in tooth powders when gums are liable to bleed, and in mouth washes, also for bleeding from nose and bowels, and for diarrhœa. **Extractum Krameria (Off).** and U.S. *Dose*, 5 to 15 grains (0.32 to 1 Gm.). An aqueous extract. **Fluidextract.** U.S. *Average dose*, 15 minims. Strength 1=1 by diluted alcohol. Of deep red colour and astringent taste. **Syrup.** U.S. *Average dose*, 1 drachm. **Fluid extract** 45, **Syrup** to 100. **Tincture (Off).** 1 in 5 of 60% alcohol by percolation. *Dose*, 30 to 60 minims (1.8 to 3.5 Cc.). Should yield 5% extractive. Might be made with 45% alcohol. —P.J. ii./09,142. U.S. 1 in 5 of alcohol 48.9% by volume. **Flavoring.** —Glyl *Mentha Viridis* vel *Piperita*, Glyl Pint; Glycerin, Syrupus Aurantii. **Trochisci (Off).** (Fruit basis.) Contain 1 grain of Extract; also made with cocaine hydrochloride $\frac{1}{2}$ grain (Off).

Lachnanthes tinctoria.—Spirit Weed, Red Root. A tincture = 1 in 10 of proof spirit of this United States plant; is used to check the cough in phthisis. *Dose*, 1 to 10 minims. —B.M.J. ii./05,1470; L.ii./or,1604. References to Alabone's treatment by lachnanthes. —B.M.J. ii./or,747,9; 2,1124,1808; i./02,101,113. Dr. Latham's report on. —B.M.J. ii./02,146; L.ii./02,72,88.

Lactose.—**Saccharum Lactis**, $C_{12}H_{22}O_{11}, H_2O = 357.48$ (360.192 I. Wts.). (Off.). Milk Sugar. *Dose*, ad lib. Used for weakly children. Is said to be a useful addition to Magnesia as a laxative, it increases the solubility of the latter by combination. It is prepared from the whey of milk.

The organisms capable of fermenting Lactose are less frequently present in normal mouths than those in which dental caries exists. In the latter the lactose fermenters are invariably present—a point which must have some bearing on the etiology of dental caries.—Kenneth W. Goadby, International Medical Congress at Budapest. *Annus Medicus*, L. ii./09,1896.

Laminaria Digitata 'Sea Tangle.' From this seaweed 'Laminaria Tents' are made for gynaecological and surgical use. Placed in contact with moisture these swell to three times their original size in dry state. The Laminaria is sterilised by drying after immersion in acetone, chloroform or alcohol 90% under pressure at 135° C., or by placing in Saturated Iodoform, in Ether or in Sublimite Solution.

Lappa, U.S. Burdock. Roots of *Arctium Lappa*, Linné, or other species of *Arctium*. On the Continent called *Bardana*, e.g., *Inf. Bardanae Spirituos* (external): *Bardana* 2, water (boiling) q.s. to 15, strong alcohol 5, to be rubbed into the scalp, Ph. Notes Denmark. **Fluidextractum Lappæ**, U.S., 1=1 by Diluted Alcohol. *Average dose*, 30 minims. In skin affections and gout.

Lauri Fructus.—*Laurus nobilis* (*Laurocæ*). The ripe fruit, Laurel or Bay Berries, contains fixed 30%, and volatile oil 1%. In rheumatic and similar pains.

Lavandulæ Florum Oleum (*Off.*). Volatile oil from *Lavandula vera* (*Labiata*)—(*L. officinalis* U.S.), Sp. Gr. not below 0.885 at 15° C. Soluble in three parts of 70% Alcohol. Shaken with water in a narrow graduated cylinder, volume of oil should not be diminished (absence of alcohol) (U.S.). See also P. ii./og, 623. French Oil never found higher than 44% in natural esters.—C.D. ii./og, 580. Terpinolene (q.v.) is an adulterant. It would be quite easy to make a mixture free of Lavender Oil to pass the tests of the present B.P. Monograph—C.D. i./io, 271. **Oleum Lavandulæ** (*P. Off.*). From flowers of *L. vera*, cultivated in England, France, and other countries. Sp. Gr., 0.883 to 0.900. O.R., -3° to -10°; Soluble 1 in 3 of 70% alcohol. The English oil should contain from 7 to 11% of esters, and the foreign oil not less than 30% of esters, calculated as linalyl acetate, as determined by saponification with alcohol potash. Ph. Ital. requires about 35% Linalyl Acetate. **Spiritus Lavandulæ** (*Off.*), 1 in 10; U.S. 1 in 20. **Tinctura Lavandulæ Composita** (*Off.*). *Dose*, $\frac{1}{2}$ to 1 drachm. Lavender Oil 45 minims, Rosemary Oil 5 minims, Cinnamon 75 grains, Nutmeg 75 grains, Red Sanders Wood 150 grains, Alcohol 90% 20 ounces. Might be 70% Alcohol.—P.J. ii./og, 142.

Leptandrin.—*Dose*, $\frac{1}{2}$ to 2 grains. A resinoid powder obtained from Culvers Root, *Leptandra Virginica*, U.S. *Veronica Virginica* (*Scrophulariaceæ*). It promotes the flow of bile without irritating the bowels; useful in dyspepsia. Acts well with podophyllin. **Fluidextractum**, U.S. 1=1 of *Leptandra* by diluted alcohol. *Average dose*, 15 minims. Solid Extract (Powder form, 1=4 of drug) by concentrating same and adding Glycyrrhiza. *Average dose*, 4 grains.

Levisticum officinale.—*Lovage*. A decoction in milk (a fresh leaf and stalk to a quart), allowed to simmer 2 hours. *Dose*, 3 to 5 ounces. For renal dropsy.

Limonis Oleum (*Off.*). From fresh Lemon Peel by expression. Sp. Gr. 0.857 to 0.860. O.R. not less than +59°. For further details of examination of this oil v. Allen, vol. ii., part 3, '07, 431. (U.S. requires 4% Aldehyde by weight calculated as Citral.) Citral $C_{10}H_{16}O=150.98$ (152.128 I. Wts.) is optically inactive: Sp. Gr. 0.893 to 0.897. It occurs in a number of other essential oils. A somewhat extensive investigation by U.S.A. authorities went to show that where pinene is found in Lemon Oil, using ordinary means of distillation, it is *prima facie* evidence of adulteration.—Examination of Nitrosochloride crystals from the Oils.—C.D. ii./og, 824. Other authorities are, however, of opinion that Pinene is a natural constituent of Lemon Oil. Umney says Pinene may or may not be present. The Nitrosochlorides of other terpenes may be similar to that of pinene.—B.C.D. ii./og, 448. Umney states the physical characters of natural oil of lemon are: Sp. Gr., 0.856 to 0.860; O.R., +54° to +66; R.I., 1.4743 to 1.4753; Citral-content, 4% to 7%. **Oleum Limonis** (*P. Off.*). The oil obtained by expression by various methods. Sp. Gr. as *Off.*; O.R., +58° to +64°; R.I., 1.474 to 1.476. Should contain at least 3.5% citral. *Note.*—The merits of the various processes for the determination of citral in lemon oil are at present under investigation.

Lemon Oil, Terpeneless and Sesquiterpeneless.—1 part equals in flavor 25 of ordinary. It is soluble in comparatively weak alcohol.

Lemon Syrup (*Off.*) is troublesome. Garsed suggests to dissolve Citric Acid 2, in Lemon Tincture 5, strain if necessary, and add Syrup 50. St. G. H. makes Lemon Syrup thus: Lemon Oil 1 minim, Alcohol 90% 20 minims, Syrup to $\frac{1}{2}$ ounce. **Tinctura Limonis** (*Off.*). Might be made with 70% alcohol.—P.J. ii./og, 142. Boa uses Fresh Lemon Peel, cut small, 25; alcohol (90%), 52 and distilled water, 48 mixed. Prepare by maceration. For Syrup of lemon.—Citric acid 4 ozs., sugar 5 $\frac{1}{2}$ lbs., distilled water 42 ozs. or q.s. tincture of lemon as above 5 ozs. Heat the water to boiling, add first the sugar, then the citric acid, and stir till dissolved. When cold add the tincture of lemon, and mix by shaking. Finally, add distilled water q.s. to make to 100 ozs. Syrup of

Lemon without Acid.—Tincture of lemon as above 1 ounce, syrup, 7 ounces. Mix.—P.J. i./00,294.

Oleum Citron, so called, is usually a blend of Lemon, Orange, etc. **Bergamot Oil** is from *Citrus bergamia* peel, by expression from the ordinary Bergamot. Sp. Gr. 0.882 to 0.888. Rotation, etc., see Allen, vol. ii., part 3, 07,399, and C.D. i./09,81 (Messina Notes). Oil of the Leaves and Wild Bergamot also described.

Linum (Off.). Seeds of *Linum usitatissimum* (*Linaceæ*). Decoction, 1 in demulcent or crushed for use as a poultice. Contains Linseed Oil, 30 to 40%. Used as enema, or with lime-water as Carron Oil, *q.v.* **Flax Seed** or **Linseed** (*Grains de Lin* in France) in habitual constipation. One teaspoonful to be taken floating in a tumbler of water before breakfast.—Med. Press, Nov. 23, 1904. Tung Oil from *Aleurites Fordii* Irritant and poisonous, is a substitute for Linseed Oil.—P.J. ii./07,241. Lewkowitsch gives full particulars.

Lobelia (Off.), U.S., P. Belg. Dried flowering herb of *Lobelia inflata* (*Lobeliaceæ*). Is purgative and emetic, but its only use is to relax spasm of the bronchi in asthma and bronchitis. Contained in many antiasthmatic powders (*vide Pulvis Lobeliae Composita*). **Fluidextract**, U.S., 1=1. An Acetic extractive. *Average dose*, 8 minims (0.5 Cc.). **Tincture**, U.S., 1 in 10 alcohol (48.9% vol.). *Average dose*, Expectorant 15 minims, Emetic 1 drachm. F.I. agreed 1 in 10 Alcohol 70, i.e., 1 strength sine Ether.—C.R. Fr. Cx, Max. single dose 30 minims approx., max. during 24 hours 95 minims approx. **Tinctura Lobeliae Ætherea (Off.)**. 1 in 5 of Spirit of Ether. *Dose*, 5 to 15 minims until nausea occurs. In atonic constipation with dryness of the fæces, the tincture in 10 minim doses combined with cascara useful.—H. Standardisation by its effect on blood pressure and subsequent paralytic action on certain nerve cells is possible.—Dixon, P.J. ii./09,157.

Flavoring.—Syl Carul, Syl Lavandulæ; Syrupus Aromaticus.

Lonicera Periclymenum.—Common honeysuckle and *L. xylosteum* (flag honey suckle).—(*Caprifoliaceæ*) Flowers or berries are poisonous.—L. i./09,932.

Lupulinum. (Off.). *Dose*.—2 to 5 grains in pill. Yellow powder—lupulinic glands—separated from the strobiles of the hop—*Humulus Lupulus* (*Moraceæ*). Aromatic and bitter, and contains the properties of the hop—the resin and volatile oil.—Naylor. In insomnia and for alcoholism. Inhalation 30 grains to a pint of warm water. In gastro-intestinal diseases—enteric and dysentery.—B.M.J. E.ii./06,60. Should be fresh. 5 to 15 grain doses. Stimulates the general and local circulation, and improves the tone of the alimentary tract, e.g. with Silver Nitrate, Iron, Quinine, &c.—M.A. 1908,20. **Tincture Lupuli. (Off.)** *Dose*.— $\frac{1}{2}$ to 1 drachm. Dried strobiles 1 in 5 Alcohol (60%). More aromatic if made from fresh hops. (Might be made with 45% Alcohol.—P.J. ii./09,142.) Extractive varies greatly—standard of 4% was suggested. Hop Pillows to induce sleep are prepared. Smoking the dried strobiles has a somniferous effect. **Fluidextractum Lupulini**, U.S. *Average dose*.—8 minims. An alcoholic extract, 1=1. **Solid Extract** by concentration. *Dose*.—2 to 6 gr.

Lycopodium. The yellow spores of the Clubmoss *Lycopodium clavatum* (*Lycopodiaceæ*), a fine powder. As a pill powder, also as a diluent for insufflations for the throat and ear, and as a dusting powder. When ignited it explodes with a flicker. *Tincture. Dose*.—15 minims to 1 drachm. **Lycopodium** first soaked in ether and dried, 1. Alcohol (90%) 10. To stop frequent micturition, and irritation of the bladder. In our knowledge a case has received great benefit after Salol, Helmitol, Bismuth, etc., had been found useless.

Lycopodium Spores as seen under the microscope.—Nature, Mar 31/10, p. 126.

Lycoperdon giganteum.—Puff Ball. This forms a soft and comfortable surgical dressing. The dusty powder is a powerful hæmostatic.—Whitla.

Maidis Stigmata.—Syn. Corn Silk. The thread-like stigmata of nearly ripe Maize fruit. The fresh are official in U.S. Are demulcent and diuretic. Used in cystitis, and nocturnal incontinence of urine. Liquid extract, *dose*, 1 drachm. Infuse corn silk 1,000 twice with water *q.s.* to cover. Evaporate liquor to 400. Cover and add cold water 300, allow to deposit, filter and evaporate to soft extract. Of this 1, with water 10, gives a clear solution. A Syrup may be

made of Liquid Extract 1, simple Syrup to 10. On Foods cultivated by the natives in Portuguese West Africa. An interesting summary divided according to their natural orders—Maize is the principal one.—*Jl. Trop. Med.* May 1, 1907.

Maize or 'Corn' Oil which is contained to the extent of 3·5 to 6% has been advised as a cheap substitute for Cod Liver Oil in tuberculosis—a palatable and easily assimilable fat.—*L.ii./08, 405.*

⑩ **Maidis Ustilago**.—Maize Ergot, Corn Ergot. Is used in parturition in place of ergot. Is said to increase the force without increasing the duration of uterine contractions. *Dose*, 15 to 60 grains, ⑪ **Fluid Extract**, $\frac{1}{2}$ to 2 drachms.—*Pr.* xl, 215.

Manaca.—A portion of the Brazilian root *Brunfelsia hopeana* Benth. (*Solanaceæ*) which has been used in rheumatic affections. Experiments have shewn it to act on the glands, especially the kidneys. **Liquid Extract 1=1.** *Dose*.—10 to 30 minims thrice daily.—*N.S.D.* It is frequently combined with Salicylates as in the following—a proprietary preparation. **Elixir Manaca and Salicylates** each ounce equals Manaca 80 grains, Sodium Salicylate 64 grains, Potassium Salicylate 32 grains, Lithium Salicylate 8 grains. *Dose*.—1 to 2 drachms.

Manna, U.S. *Average dose*, $\frac{1}{2}$ ounce. Saccharine exudation from *Fraxinus Ornus*, Linné (*Oleaceæ*), and other species. In flattish, somewhat three-edged pieces. Soluble with some residue about 1 in 3; slightly in Alcohol 90%. Contains Mannitol (*syn.* Mannite) (a non-fermentable sugar which does not reduce Fehling's Solution), $C_6H_8(OH)_6 = 180\cdot74$ (183·112 I. Wts.), to extent of 75%, and Dextrin about 20%. Has mild laxative properties.

Marrubium, U.S.—Horehound. Dried leaves and flowering tops of *Marrubium Vulgare*, Linné (*Labiataæ*). *Average dose*, 3) grains. Given in lung affections—has tonic properties. Infusion 1 in 20 of boiling water.

Mastich (P. Belg.), yellow brittle resinous tears obtained from *Pistacia lentiscus* (*Anacardiaceæ*); insoluble in Water, but partly in Alcohol 90%; also soluble in Ether 2 in 1 and in Chloroform 2 in 1. **Alcohol Mastichi**, R. D. H.—Mastich 2, Alcohol 90% 1; dissolve. Harvard Liquid is similar; this is employed for covering a cottonwool dressing so as to form a temporary covering, *e.g.*, during the treatment of dental canals with an antiseptic such as Lysoform. **Æther Copal**, R. D. H. (Copal Solution).—Copal 1, Ether 1; dissolve. For covering cement fillings to protect from the saliva. Zanzibar Copal is a fossilised resinous body obtained from *Trachylobium Hornimannianum* (*Leguminosæ*); *Vateria indica* (*Dipterocarpeæ*), Indian; the Brazilian is from *Hymenæa* species and other plants. Australian Copal is Gum Kauri, *g.v.*

For further details of examination of Mastich, Copal and other resins, see Allen, vol. ii., part 3, '07, p. 180. **Microscopic Varnish**.—Mastich $\frac{1}{2}$ ounce, Caoutchouc 15 grains, Chloroform 2 ounces; macerate and filter. Mastix is official in P. Belg.

Matico, U.S.—Leaves of *Piper Angustifolium* (*Piperaceæ*). *Average dose*, 60 grains. Has long been said to have styptic powers if applied locally to a bleeding surface (Ruspini's Styptic, but see 'Patent' chapter). Given internally has proved useful in gonorrhœa, cystitis, and leucorrhœa. **Fluidextractum Matico**, U.S., 1 = 1 Hydro-alcoholic. *Average dose*, 1 drachm.

Thoms reported on the Pharmacology and Chemistry of Matico leaves and oils.—*Int. Cong.* 1909:—

P. Camphoriferum, D.C., *P. lineatum* Ruiz and Pavon, and *P. Angustifolium* var. *Ossanum* occur commercially.—*P. Angustif.* seldom occurs in unadulterated form. Crystalline Matico-Camphor, which used to be found in the leaves, is never found now. See also C.D., i/09, 873.

Mel Depuratum (Off.). The honey of commerce melted on a water bath and strained hot. Is demulcent, laxative and nutritive. *Oxymel (q.v.)*, is a frequent ingredient in cough mixtures.

Mel Rosatum P. Jap. Macerate Rose Petals 1 in dilute Alcohol 5, 24 hours with shaking, press and mix with the liquor Honey 9, Glycerin 1, and evaporate to 10.

Melaleuca Viridiflora (Myrtaceæ).—Indigenous to New Caledonia. ★Gomenol, a French proprietary, is stated to be a distilled essence of; given in rhinitis,

laryngitis, and other diseases of the respiratory system. *Pates Pectorales au Gomenol* are also made. In influenza, bronchitis, and coryza and with Vaseline Oil as Ear Drops.—Ph. Notes.

Melissa Officialis (*Labiatae*) 'Balm' was official in U.S. 1890, *q.v.* Eau de Melisse des Carmes. *Syn.* Alcoolat de Mélisse composé, FR. Cx. German *Carmeliter Geist*. Spiritus *Melissae Compositus*; digestive; twenty to twenty-five drops twice a day, is also used as an application in rheumatism, etc. Eau de Carmes was first sold by the Barefooted Carmelites, the monks of the New Reform, as they called themselves, who found a home in Paris in 1605—the elixir was introduced in 1611.—C.D. II./99,819, *q.v.* for more on historical aspect.

Menyanthes trifoliata. *Syn.* Trifolia Fibrina, P.G.—Bogbean Leaves or Buckbean. Are bitter tonic, emmenagogue, antiscorbutic, vermifuge and febrifuge; large doses are purgative and emetic; contain Menyanthin, $C_{30}H_{46}O_{41}$ = 625.62 (630.368 I.Wts.), a glucoside. Infusion 1 in 20. *Dose*, 2 to 6 ounces, taken hot, early in the morning daily, useful for functional amenorrhœa.—L. i./95,132, 235. Liquid Extract with Liquorice, 1 in 2. *Dose*, $\frac{1}{2}$ ounce. The leaves are in P. Dan.

Methyl Chloridum CH_3Cl = 50.10 (50.484 I. Wts.)—This gas made by distillation of Methyl Alcohol, Sodium Chloride, and Sulphuric Acid is supplied compressed in cylinders. As local anæsthetic it is valuable in neuralgia, sciatica, rheumatism. Spray the part for 5 or 6 seconds only—if effect too strong, apply Glycerin.

Mezereum. U.S. *Average dose*, $7\frac{1}{2}$ grains. Dried bark of *Daphne Mezereum* (*Thymelæaceæ*) and other European species. Fluidextract, U.S., is 1 = 1 Hydroalcoholic. Contains a crystallisable substance (Daphnetin), which is isomeric with Esculin (*q.v.*). Has been used as an epispastic for many years past, and stimulant.

Mollinum. *Syn.* Salve Soap-Unna. Prepared by boiling Lard 400 with Caustic Potash 56 in Water 400 and Alcohol 90% 40. Allow to stand 12 hours at 50–60° C., then add Glycerin 150. A white soap, containing about 12% excess of fat. As a basis for ointments for rapid absorption. It is readily washed off with water, with which it forms a lather. It leaves the skin fresh and supple, and makes no grease spots on linen. **Mollinum Hydrargyri** and **Mollinum Potassii Iodidi** contain 33% and 10% respectively of mercury and potassium iodide. Not incompatible with mercuric chloride. Is used with respectively 3 to 5% of phenol and salicylic acid and thymol, and with birch tar 10 to 20% for psoriasis; with 30 to 50% of sulphur or 10% of storax for acne and scabies;—with 5% of chrysarobin or naphthol; and with 10% of ichthyol, resorcin, iodoform, naphthalene or white precipitate.

Monsonia ovata. A Cape Geranium. Is closely related to and used in same manner as Geranium Maculatum, U.S.—N.S.D. A South African plant used as a native remedy for dysentery. Tincture, 1 in 8, Alcohol (90%). *Dose*, 1 to 4 drachms every 3 or 4 hours. Liquid Extract 1=1. *Dose*, 10 to 30 minims.—L./97, 363, 433; Y.B. 1898, 99, 426, 465; P.J. i./97, 162, 450; M.C., April, 97, 63. *Monsonia Burkei* (or *biflora*) preferred, and *Pelargonium tuberosa* also recommended for dysentery.—L. ii./98, 127; ii./99, 1826. Useful in anthrax.—P.J. i./01, 106.—In dysentery referred to again.—L. ii./06, 1253. **Monsonia biflora.** As prophylactic to hæmorrhage in enteric fever at the seventeenth or eighteenth day, Maberley separated an active principle which he named *entericin*—neither alkaloidal nor glucosidal. *Dose*, $\frac{1}{4}$ –4 drachms every 4 to 6 hours.—L. ii./09, 1293. Another group of active principles has great constipating effects.—L. i./09, 1838. See also L. i./10, 386.

Mori Succus.—Mulberry Juice. *Dose*, 1 drachm. The juice of the fruit of *Morus nigra* (*Moraceæ*). Mild laxative. Used in the form of Syrupus Mori. Mulberry juice 20, heat to boiling point and filter. Dissolve sugar 36 in filtrate and add Alcohol 90% 2½ to the liquid.

Moschus (*Off.*), Ph. Ned. Musk. *Dose*, 5 to 10 grains (0.32 to 0.65 Gm.). The dried secretion from the preputial follicles of the musk deer, *Moschus Moschiferus* (*Ungulata*). This is believed to be wrong—the Secretory Gland is a special Gland.—C.f. FR. Cx. That known as Grain Musk is Official. A useful nerve stimulant in cases of exhaustion in fevers and blood poisoning. (West London Med. Jl. ix, 20.) Of value both for nervous excitement or nervous collapse. Is effective

in obstinate hiccough and infantile convulsions. **Mistura Moschi.**—Musk 5 grains, Gum Acacia 5 grains, Syrup of Orange 1 drachm, Rose Water to 1 ounce. **Tincture, U.S.**—1 in 20 Alcohol 50% approximately. *Average dose*, 1 drachm. A Tincture of Artificial Musk has been used in whooping cough. Artificial Musk consisted formerly of a resinous substance formed by action of Nitric Acid on Oil of Amber. Artificial Musk varies in composition. The odorous constituent of the original 'musc baur' was the trinitro-derivative of tertiary butyl-xylene.—P.J. ii./06,377. In cardiac failure of acute pneumonia with camphor in pill.—West P. R. Apl.08,435.

Muira-Puama.—This drug, which comes from Brazil, has been described as belonging to *Liriosma Ovata*, Miers (fam. *Oleaceæ*). The drug is said to contain an alkaloidal crystalline substance, an amorphous, bitter substance, a little fat, and two kinds of resinous acids. A careful examination which we conducted did not confirm the statement as to the presence of an alkaloid. The samples of roots which we examined were, however, obtained in the ordinary way of commerce, and as these Brazilian drugs are much confused (different plants go under the same name in different provinces) it is just possible that one of the number of plants sold under the name Muira may contain an alkaloid. It has an irritating action, also tonic aphrodisiacal properties. Efficacious in the treatment of nervous disorders.—F.N. 1906. ★**Muiracithin** consists of the residue *in vacuo* of 100 Gm. fluidextract of Muira-Puama and 5 Gm. Lecithin, with Licorice Powder added made into 100 pills. *Dose*, three to four pills daily before meals, one morning, one noon and two in the evening. **Pilula Potentin Composita** contains Muira Puama Extract 1 grain with Ovocleithin 1 grain. A useful nerve stimulant and aphrodisiac. *Dose*, 3 to 6 per diem before meals.

Myricin.—*Dose*, 2 to 5 grains. The powdered extract of *Myrica Cerifera*. An astringent and stimulant, and in large doses, emetic. For diarrhœa and jaundice.

Myristica, Nutmeg (Off.), U.S. *Dose*, 5 to 15 grains (0.32 to 1.0 Gm.). Dried seed of *Myristica fragrans (Myristicaceæ)* with testa removed. Aromatic, carminative, and stimulant. Contains **Nutmeg Oil**. *Dose*, $\frac{1}{4}$ to 3 minims. Colourless or pale yellow liquid with Sp. Gr. 0.870 to 0.910, usually 0.892 to 0.918. Soluble in 3 volumes of 90% alcohol.—P.J. ii./08,624. [**Oleum Myristicæ (P. Off.)**. Distilled from nutmegs and rectified. Sp. Gr. 0.870 to 0.920 (instead of above). O.R. +13° to +30°; R.I., 1.474 to 1.484; Soluble 1 in 3 of 90% alcohol. When evaporated on a water bath it should not leave a residue that crystallises on cooling.] Has properties representative of the seeds. The expressed or concrete oil of nutmeg of yellowish colour contains **Myristicin**, $C_{12}H_{14}O_3 = 204.56$ (206.112 I. Wts.). It is occasionally employed as a gentle local stimulant. Spirit of Nutmeg (*Off.*). *Dose*, 5 to 20 minims. Poisoning by chewing nutmeg.—B.M.J. i./06, 538 Notes on the various forms of Mace of commerce.—Holmes, P.J. ii./08,652. Poisoning by nutmeg—three cases.—B.M.J. i./09,1005. Although Oil of Nutmeg and Mace only cause fatal poisoning in a rabbit in doses of 10 to 12 Gm., and a single nutmeg is capable of producing serious effects in man, it should be remembered that Oil of Nutmeg is very variable, some containing hardly any myristicin. The narcotic property of Nutmeg is attributable to myristicin, and it appears from experiments on animals that this substance when associated with the other constituents of nutmeg is more readily absorbed than when in the pure state. It would also appear that the lower animals are much less sensitive to the direct action on the cerebral function than man. Nutmeg does not appear to contain any other substance of physiological action on animals.—Am. J. Ph. Dec. '08,563.

Myrrha (Off.), U.S. *Dose*, 5 to 20 grains. Yellowish or reddish gum resin from *Balsamodendron Myrrha (Burseraceæ)* and other species. Soluble in water to the extent of about 50% (forms whitish emulsion on trituration with), the remainder being mostly soluble in alcohol 90%. It is soluble in alkalis, e.g., Potassium Carbonate. A favourite constituent in mouth washes, e.g., Tincture of Myrrh and Borax, 1 of each in Eau de Cologne 20. The Ash amounts to 6.3%; of this 15.4% is magnesium carbonate. A determination of the amount of magnesium carbonate in ash of myrrh might tell whether the drug is genuine or adulterated.—P.J. ii./05, 128. Constituents of Myrrh, report on.—P.J. i./06,128. Nitric acid should give with genuine myrrh a transparent dirty yellow liquid. False myrrh may give a bright yellow solution, and bdellium is not dissolved. **Tincture (Off.)**, 1 in 5 alcohol 90%; U.S., 1 in 5 alcohol 94.9%. **Flavoring.**—Glyl or Syl Mentha Piperitæ or Lavandulæ; Extractum Glycyrrhizæ Liquidum,

For analysis of varieties of myrrh see Allen, vol. li., part 3, '07, 216.

Myrtillus (*Vaccinium Myrtillus*).—Bilberry or whortleberry. An extract or jam has been employed with good results in dysentery, and has been painted on the tongue in stomatitis. It is said to be of great value in typhoid, rendering the intestine aseptic. Suppositories containing 1 Gm. of the extract, and a liquid extract are prepared. An enema is also used. *Dose*, 2 to 3 tablespoonfuls.—B.M.J. i./03, 306, 402, 485, 972; P.J. i./01, 702. The fruits are in P. Austr.

Myrtol.—A constituent of myrtle oil; has been recommended in putrid affections of lungs and air passages. Expectoration lessened, but no effect on bacilli. *Dose*, 5 to 15 minims on sugar. Capsules contain 2 and 5 minims.—B.M.J. i./09, 336; P.J. 1889, 782; Y.B. 1890, 307.

Naftalan.—A German specialty. An ointment prepared by dissolving $2\frac{1}{2}$ to 4% of anhydrous soap in purified petroleum naphtha. Used as an application for arthritis, rheumatism and eczema. Melts at 70°C. Useful in bedsores.—P.J. ii./00, 206.

① **Narceina**.— $C_{23}H_{27}NO_3$, $3H_2O = 495.55$ (499.274 I. Wts.), *Dose*.— $\frac{1}{4}$ to 1 grain. An Opium Alkaloid soluble in alcohol, hardly in water. Hypnotic sedative of doubtful utility. ② **Narcyl** is Ethyl-Narceine Hydrochloride $C_{25}H_{31}NO_4.HCl = 505.92$ (509.726 I. Wts.). *Dose*, divided, up to 1 grain per diem. White crystals, analgesic, slightly stimulant—not hypnotic. Action is similar to morphine, but is not largely used in medicine.

Niccolum.—Ni = 58.68 (I. Wts.). A constituent of German Silver:—Nickel 2, 3 or 4, Copper 8, Zinc 31. The nickel coins in Germany consist of Copper 3, Nickel 1. **Bromide**. $NiBr_2 + 3H_2O = 272.568$ (I. Wts.). *Dose*.—1 to 5 grains. Is in green deliquescent crystals soluble in water and in alcohol. To be given diluted. In epilepsy, 1 grain pills, action same as that of Potassium Bromide. **Niccoli Bromidum Effervescens**. *Dose*.—1 drachm, containing 3 grains. **Syrup**. *Dose*.—1 drachm (4 Cc.). Nickel Bromide 10, Water 120, Glycerin 15, Sugar 250. Dissolve. **Sulphate**. $NiSO_4.7H_2O = (280.862$ I. Wts.) *Dose*.— $\frac{1}{4}$ to 2 grains after meals. Greenish crystals, very soluble in water. Has been used in chlorosis (like iron augmenting number of blood corpuscles), amenorrhœa, splenic enlargement, and in locomotor ataxy. Resembles zinc sulphate in the fact that it is a nervine tonic and astringent. Allays nervous excitement and pain, particularly useful in cases where opiates cause vomiting, headache, and skin itching.

Other Nickel Salts are:—① **Nickel Arsenate** $Ni_3(AsO_4)_2.8H_2O = 598.168$ I. Wts.); **Nickel Acetate** $Ni(C_2H_3O_2)_2.4H_2O = 248.792$ (I. Wts.), soluble in water; **Nickel Benzoate** $Ni(C_7H_5O_2)_2 = 300.76$ (I. Wts.) + aq.; **Nickel Chloride** $NiCl_2.6H_2O = 237.696$ (I. Wts.), solution in water makes "Sympathetic Ink"; ② (applicable to Ireland also) **Nickel Cyanide** $Ni(CN)_2 = 110.70$ I. Wts.); ③ **Nickel Iodide** $NiI_2 = 312.52$ (I. Wts.) soluble in water; **Nickel Phosphate** $Ni_3(PO_4)_2.7H_2O = 492.152$ (I. Wts.).

④ **Nicotina**.—*Syn.* PYRIDYL-METHYL-PYRROLIDIN, $C_{10}H_{14}N_2 = 160.98$ (162.132 I. Wts.) *Dose*.— $\frac{1}{4}$ to 1 grain (0.01 to 0.065 Gm.). Colourless liquid (Sp. gr. 1.011) volatile alkaloid (darkens in time) from Tobacco (*Nicotiana Tabacum*). Has been used hypodermically for tetanus. *Antidotes*.—Emetics, stomach-pump, Tannic Acid (small quantities repeatedly) stimulants, nearly equals adrenalin in power of raising blood pressure. Tobacco must be barred where raised high tension indicative of danger.—Brunton, L.—ii./03, 1132.

⑤ **Nicotine Salicylate**. *Syn.* ⑥ ***Eudermol** $C_{10}H_{14}N_2.C_6H_4.OH.CO.OH = 277.90$ (300.18 I. Wts.). White crystals freely soluble in water. 1% Ointment for skin affections useful.

The action of Nicotine and other pyridine bases upon muscles and on the nictitans of Nicotine by Curarine.—*Nature*, Mar. 17, 1910, p. 87.

Tobacco smoke contains *inter alia* Thiocyanates or Sulphocyanides—presumably of Ammonia.—L.L./10, 662.

⑦ ***X.L.All Fumigator** contains Nicotine 37.3%, Camphor 34.3%, Alcohol 5.1%. Caused poisoning—L. ii./06, 1144, *c.f.* Edn. XII., 496. Percentage of various tobaccos.—B.M.J. i./09, 911. Horticultural use of Spray, Fumigant, and Paste.—P.J. ii./08, 722.

*Agricultural and Horticultural Poison. See note under Arsenic p. 141.

Ceanthe crocata. Water dropwort. (*Umbelliferae*.) Contains Ceanthotoxin, which gives rise to convulsions by action on the spinal medulla. Poisons children, being mistaken for Angelica.

***Oleum Crotonis* (Off.).** *Syn.* *Oleum Tiglii*, U.S. *Dose.*— $\frac{1}{2}$ to 1 minim. *Fr. Cx.* gives max. single dose 0.05 Gm. (=1 minim approx.). Max. during 24 hours 0.1 Gm. (=2 minims nearly). Expressed from seeds of *Croton Tiglium* (*Euphorbiaceæ*). *Sp. Gr.* 0.940 to 0.960 (*Off.*). Saponification No. 203 to 215, U.S. Iodine value 103 to 109. *Soluble* in Ether and in Olive Oil. A powerful skin irritant will blister, and even cause suppuration and scarring. It has been found possible to immunise animals to the poisonous effects of Croton Oil by gradual increasing dosage of 'Croton,' *vide* U.S.D. 886. Has been employed in tinea. *Liniment* (Off.) Croton Oil 1, Cajuput Oil 3 $\frac{1}{2}$, Alcohol 90% 3 $\frac{1}{2}$. This well diluted may stimulate growth of hair on bald patches, also used as a counter irritant, but may produce powerful inflammation. In pneumonia of great benefit. *Pr. Aprl.* 08,443. Internally so violent a purgative that it is rarely given except to lunatics for obstinate constipation, and in cases of apoplexy (one or two drops placed on the back of the tongue). May be given as Compound Castor Oil Capsules, *q.v.* **Antidotes.**—Olive Oil or milk as diluent. Opium to relieve pain and irritation.

Omphalea megacarpa diandra* and *O. triandra from Trinidad. Seeds and the fixed oils obtained from, are simple purgatives and laxatives. Absence of unpleasant flavor is a distinct advantage.—*Cash.*—P.J. ii/08,351,433.

Origanum Majorana (Sweet Marjoram) and ***O. Vulgare*** (French Codex Common Marjoram) (*Labiatae*) have been used medicinally. Value is attributed to the essential oil contained. Superseded by Oil of Thyme (*vide* *Thymus Vulgaris*), which is called in commerce Oil of Origanum. Aromatic Tonic. The Oil of Red Thyme now coming into this country from Cyprus is of a species of Origanum. The Oil which originally found a place in pharmacy under a misnomer as Oil of Origanum may at no distant date be derived from a species of Origanum—contains 80% Carvacrol.—*Umney*, C.D. ii/09,452.

Origanum of Cyprus contains 82 $\frac{1}{2}$ % of Carvacrol.—*Holmes*, P.J. ii/07,378.

***Pareira*, (Off.).** U.S. *Average dose* (U.S.), 30 grains. Dried root of *Chondrodendron tomentosum*, c.f. *Cissampelos*, I.C. *Add. Uses.*—Similar to those of Buchu. Employed in chronic inflammation of the genito-urinary tract. **Fluid extractum Pareiræ**, U.S., 1=1 Glycero-alcoholic. *Average dose*, 30 minims. **Extractum Pareiræ Liquidum** (Off.). *Dose*, $\frac{1}{2}$ to 2 drachms. Extract the Pareira Root in No. 40 powder with boiling water. Evaporate the liquor until it contains 33 $\frac{1}{3}$ % extractive matter. Add to 3 volumes of such, Alcohol 90% to produce 4. *Greenish's improved formula*:—Mix 20 of Alcohol with 20 of Glycerin, and 60 of Water. Moisten Pareira Root 100 in No. 10 powder with 40 of this mixture. Pack in percolator and percolate with remainder, continuing the percolation with 20% Alcohol until exhausted. Reserve the first 75, concentrate subsequent percolates to soft extract, and dissolve in the reserve, adding Alcohol 20% *q.s.* to make 100. Allow to stand 14 days and filter.—P.J. ii/04,701.

***Passiflora Incarnata* (*Passifloraceæ*).**—In epilepsy Passion flower with bromides often of great service.—*B.M.J.E.* ii/08,88. In neuralgia, dysmenorrhœa, and diarrhœa.—*N.S.D.*

***Pelargonium flabellifolium*.** Root from Natal possesses great astringency. *Dose.*—5 to 20 grains, found useful in dysentery. Tablets Compound, *Pelargonii* 5 gr., *Opii* $\frac{1}{2}$ gr., *Ipecac.* $\frac{1}{4}$ gr., *Bismuth. Salicylat.* 2 $\frac{1}{2}$ gr., *dose*, 1 or 2.

***Pepo*, U.S.**—Ripe seed of *Cucurbita Pepo* (*Cucurbitaceæ*), Pumpkin. *Average dose*, 1 ounce (30 Gm.). Said to be a never-failing remedy for tapeworm, given before breakfast, followed by coffee and later a brisk cathartic. The oil suggested.—*B.M.J.* i/09,71.

***Phaseolus Radiatus*.**—The fruits called by the Malays Katjany-idgo have been used in beri-beri with encouraging results. Known as a remedy since 1747, when it was used by Rumulus, a Dutch medical man. 150 Gm. daily given; result to be looked for in 14 days.—'La Caducée,' March, 1905,79.

***Phloridzin*, $C_{21}H_{24}O_{10} \cdot 2H_2O = 468.67$ (472.24 I. Wts.).** *Syn.* *Phlorizin*. A glucoside from various rosaceous trees, in pinkish-white crystals, sparingly soluble in water, in alcohol 90% 1 in 4, and in ether, and induces artificial diabetes

(glycosuria) in doses of at least 15 grains (v.p. 250). A valuable mild tonic, suitable for children; a substitute for quinine. *Dose*, Tonic 5 grains. Antiperiodic, 15 grains. Diminished Phloridzin glycosuria indicates disease of the kidney, and complete absence of sugar should be regarded as a sign of advanced renal disease.—L. i. 67, 717, and also p. 250.

Phytolaccin. *Dose*, 1 to 5 grains. Extractive from *Phytolacca Decandra*, Poke Root (*Phytolaccaceæ*).—U.S. Has emetic, cathartic and alterative properties. Has been used in rheumatism and syphilitic affections. A tincture 1 in 10 alcohol 45%. *Dose*, 3 to 10 minims. Fluidextract, U.S., 1=1 by Diluted Alcohol. *Average dose*, Emetic 15 minims; alterative $\frac{1}{2}$ minims. Locally for painful mammae.

Pichi.—Leaves and twigs of *Fabiana imbricata*; useful in gravel and some kidney diseases. Liquid Extract. *Dose*, 10 to 60 minims. Has given good results in gonorrhœa and cystitis. Tablets of the Solid Extract containing 4 grains equivalent to 1 drachm of Liquid Extract are preferred by patients, and have been found useful in genito-urinary diseases. In gonorrhœa with lymphangitis, œdema, etc., good results. Compound Tablets of Pichi Extract.—4 to 8 grains with Salol and Tannin of each 2 grains, useful to combat bacteria.—F.N., 1909.

Pimento (Allspice) (Off.), U.S. Dried full-grown unripe fruit of *Pimenta officinalis* (*Myrtacæ*). From W. Indies. *Aqua Pimentæ* (Off.) 1 in 20. *Dose*, 1 to 2 ounces. Pimento Oil. *Dose*, $\frac{1}{2}$ to 3 minims. Yellowish colour. Sp. Gr. 1.040 to 1.049 O.R.—1 to—3° Eugenol 65 to 75%.—P.J. ii./08, 624. Oleum Pimentæ. (P. Off.)—Sp. Gr. 1.040 to 1.055 [Off. not below 1.040]; O.R., 0° to—4°; R.L. 1.508 to 1.535; Soluble 1 in 3 of 70% alcohol. It should contain not less than 65% by vol. of eugenol when tested as under Oleum Caryophylli. (P. Off.) Stomachic, and antispasmodic. Put into hollow teeth to relieve pain.

Pinus Canadensis.—The hemlock spruce of the U.S.A. *Syn.* *Abies Canadensis*. A fluid extract is used as an astringent in leucorrhœa; and given internally for diarrhœa, hæmoptysis, and night sweats. *Dose*, 10 to 60 minims, also a distilled colourless variety in commerce.

Pinus Strobus. White Pine of America—the Syrup of the bark of which in that country enters frequently into Cough Syrups.—L. ii./09, 203.

Piperina, U.S. $\text{CH}_2\text{O}_2\text{C}_6\text{H}_3\text{CH}:\text{CH}:\text{CH}:\text{CON}.\text{C}_5\text{H}_{10}=283.05$ (285.162 I. Wts.) 253.04 U.S. Wts.). *Dose*,—1 to 10 grains. A crystalline principle from black and long pepper, the fruits of *Piper nigrum* (Off. and U.S.) and *Piper longum* (*Piperacæ*). In large colourless prisms, which turn yellow with keeping. Melts at 130° C. (266° F.) U.S. Insoluble in water, soluble in alcohol, and less soluble in ether. At first tasteless, but on prolonged contact it develops biting taste; it has febrifuge, stomachic and antiperiodic action. Oleoresina Piperis, U.S. *Average dose*,— $\frac{1}{2}$ grain. Is prepared by acetone extraction of pepper.

Piscidia Erythrina. Jamaica Dogwood (where used as fish poison).—Extractum (Alcoholic) from the bark. *Dose*, 2 to 5 grains, and Liquid Extract 1=1. *Dose*, 20 to 120 minims. In neuralgia, toothache, bronchitis, pertussis, insomnia, and dysmenorrhœa.

Pistolia Gout Powder.—One formula says composed of Calumba and Patchouli only. Several authorities, however, give (which is more often used) Bryony Root 2½ drachms, Gentian 2½ drachms, Chamomile 2½ drachms, Colchicum Root 5 drachms, Betony Root 10 drachms. Mix and divide into 365 powders. *Dose*, 1 to be taken each day of the year in a full glass of hot or cold water.—Ph. Form. A slightly varied formula.—B.M.J. i./09, 852. Have also been advocated for rheumatism.

Plectranthus Zeylanicus (*Labiata*) Singhalese *Irivériyā*. A Ceylon plant used by the natives as application to the head in delirium and coma, and internally as carminative; antiseptic stomachic and hepatic stimulant. Leaves and stem, especially the latter in infusion, decoction, or aqueous extract. Employed in dyspeptic conditions, and is valuable in diarrhœa.—B.M.J. i./07, 327.—Ph. Notes.

*Pollantin. A Hay Fever specific. Professor Dunbar and Sir Felix Semon have called attention to an anti-serum obtained by treating a horse with irritant toxins obtained from the pollen of grasses.—B.M.J. i./03, 713, 743, 1235, 1279, 1291. It is not a panacea.—B.M.J. ii./03, 123, 220. A few drops instilled into

the eye or nostrils, when an attack of hay fever comes on, checks the suffusion of the conjunctiva, and the sneezing and general discomfort.—L. ii./03,1462.

The serum is preserved by 1% carbolic acid, and is sterile. Reports of cases.—B.M.J.E. ii./04,11. Also supplied in dry form as snuff. Gratifying results in ten cases. The flower "Golden Rod" was used.—B.M.J.E. i./04,79. Semon on the serum.—B.M.J. i./04,80; P.J.F. No. 2468, P.J. ii./05,24. Horses which previous inoculation have been shewn to be responsive to the hay fever toxin are injected hypodermically with increasing doses of aqueous triturations of grass—or other pollen (e.g. *Ambrosia* and *Solidago* species which are causative of Autumn catarrh in U.S.A.). The inoculations are continued for several months 'for sufficient antitoxin to form. The Antitoxin content is estimated before the serum is issued for sale, by comparing with standard solution of hay fever toxin and serum on the eyes of a hay-fever patient.—Schimmel & Co. Does not appear to have produced the curative or prophylactic results at first claimed for it.—B.M.J. ii./08,202.

Populin.—Benzoyl - Salicin, $C_{13}H_{17}(C_7H_5O)O_7 + 2H_2O = 423.00$ (426.208 I. Wts.). From *Populus tremuloides* (*Salicaceæ*). Dose, 1 to 4 grains. Has antipyretic properties. A simple way of producing synthetic Populin.—P.J. ii./04,233.

Psidium Guajava, Ph. Ned. (*Myrtaceæ*). The leaves are mildly aromatic and astringent.—N.S.D. 895.

Pterocarpi Lignum. Red Sander's Wood. U.S. Heart wood of *Pterocarpus santalinus* (*Leguminosæ*). Contains santalin, and is used as a colouring agent in compound tincture of lavender.

Pulegium. Pennyroyal (*Labiataæ*). Oleum Pulegii, Oil of Pennyroyal Sp. Gr. 0.927 to 0.962 Rotation + 13° to + 35° often adulterated.—P.J. ii./08,624. Encourages menstruation—administered in form of a hot tea at bedtime. Is reputed to produce abortion. This is distinct from the Oil passing under that name in U.S., i.e., Oleum Hedeomæ, from *Hedeoma Pulegioides* (*Labiataæ*), which has similar properties. Constituents of this oil.—P.J. 1/07,531.

Pulque is the fermented sap of *Agave Americana*, and *A. Mexicana* (*Amaryllidaceæ*). Contains *inter alia* the phosphates of Magnesium, Potassium, and Calcium, and 7% of Alcohol. It is claimed that it stimulates renal activity, is a powerful nutritive, has been used with success in Bright's disease, is laxative and diuretic. Consumption in Mexico City is stated to be about 2 quarts of fresh juice per day per head.—C.D.I./10,54.

Pyrethri Flores. The dry flowers of *Pyrethrum roseum* and *P. carneum* in powder as a dusting powder to keep off insects. Those from Dalmatia are from *Pyrethrum cinerariaefolium* (*Compositæ*). A Tincture, 1 in 4 Alcohol 60% is used as an insecticide lotion. The powdered drug may be puffed from bellows into the room to kill mosquitos. The powder produced from closed flowers should yield 4% to Ether,—for White Cross Congress.—Umney, C.D. ii./09,580.

Pyrethri Radix.—Pellitory Root (*Off.*), U.S. Fr. Cx. Average dose, 30 grains. Dried root of *Anacyclus Pyrethrum* (*Compositæ*). A useful sialogogue, causing considerable salivary effusion; is used in the form of tincture 1 in 5. Might be made with 60% alcohol.—P.J. ii./09,142. U.S. Alcohol 94.9% vol.). Must be given with caution to children, as it is powerful in effect. Glycogelatin Pastils are made containing 1 grain of the powder for dryness of the mouth. To promote a continuous flow of saliva and thus irrigate the ducts and so prevent ascending infection. Severe hæmatemesis is often followed by inflammation of the parotid glands. *S. pyogenes aureus* and *M. lanceolatus* found in the pus.—B.M.J. i./09,1297.

Quassia (*Off.*).—Jamaica Quassia. Wood of *Picræna* (or *Picrasma*) *excelsa* (*Simarubaceæ*). Contains picrasmin. Infusion 1 in 100. Chiefly employed as a bitter tonic. **Flavoring.**—Syl Vanillæ, Syl Rosæ; Syrupus Zingiberis. Liquor Quassiæ Concentratus 1 in 10 (p. 438). Tincture 1 in 10. Alcohol 45%. Might be made with 30% Alcohol.—P.J. ii./09,142. By rectal injection the daily use of a strong infusion will get rid of tapeworms and threadworms. *Surinam Quassia* (not now in use) is the wood of *Q. amara* (U.S.), a branching shrub, whereas *P. excelsa* is about 100 feet high. Extractum Quassiæ, U.S., aqueous extract made up with milk sugar. (Powder form, 1=10 of drug). Fluid-extractum Quassiæ, U.S., 1=1 Hydro-alcoholic. Average dose, 8 minims.

Quassia is free from tannin, hence compatible with iron preparations as tonic. It contains Quassin, $C_{10}H_{12}O_3$ (?) = 178.74 (180.096 I.Wts.), which forms lamellar crystals, soluble about 1 in 400 of water, soluble also in acid and caustic alkaline solutions. Increases secretion of salivary glands and kidneys, and stimulates digestion. *Dose*, $\frac{1}{10}$ to $\frac{1}{2}$ grain.

Quassin, Fr. Cx. has formula $C_{22}H_{42}O_{10}$ = 581.92 (586.336 I.Wts.). *Mar. single dose*.— $\frac{1}{16}$ grain. P.J. ii. 08,437, goes very fully into the composition of 'Quassin' from Surinam Quassia, *Q. Amara* and from Jamaica Quassia (*Picraena excelsa*). The chief constituent of the latter being Picrasmin, as mentioned above. Picrasmin melts above 200° C. whilst Quassin, Fr. Cx. melts at 21° C.

Threat worms discharged on the third day by 2 grain Quassia Extract Pills (Keratin coated)—one morning, noon and night. Previously 2 ounces of compound decoction of Aloes.—B.M.J., i. 07,932.

Anti-smoking Gum.—Quassia made up in form of a chewing gum—a substitute for smoking for the use of patients suffering from tobacco amblyopia who feel the loss of their tobacco. Finely ground Quassia 1 in gum mass 12 is not too strong for excessive smokers, particularly if there be an alcoholic complication. Where this is absent 1 in 20 is strong enough. It creates appetite.—C.D. i. 09,373. Examination of Simarubaceous plants, *Q. Amara*, *P. excelsa* etc.—P.J. ii. 08,30,103.

Quebracho (*Aspidosperma Quebracho*) Bark from Argentina contains Ⓢ Aspidospermine supplied as Ⓢ Sulphate ($C_{22}H_{30}N_2O_9$)₂ H_2SO_4 = 800.66 (806.606 I.Wts.) Tonic, febrifuge and antispasmodic. *Dose*, $\frac{1}{4}$ to $\frac{1}{2}$ grain. In heart affections with dyspnea. Ⓢ Tincture of Quebracho 1 in 5 alcohol 60%. *Dose*, $\frac{1}{2}$ to 1 drachm. Ⓢ Liquid extract 1=1. *Dose*, 5 to 10 minims.

Quercus, U.S.—Bark of *Quercus Alba*, Linné (*Cupuliferae*), White Oak. Fluid-extract (1=1 Glycero hydro-alcoholic astringent). *Average dose*, 15 minims. Lotion, 1 in 20 of water, for leucorrhœa and gonorrhœa of women. Also for hæmorrhoids, and gargle for sore throat. Decoction 1 in 16. *Dose*, 1 to 2 ounces per os and injected per rectum. A weak decoction is useful for washing perspiring feet and indeed the entire body in such cases.—C.D. ii. 09,326.

Quillaia saponaria (*Rosaceae*). (*Off.*) P. Austr. Syn. Panama Bark (Soap bark). Contains quillaic acid, $C_{19}H_{30}O_{10}$ = 415.09 (418.24 I. Wts.), and saponin, $C_{17}H_{25}O_{10} + H_2O$ = 405.15 (408.224 I. Wts.), closely allied to saponin. Has a sweetish but acid after-taste, and possesses emulsifying properties, causing frothing in water in which it has been macerated. Its lather kills pediculi of scalp. Soap-bark has been used as an expectorant in bronchitis, contra-indicated in inflammation of the intestines or stomach, or ulcerated condition of the mucous membrane. Is used for emulsifying tar preparations, and in Emulsio Chloroformi. Tincture (*Off.*), 1 in 20 of Alcohol (60%). (Might be made with 45% of Alcohol.—P.J. ii. 09,142). Five minims of this will emulsify 1 drachm of fixed oil. (U.S. approximately the same strength.). *Dose*, 30 to 60 minims. Fluidextract, U.S. 1=1. *Average dose*, 3 minims. The powder has very marked sternutatory properties. Acne Lotion—Decoction of Quillaia 4 ounces, Eau de Cologne 60 minims, Ammonia Solution 40 minims. Use night and morning.—C.D. ii. 05,1052. It has poisonous properties.

Will emulsify Lemon Oil—thus for a 'Syrup of Lemon' take Lemon Oil 1, Quillaia Tincture 1, Water 14, shake and add Syrup 236, also Tolu Balsam; thus for a 'Syrup of Tolu' take Tolu Balsam 6, Fluidextract of Quillaia 1, Alcohol 90% 5. Dissolve and add Syrup 180, shake and filter.—C.D., i. 07,241.

Resina (*Off.*).—From the crude oleo-resin of various Pines after distilling Oil of Turpentine. Yellow resin soluble in Alcohol 90%, Ether and Benzol. Unguentum (*Off.*) Resin 4, Yellow Beeswax 4, Lard 3, and Olive Oil 4. Ceratum, U.S. Resin 7, Yellow Wax 3, Lard 10. Ceratum Compositum, U.S. Melt Resin 22.5, Yellow Wax 22.5, Suet 30, Turpentine 11.5 together, and add Linseed Oil 13.5. A resurrection of the old Deshler's Salve, in U.S. 1870. Oleum Resinæ Empyreumaticum, P. Austr. Brownish oil by distillation of colophony. Sp. Gr. 0.96–0.99. Saponification No. 4 to 12. Iodine No. 50.80.

Rhinacanthus Communis, TRENA DJAPAN, Ph. Ned. The root used in India in ringworm and other skin diseases. Acetum, Ph. Ned. Strength 1 in a mixture of Alcohol (90%) 1 and Acetic Acid (6%) 9.

Rhus aromatica. (*Anacardiaceæ*.) (Sweet or Fragrant Sumach). The bark of this Canadian and U.S. plant contains Tannin and Volatile Oil. *Dose.*—5 to 30 grains has given good results in incontinence of urine. B.M.J. ii./09,752. Said to act on the muscle fibre of the bladder. **Liquid Extract** 1=1. *Adult Dose.*—10 to 30 minims. 5 minims thrice daily to children under two years, and 10 minims to children 8 years. **Rhus Glabra,** (*Anacardiaceæ*). U.S. *Syn.*—Sumach or Smooth Sumach. The dried fruit. *Average Dose.*—15 grains. Astringent and refrigerant in diarrhoea and dysentery. **Fluidextract, U.S.** *Average Dose*—15 minims. 1=1 Glycerolcoholic.

Rhus Toxicodendron. (*Anacardiaceæ*.) *Syn.* **Poison Oak.**—Poison Ivy Leaves. Contains a poisonous tar or wax of a glucosidal nature.—P.J. ii./06,325. 'Rhus Iox' is only poisonous to people with a delicate skin. The best relief is obtained by moistening a crystal of washing soda and rubbing it over the affected part. Tincture of Serpentry and Tincture of Lobelia have also proved effectual.—E. M. Holmes, "Daily Telegraph," Aug. 14, '08. There was a common idea that handling the plant caused eczema. Pfaff and his pupils showed that Toxicodendrol—a non-volatile oily substance was the poison.—P. ii./09,532. **Tincture.** *Dose.*—2 to 15 minims. Imported from North America, prepared from fresh leaves 1, alcohol 2. A German formula is—Expressed juice 5, alcohol 6. Used for rheumatism, in chronic skin affections, paraplegia, and incontinence of urine from atony of the bladder. Also for hæmorrhoids. Whitla says it gives satisfaction, but may irritate stomach and bowels. Description, Botanical of the plants and means of distinguishing from harmless Ampelopsis.—Holmes, P.J. ii./08,231. L. ii./08, 887.

Rosæ Gallicæ Petala (*Off.*), U.S. The fresh and dried unexpanded petals. **Confectio Rosæ Gallicæ** (*Off.*).—Fresh Red Rose Petals 1, Sugar 3, beaten together in a stone mortar. **Infusum Rosæ Acidum** (*Off.*).—Petals $\frac{1}{2}$ ounce, Dilute Sulphuric Acid 2 drachms, Boiling Water to 1 pint. Infuse 15 minutes. **Syrupus Rosæ** (*Off.*).—Petals 2, Sugar 30, Water *q.s.* to 46. U.S. has **Fluidextract** 125, Diluted Sulphuric Acid 10, Sugar 750, Water to 1,000. **Fluidextractum Rosæ, U.S.**, 1=1 Glycerolhydro-alcoholic.

Rotra.—From the fruit of this plant (*Eugenia Sp., N.O. Myrtacæ*) a wine has been prepared. *Dose.*—8 ounces or so daily for a week in dysentery.—F.N. 1909.

Rubidium.—Rb=85.45 (I. Wts.). The salts of this metal, on account of their higher molecular weight and greater electrolytic conductivity, have been thought to possess greater chemical activity than those of ammonium, potassium and sodium, while resembling those in therapeutic action. The **Bromide.** RbBr=165.37 (I. Wts.). *Dose.*—5 to 30 grains. Is in colourless crystals soluble 1 in 1 of water. Employed with good results in epilepsy. As also **Rubidium-Ammonium Bromide.** RbBr3NH₄Br=459.316 (I. Wts.). White granular crystals, more favourable than potassium bromide in some cases. *Average Dose.*—90 grains daily. The **Iodide.** RbI=212.37 (I. Wts.). *Dose.*—5 to 20 grains. Colourless crystals, soluble 1 in less than 1 of water; has bitter saline taste. Alterative in syphilis. Does not disturb heart or stomach.

Rubus Chamæmorus (*Rosacæ*).—Cloudberry, Norwegian blackberry, marsh or dwarf raspberry. Also grown in Newfoundland. Known in Russia as Moroshka and in Germany as Torfbeere, Maltebeer, Wollenbeere, and Zwerg Maubeere.—P.J. ii./07,639. The leaves of this are diuretic, useful in nephritis, cirrhosis of liver, and cardiac affections. Infusion, 1 in 12, *dose*, $\frac{1}{2}$ ounce; fluid extract, *dose*, $\frac{1}{2}$ to 1 drachm. Fruit is antiscorbutic and used for hæmoptysis, will also abate fever.

Rubus villosus or *Rubus nigrobaccus* or *Rubus cuneifolius* (*Rosacæ*) (species of Blackberry) is Official in U.S. **Fluidextract, U.S.**, 1=1 Diluted Alcohol. *Average dose*, 15 minims. **Syrup, U.S.**—Fluidextract 1, Syrup to 4. *Average dose*, 1 drachm. *R. Idæus*=Raspberry.

Rumex obtusifolius—the dock.—Dried root of was found to contain 0.447% of iron in a combination analogous to the ferric derivatives of the nucleones. ★ **Fer Ascoli Tablets.**—A preparation with nucleins as base:

contains 8% of iron. Valuable in treatment of anæmic girls.—L. ii./09, 322.

Rumex Crispus.—Yellow Dock (*Polygonaceæ*). The root contains Emodi Chrysophanic Acid and Rumicin,—the last (*Syn.* Rumin) Dose, 1 to 4 grains, scrofulous affections, dyspepsia, astringent and tonic. Tincture 1 in 10, Alcohol 50%. Dose, 1 to 10 minims. Unguentum Rumicis.—Fresh Yellow Dock Root 1, Benzoeated Lard 2, warmed two hours and strained. Used like Chrysarobin applications.

Ferroplasma.—An organic iron compound extracted from cultivated *Rumex Crispus*. The roots of this plant are capable of taking up considerable quantities of iron when grown on soil containing iron compounds.—Am. J. Ph. Mar. '08, 141.

Ruta Graveolens.—(*Rutaceæ*). Dose, 10 to 30 grains. Contains about 1% Volatile Oil Sp. Gr. 0.880 (consisting of Methyl Nonyl-Ketone $\text{CH}_3\text{CO.C}_9\text{H}_{19}$ and Methyl-heptyl Ketone). Dose, 2 to 5 minims. In amenorrhœa and menorrhagia. Large doses have been given to procure abortion.

Confectio Rutæ.—Dose, 1 to 2 dr. Fresh Rue, Caraway, Bay Berries of each 1½, Sagapenum ½, Black Pepper ½, Honey 16. Add the first three in powder by degrees to the Sagapenum melted in the Honey with water q.s. Carminative and antispasmodic. Sometimes used as enema in infantile convulsions.—Pereira. St. G. H. has Rue 6, Caraway 6, Bay Berries 6, Black Pepper 1, Asafoetida 2, Honey 64, Water q.s.

① **Sabina, U.S.** Average dose, 7½ grains. FR. CX. has this as max. single dose. Max. during 24 hours 15 grains. Tops of *Juniperus Sabina* (Savin), Linné (*Conifera*). ② **Fluidextract, U.S.** 1=1 Diluted Alcohol. Average dose, 5 minims. ③ **Oleum Sabinæ (Off.), U.S.** Dose, 1 minim. Has emmenagogue and abortifacient properties. The oil from *J. phœnica* is an inferior substitute medicinally.—Umney, C. D., li./09, 580; P. J. ii./08, 624.

Sagapenum.—Dose, 10 to 30 grains. A gum-resin, rarely met with; is in yellowish-red pieces. Has a taste somewhat resembling asafoetida, and properties similar to this and galbanum, for use in amenorrhœa and hysteria.

Salep.—Tubera Salep, P. G., Ph. Ned. Dried tubers of various species of Orchis and allied plants. When fresh have bitter taste. They are immersed in boiling water after collection; contain mucilage and have nutritious and demulcent properties; allay gastro-intestinal irritation. Mucilago Salep, P. G. Freshly made.

Salix nigra.—The bark of this, the black or pussy willow, is used as a sexual sedative, tonic and astringent, and given for gonorrhœa and spermatorrhœa. Liquid extract, 1 in 1. Dose, ½ to 1 drachm. Flavoring.—Syl Lavandulæ, Syl Sassafras (full doses); Syrupus Aurantii, Syrupus Rosæ. Solid Extract. Dose, 1 to 5 grains. Relieves ovarian pain and nocturnal emissions. *Salix discolor* (Muhl), yields Salinigrin,—a new glucoside.—Y. B. P. 1902, 483.

Salvia, U.S.—Sage (*Labiata*). Dose, 15 to 30 grains. Dried leaves, aromatic, astringent tonic.

Sambuci Flores (*Sambucus nigra*—*Caprifoliaceæ*), Elderberry flowers (*Off.*). Infusion and pomade are used as domestic remedies for sores, bruises, etc. **Aqua Sambuci (Off.)** is prepared from the fresh flowers (or flowers preserved with common salt), a frequent ingredient in lotions for the eyes and skin. Rob Sambuci, Ph. Ned. Fresh fruits 10, Water 1, shake 5 minutes, press out and dissolve in the juice 4 parts, sugar 1.

Sanguinaria Canadensis, U.S. (*Papaveraceæ*). 'Blood Root,' Expectorant, emetic, tonic, for cough. Average dose, 2 grains. ② **Fluidextract 1=1.** U.S. Average dose, 1½ minims. ③ **Tincture U.S.** Average dose, 15 minims. *Sanguinaria Root* 5, Acetic Acid 1, Alcohol 30, Water 50, by hydro-alcoholic macero-percolation; contains alkaloid ④ *Sanguinaria* $\text{C}_{20}\text{H}_{15}\text{NO}_4\text{H}_2\text{O}$, = 348.54 (351.146 I. Wts.) and a resinoid extractive Sanguinarin. Dose ¼ to 1 grain.

Saponins are toxic glucosides contained in *Sarsaparilla* and *Quillaia*.

Sassafras Radix (Off.). *S. officinale*, or *S. variifolium* (*Lauraceæ*), U.S. The oil (*Oleum Sassafras*, U.S.), containing Safrol, destroys the vitality of pediculi; it should be applied with a stiff brush but not touch the skin; yet,

if so, a little bland oil allays the irritation it causes. Black Sassafras, *vide* I.C. Add. Saffrol, U.S. $[C_6H_3C_3H_5(OOCH_2) 1 : 3 : 4] = 180.86$ (Off. and U.S. Wts.) (162.08 I. Wts.). Obtained from camphor oil, sassafras oil, and other volatile oils, is used for scenting soaps and as an anodyne liniment in subacute rheumatism. Optically inactive, soluble in an equal volume of strong alcohol and in 30 of 70% alcohol. *Dose*, 20 to 30 minims. Mucilage of Sassafras Pith, U.S. 1 in 50 by cold maceration. Used internally in diarrhoea and as a collyrium.

A cheap and certain cure for all lice and nits in pediculosis.—B.M.J. ii./07,64.

Sp. Gr. of the oil usually 1.068 to 1.086. O.R. + 1° to + 3°.—P.J. ii./08,624.

In treating ringworm, the hair is cut close round to identify the patches, and the oil applied twice a day by a brush. This is continued for a few weeks if necessary. Non-irritating and pleasant to use, prevents spread of the infection, and destroys the fungus.

Saw Palmetto.—A palm growing in America. Possesses sedative, tonic and diuretic properties. Is largely used in urethritis, gonorrhoea, dysmenorrhoea, impotence, cystitis. A liquid extract 1=1. *Dose*, $\frac{1}{2}$ to 2 drachms. **Flavoring.**—Glyl Lavandulæ (full dose); Spiritus Myristicæ, Syrupus Aurantii. A solid extract is also prepared. *Dose*, 3 to 5 grs. in pill or tablet. Is also frequently combined with Santal in a miscible form, *e.g.*, Sanmetto. Sabal, U.S., is the partially dried ripe fruit.

Scilla (Off.). *Dose*, 1 to 3 grains. The bulb of *Urginea Scilla* (*Liliaceæ*) (*U. maritima*, U.S.), with membranous outer scales removed, cut into slices and dried. Resembles Digitalis in action. It is also expectorant and more diuretic. Off. are **Acetum Scillæ**, 1 in 8 of Dilute Acetic Acid. *Dose*, 10 to 30 minims (0.6 to 1.8 Cc.). (P. Aust. 1 in 10; Ph. Ned. 1 in a mixture of Alcohol 90% 1, Dil. Acetic Acid, 6% 9); **Oxymel Scillæ**, Squills 2½ ounces, Acetic Acid 2½ ounces, Water 8 ounces, Clarified Honey *q.s.* to Sp. Gr. 1.320; **Pilula Scillæ Composita**, Squills 1½, Ginger 1, Ammoniacum 1, Hard Soap 1, Syrup of Glucose 1; and **Tincture**, 1 in 5 of 60% alcohol. Might be made with 45% alcohol.—P.J., ii./09,142. **Flavoring.**—Void of much taste. Use, *e.g.*, Syl Coriandri, Syl Anisi; Syrupus Tolutanus. In U.S. are **Acetum** 1 in 10; **Fluidextract**, 1=1 Acetic, *average dose* 15 minims. **Syrup**=Vinegar of Squills 45, Sugar 80, Water to 100; **Syrupus Scillæ Compositus**, *average dose* 30 minims=Fluidextract of Squill and of Senega each 80, Antimony Potassium Tartrate 2, Sugar 750, Water to 1,000. **Tincture**, U.S., 1 in 10.

Poudre de Scille.—Fr. Cx. Max. dose during 24 hours 15 grains. Fr. Cx. has **Extract** (Alcoholic), with max. doses provided; also **Tincture** 1 to 5 Alcohol 60%, max. single dose 25 minims, max. during 24 hours 85 minims approximately.

Normal Tincture (Physiologically) of Squill may be of such a strength that the minimum lethal dose per 100 Gm. of frog is 20 minims, such dose proving fatal within 4 hours. See also pp. 209, 752.

Squill as cardiac stimulant is better than either digitalis or strophanthus. Squill and digitalis affect tonicity of the heart beneficially. Whether valvular disease is present or not, signs of lowered tonicity should be treated by.—Pr. 1907, Oct., 490.

Scopola Carniolica (*Scopolina atropoides*).—The root of this, an Austrian plant, has been imported as a substitute for belladonna, and is contained in U.S., 1900, with not less than 0.5% alkaloids, assayed as belladonna leaves. Scopola root contains two bases—(a) scopalamine, optically active, which is identical with hyoscyne, and (b) scopolamine, which is optically inactive, and which is identical with Hesse's atrosine.—Naylor Presidential Address, B.P.C., P.J. ii./05, 123. Atrosine melts at 92–93° C. Its dehydrated hydrobromide is optically inactive melting at 181° C.—Ph. Scopola *per os* is said to cause less dryness of the throat than belladonna, and is probably more nearly allied to hyoscyamus in its action. **Extract**, U.S. 2% alkaloids. Yield is (in pill consistence) 16–20% of the drug. Made by concentrating Fluidextract. *Average dose*, $\frac{1}{2}$ grain. **Fluidextract**, U.S. Standardised to 0.5% mydriatic alkaloids. *Average dose*, 1 minim, 1=1 Hydroalcoholic, and **Tincture**, *dose*, 5 to 20 minims. (Made same strengths as Belladonna Tincture, U.S. For Scopolamine, mydriatic alkaloid, *vide* also p. 389.

Scopola Japonica is stated to contain about 0.18 alkaloids consisting of about 90% Hyoscyamine with about 5% Scopolamine, and a minute quantity of Atropine.—M. Watanabe, Int. Cong. 1909.

This plant is so closely allied to *S. Carniolica* that its distinction is very doubtful. —Holmes confirms this. N.S.D.

There does not seem to be any necessity for introducing *Scopola* into the B.P.—Umney, C.D.ii./08,493.

Scutellaria, U.S. 'Skullcap.' *Average dose*, 15 grains. Dried herb of *Scutellaria lateriflora*, Linné (N.O. *Labiatae*). Used in the form of dry, greenish-brown powdered extract (scutellarin). *Dose*, 1 to 5 grains. For epilepsy, insomnia, and hicough, **Fluidextract**, U.S., 1 = 1, hydro-alcoholic, *Average dose*, 15 minims.

Sempervivum tectorum. Common Houseleek.

According to N.S.D. the bruised recent leaves are employed as cooling applications to burns and other external inflammations. **Succus** (preserved with 20% Alcohol) is said to cure warts.

Senecio.—**Ragwort**. *Senecio Jacobæa* and *S. aureus* (*Compositæ*) are emmenagogues, and have been employed in amenorrhœa and dysmenorrhœa, especially when depending on chill. **Liquid Extract**, 1 = 1 of herb. *Dose*, 20 to 60 minims. **Tincture**, 1 in 10 of proof spirit. *Dose*, 1 to 2 drachms. Two alkaloids, (a) **Senecionine**, $C_{18}H_{25}NO_6(?) = 324.78$ (327.21 l. Wts.) and (b) **Senecine** are contained. Excellent in gastralgia and dyspepsia.—P.J. ii./04,967.

Senecio latifolius. Closely related to the common groundsel is stated to have poisoned cattle in S. Africa.—P.J.i./09,364.

Two new alkaloids isolated—(a) **Senecifoline** $C_{18}H_{27}O_8N = 382.36$ m.pt.194°C and (b) **Senecifolidine** $C_{18}H_{25}O_7N = 385.226$ m. pt. 212°. The former has been reported on by Cushny as being poisonous to animals.

Senega (*Off.*), U.S. Dried root of *Polygala senega* (*Polygalacæ*). An expectorant, contains **Senegin**. **Infusion** 1 in 20, Concentrated Solution 1 in 2, and **Tincture** 1 in 5. **Fluidextract**, U.S., 1 = 1. *Average dose*, 15 minims. The alkali contained forms soluble compounds with the pectin principles in the root thus preventing gelatinisation (Caspari). **Syrup**, U.S.—**Fluidextract** 1, Simple **Syrup** to 5. The concentrated infusion of commerce is apt to deposit, owing to action of enzymes; less likely to if made with a little alkali. **Polygalæ Radix**, P. Belg., is the same. **Fluidextract** P. Belg. yields 25 % solid matter. **Tincture** (*Off.*) 1 in 5. Might be made with 45% Alcohol.—P.J.ii/09,142.

Infusum Polygalæ Compositum. *Dose*, $\frac{1}{2}$ to 1 ounce. **Senega** 10, boiling water 165, potassium iodide 5, paregoric 20, lobelia tincture 10. In use on the Continent.

Tisane de Polygala (Root)—(Fr. Cx.), 1 in 10 boiling water; infuse $\frac{1}{2}$ hour.

Description of constituents.—Naylor, P.J., July 28,06.

Serpentariæ Rhizoma (*Off.*), U.S. *Average dose*, 15 grains (1.0 Gm.).

Dried rhizome and roots of *Aristolochia Serpentina* (*Virginia Serpentina*) or of *A. reticulata* (*Texas Serpentina*) (*Aristolochiaceæ*). Bitter tonic. Official are **Infusion** 1 in 20, Concentrated Solution 1 in 2, **Tincture** 1 in 5. **Fluidextract**, U.S., 1 = 1 Hydro-alcoholic. *Average dose*, 15 minims (1 Cc.). **Tincture**, U.S., 1 in 5 of Alcohol and Water in proportion of 65 and 35.

Shellac.—A resinous substance formed by a scale insect, *Tachardia Lacca* (fam. *Coccidae*, ord. *Hemiptera*), which lives on a large number of trees, e.g., *Butea frondosa*, *Ficus religiosa*, *Schleichera trijuga*, *Shorea robusta* (Wild Lac). The plants specially cultivated for Lac are *Acacia arabica* and *Cajanus indicus*. The red dye or lake washed out in the process of manufacture is now no longer a commercial article. A small proportion of common resin and powdered orpiment, and necessary colours for decorative work added.—P.J. ii./05,640. Treatise on chemistry of shellac.—P.J. ii./05,653.

Allen for the commercial analysis aspect, see vol. ii., part 3, 07,190.

Simaba Cedron.—**Tincture** of the seeds hypodermically for malaria with good results.—Med. Times xxix. No. 10.

Simaruba officinalis (*Simarubacæ*).—*Syn.* MOUNTAIN DAMSON. *Dose*, 15 to 30 grains. **Infusion** 15 grains to 1 ounce in boiling water (infuse 15 minutes). *Dose*, 1 ounce. Has bitter taste, is astringent, and useful in dysentery. Contains (a) a colourless crystalline bitter glucoside $C_{22}H_{30}O_9$ (b) a colourless crystalline bitter principle, (c) yellow resin, (d) brown resin.—C.D., i./08,600.

Decoctum Simarubæ et Punicæ Granati.—Add **Simaruba Bark**, **Pome-**

granate fruit rind and Gum Arabic of each 15 Gm. to a litre of water and boil down to $\frac{1}{2}$ litre. *Dose*, 30 Cc. three or four times daily. Cures dysentery rapidly. (Egypt).—Ph. Notes.

Simulo.—Fruit of *Capparis coriacea*, from Peru. Its powder, 45 grammes in 500 grammes of sweet wine, of which a wineglassful was taken every night and morning, cured a case (Dr. Larrea, who narrates it) of epilepsy after he had 14 fits, preceded by a distinct aura. He has used it much in nervous diseases, hysteria, and epilepsy. — L. i./85,722; B.M.J. i./35,1184; P.J. 1885,890. Cases of epilepsy improved by its use.—L. i./88,817. For chorea.—Th. Gaz. 1890,692.

Solanum Carolinense.—Horse-nettle. A native of Southern U.S. A liquid extract 1=1 is employed in epilepsy. *Dose*, 15 to 60 minims.—H.

Solanum Dulcamara (*Caules Dulcamaræ*, P. Austr.) (*Solanaceæ*).—Woody nightshade, Bittersweet. The dried herb is employed. Sedative, analgesic. Contains the alkaloid 'Solanine.' **Extractum Dulcamaræ**, P. Austr.—An aqueous extract inspissated and mixed with equal amount of acacia, and powdered.

Solanum Nigrum.—Black or garden Night-shade. N.S.D. says from results of numerous experiments the berries are not poisonous to man. The leaves are said to be eaten boiled in the Isles of France and Bourbon and Hawaii Islands.

The Wonderberry stated to be from a luxuriant form or hybrid of *Solanum Nigrum* and to be edible. The berries of *S. Nigrum* contain 0.3% of *Solanine*—of which 1 Gm. is said to be necessary to kill a rabbit,—a glucosidal alkaloid easily decomposed. Tomatoes also contain this alkaloid. For those desirous of eating the berries (which should be cooked) use the cultivated wonderberry only. In India, China, and Brazil, the plant is taken as a diuretic for skin diseases and the juice for enlargement of the liver.—P. J. ii./09,422.

Solanum Sodomæum. The fruit of this plant is the apple of Sodom—when ripe is a pale yellow berry averaging 1 inch in diameter. Employed for destroying parasites in S.A. also for itch, ringworm, etc.—Juice of the fruit is extremely acid and bitter—it contains *Solanine*.—Oliver, C.D. ii/05,374; ii./08,325.

Sorbus Aucuparia.—The Mountain Ash. A liquid extract is prepared, 1=1. *Dose*, 10 to 30 minims. A useful mild aperient; also has diuretic and emetic properties.

Sorghum, Chinese Sugar Cane, *Andropogon arundinaceus* (*Gramineæ*). Indigenous in China and India and cultivated in U.S. Proprietary preparations such as 'Lithiated Sorghum Comp.,' are popular in America in bladder affections.

Soya Seeds, oil of.—Iodine value 131.—Cowie, C.D. i./10,66.

Spigelia, U.S. *Sp. Marilandica* (*Loganiaceæ*), Indian Pink-root. *Average dose*, 60 grains. **Fluidextract**, U.S., 1=1 diluted Alcohol. *Average dose*, 1 drachm. Is employed for round and tapeworm, but is very potent. *Ruellia Ciliosa* has been confused with it, and *Phlox Carolina* is erroneously regarded as an adulterant.

Spondias Mongifera. *Syn.* Desni Amra (Bengali) and Amratak (Sansk.). Kernels of the ripe seeds effective in removing thirst in polyuria, and burning sensation in diabetes. 5 grain doses every morning. The Bark is good in acute dysentery.—Calcutta Med. Jl. Apl. '07,301. Must not mistake for *Sp. Dulcis* (Belati Amra). The stones of the fruits are also imported.

Staphisagriæ Semina *Off. U.S.* *Average dose* (U.S.).—1 grain.

The seeds of *Delphinium Staphisagria* (*Ranunculaceæ*) contain about 30% of oil and the white crystalline alkaloid **Delphina**. *Syn.*—**Delphinine**. $C_{22}H_{35}NO_6$ = 406.24 (409.29 I. Wts.). *Dose*.— $\frac{1}{4}$ grain increased to $\frac{3}{4}$ grain. Soluble in water, alcohol, and ether. A heart poison. Given internally in toothache, neuralgia, earache, rheumatism, dropsy, and spasmodic asthma. Locally, an alcoholic solution or ointment, containing 2 to 8%, causes tingling and transient redness like veratrine. One part of the oil **Delphina** expressed from the seeds to 6 or 12 of perfumed olive or almond oil effectually kills pediculi of all kinds. Remove nits with a mixture of vinegar and proof spirit. **Ungentum** (*Off.*).—Stavesacre Seeds, crushed, 4, Benzoated Lard 35, heat on a water-bath for 2 hours, strain and press through calico, add Yellow Beeswax 4; dissolve by heat and stir until cold. U.S. 1905 omitted an ointment which perhaps, it should not have done, as the parasiticide is still largely used in U.S. **B.S.H.** has Expressed Oil 60 minims, Lard 1

ounce. For scabies and to kill lice. **Fluidextract U.S. 1 = 1** Hydro-alcoholic. *Average dose*.—1 minim. **Liquor Delphinine Compound**. An etherised acetic proprietary preparation applied to hollow carious teeth to stop pain; is not given internally.

Stillingia Sylvatica U.S. (Euphorbiaceæ), Queen's Root.

Dose.—Average 30 grains. Contains Volatile Oil and Alkaloid (?). Large doses emetic, cathartic: small doses alterative. Is employed in scrofula, syphilis, jaundice and for piles. **Fluidextract U.S. 1 = 1**. *Dose*.—30 minims. **Liquor Stillingiæ Compositus** is McDade's Succus Alterans for syphilis. *Dose*.—1 drachm.

Styrax Præparatus (Off.), U.S. Thick brownish liquid compound obtained from *Liquidambar orientalis (Hamamelidaceæ)*. Contains Cinnamyl Cinnamate (Styracin) and other Cinnamic Acid Compounds, together with a large proportion of Storresin, $C_{26}H_{52}(OH)_2 = 534.4$ (538.461 I. Wts.). Ointments of 20% are used in parasitic skin affections.

For chemical characters see also Allen, vol. ii., part 3, '07, p. 60.

Succinum—Amber obtained from a fossil resin found in Germany. Oleum Succini. *Dose*, 1 to 5 minims. Useful in persistent hiccough, asthma, whooping cough and hysteria. Diluted with Olive Oil is rubbed upon rheumatic parts and upon the chest for bronchitis and pertussis. B.P.O. has Amber Oil 1, Clove Oil, 1, Olive Oil 2 as **Linimentum Succini Compositum**.

Distillate from resin universally sold as Amber Oil.—Details P. J. ii./o8,624.

Sumbul Radix (Off.) Transverse slices of the root of *Ferula Sumbul (Umbelliferae)*, but this is not collected now. U.S. is "from an undetermined plant, probably belonging to N.O. *Umbelliferae*." Nervine sedative, and anti-hysterical. Contains aromatic volatile oil, and resin. **Tincture (Off.)** 1 in 10. *Dose*, 30 to 60 minims. Extract Sumbul average yield is 15% (Caspari). **Fluidextract, U.S., 1 = 1**, hydro-alcoholic. *Average dose*, 30 minims.

Sutherlandia frutescens (Leguminosæ).—Cancer Bush, Kanker Bosche, a S.A. Dutch remedy. Infusion of the bark and leaves for cancer.—B.M.J.i./o6,759.

Symphytum officinale.—The Comfrey plant and root boiled as a poultice for sarcomatous or cancerous tumours; one such cured.—L. i./99,810. For hæmoptysis and kidney disease with blood in the urine, as a decoction or syrup.—L. i./99,939. General uses, from an old herbal.—L. i./99,1068. Root pulped was used to stiffen bandages for fractures.

Symploci Folia, Ph. Ned. (S. odoratissimus). This and the following, *S. Racemosa* are given in menorrhagia. **Symplocos racemosa, Roxb. (N.O. Styracæ)**. The bark of this plant has Syn. Lodh bark, A native of E. India and China. It has been used in menorrhagia and is considered to have a special action on relaxed mucous membranes. *Dose* of bark 20 grains.—Holmes. **Liquid Extract of Symplocos racemosa (Lodh Extract)**. *Dose*.—30 to 60 minims *t.d.* Sir Patrick Manson has recommended this for the chyluria associated with filaria.

Tamarindus Indica (Leguminosæ). *Dose*.—1 to 8 drachms. The preserved fruit contains Tartaric Acid and Potassium Acid Tartrate in considerable quantity, and added sugar about 30%. It is also imported pressed into a solid mass as pulp.

Pastilli Tamarindorum Compositi. P. Aus. Add. VIII. 'Hindu Dates'.—Tamarind Pulp 10, Senna in fine powder 3, Sugar 5, Wheat Starch 1. Mix on water bath. Divide into Pastilles weighing about 40 grains each and cover with chocolate. Useful laxatives for children and invalids.

Tamus Communis. (Dioscoriaceæ). Black Bryony (found chiefly in Mediterranean region). **Tincture** of this, applied with brush, has been found useful in chilblains (unbroken), in conjunction with Calcium Lactate internally. The berries are said to be an irritant poison.

Tanacetum, Tansy.—Leaves and tops of *Tanacetum vulgare*. An aromatic bitter used as a vermifuge, but may cause dangerous irritation. **Liquid Extract, 1 = 1**. *Dose*, 15 to 30 minims.

Taraxacum officinale (Compositæ) (Off.), U.S. *Average dose*, 120 grains Official in this country are: **Extractum** from fresh root, *Dose*, 5 to 15 grains

Liquid extract 1=1, *Dose*, $\frac{1}{2}$ to 2 dr.; *Flavoring*.—Syl Limonis, Syl Cinnamomi, Syrupus Zingiberis. **Succus**, 3 of expressed juice with 1 of Alcohol 90% *Dose*, 1 to 2 dr.; **Taraxacum Coccoa**. An agreeable hepatic stimulant suitable for children and infants who are bilious. *Dose*, one tablespoonful to be taken in the morning. **Fluidextractum**, U.S., 1=1 Hydro-alcoholic with 5% of Soda. *Dose*, 2 drachms. Sodium Hydroxide is added to neutralise natural acidity and make compatible with alkalis.

Taxus Baccata.—The Yew. (D) Taxine, $C_{37}H_{51}NO_{10}$ = 664.41 (669.418 I. Wts.), an alkaloid, is extracted. White crystals soluble in alcohol and ether. *Dose*, $\frac{1}{100}$ to $\frac{1}{50}$ grain. Is said to have an action on circulation.—Proc. Chem. Soc. Vol. 18, No. 253.

Telfairia Pedata. (*Cucurbitaceæ*). Khomé or Quemmie Seeds. These brownish coloured seeds contain about 50% of yellow fragrant drying oil Specific Gravity 0.928. Telfairic Acid is the drying constituent suitable for soap making and illuminating. May have vermifuge action. From an examination which we have made we cannot trace an alkaloid in any appreciable quantity. Used by natives of East Africa as a remedy for stomach troubles and for rubbing on cuts and bruises.

Terebinthina Canadensis (*Off.*), U.S.—The balsam obtained from *Abies balsamea* (*Conifera*), known as Canada Balsam, is used for microscopic purposes as a mounting medium. Is a constituent of Collodium Flexile (*Off.*) It has a refractive index approximating that of microscopic glass, and 'sets' in a non-crystalline transparent condition. In preparing for use it has to be gently heated in an open dish for a week or more until a small quantity removed becomes brittle when placed on a cold slab. Canada Balsam 1 part by weight in Xylol, in turpentine, in benzol, and in chloroform, each 1 by measure, are prepared for microscopic use. The first mentioned is chiefly employed and is frequently designated 'Xylol-Balsam.'

For adulterants, etc., of Canada Balsam, see Allen, vol. ii., part 3, 07, 199.

Terebinthina Chia, P.L.—*Dose*, 5 to 10 grains. Oleoresin from trunk of *Pistacia Terebinthus*; was used for cancer of the female generative organs. Its taste is agreeable. **Mistura Terebinthinæ Chiæ** (30 grains in 1 ounce). *Dose*, 3 drachms daily, in divided doses, after food—gradually increased to 9 drachms. Has given relief in cancer. **Pilula Terebinthinæ Chiæ**. Chian Turpentine 3, Sublimed Sulphur 2. In grains for one pill, in grammes for fifteen; *dose*, 2 every 4 hours. With Lycopodium to preserve their shape. Justifiable in inoperable cancer.—M.P. Oct. 19, 04.

Teucrium Scordium (*Labiata*).—Water Germander. *Dose*, 10 to 20 grains. Contains a volatile oil and a bitter principle. Given for hæmorrhoids and pruritus ani. Diaphoretic; tonic for scrofula, gout, dropsy, flatulence. Liquid Extract. *Dose*, $\frac{1}{2}$ to 1 drachm. (D) **Electuaire Diascordium**, 'Diascordium,' Fr. Cx. Water-Germander Herb 50, Red Rose petals 20, Bistort Root 10, Gentian 10, Tormentilla 10, Barberry Berries 10, Ginger 5, Long Pepper 5, Canella 20, Siam Benzoin 10, Galbanum 10, Gum Arabic 10, Carbonate of Iron 20, Opium Extract 5, Mellitus Rosæ—Mellité de Rose Rouge 650, Malaga Wine 100—by weight throughout. 15 grains of this Electuary contains approximately 0.006 Gm. (about $\frac{1}{16}$ grain) of Opium Extract.

Thapsia.—The root of *Thapsia garganica*, an umbelliferous plant grown in Algeria (allied to the Silphion of the ancients); when exhausted with alcohol yields a resin which is employed in the French Codex to form a rubefacient plaster, **Emplastrum Thapsiæ**; Fr. Sparadrap de Thapsia, Emplâtre Révulsif de Thapsia.

Thuja Occidentalis.—Arbor Vitæ. A Tincture is prepared, of the dried young tops in 10 of 70% alcohol. *Dose*, 2 to 5 minims (0.12 to 0.3 Cc.). Thuja has an irritating action on the skin, and has been employed to remove warts and fungoid granulations from ulcers; internally for amenorrhœa, pulmonary catarrh, and worms. ***Ecthol**. *Dose*, 1 drachm well diluted. Is said to contain *Thuja occidentalis* and *Echinacea angustifolia*. Employed in all forms of septic conditions, e.g. blood poisoning, typhoid, erysipelas, diphtheria, acne, etc.; also locally for any kind of pustular formation; as wound dressing, diluted with 2 to 10 times volume of boiled water.

Thymus Vulgaris (*Labiatae*). Thyme. **Extractum Thymi Liquidum**. P. Helv. *Dose*, 5 to 30 minims (0.3 to 2 Cc.). Moisten Thyme 100 with a mixture of Glycerin 10, Alcohol 20 and Water 20. Percolate with a mixture of Alcohol 1 and Water 3, and reserve the first 85. Percolate further, recover the alcohol, and evaporate second percolate to soft extract and dissolve in reserve so as to produce 100. *Flavoring*.—Syl or Glyl Pini, or Lavandule; Syrupus Aurantii. Pertussin, a proprietary article for whooping cough, contains this drug. *Dose*, 1 to 4 drachms repeated. Syrupus Thymi (Ph. Notes) Liquid Extract of Thyme 1, Syrup 7 has similar properties and dose. J. Pollard finds this preparation with a small dose of Heroin a virtual specific for hacking cough.

***Tonga**.—A specialty for neuralgia. *Dose*, 1 to 2 drachms. A liquid prepared from *Epipremnum mirabile* and *Premna Taitensis*. **Succus Ari**, prepared from *Arum maculatum* *Dose*.—1 drachm. Relieved a case of neuralgia in which Tonga was equally successful.

Tulipa.—An extract of the bulb under the name of Chielin, in the form of a cream and soap, is advocated in eczema. The soap is suggested also for seborrhoea, acne vulgaris, and similar affections. It is soaked in water, is applied to the skin, and allowed to remain on during the night.—B.M.J.E. ii./02, 80; M.A. 1904, 15.

Ulmus fulva (*Ulmaceae*).—The SLIPPERY ELM grows in America (*Ulmus campestris* is common in Europe). The inner bark of fibrous texture has a highly mucilaginous taste; in powder is much used as a demulcent. It should be free from starch. Ten grains shaken with an ounce of water should form a thick jelly-like fawn coloured mass. *Decoction*, 1 in 8. *Dose*, 2 to 4 ounces. A mucilage 1 in 16½ is Official in U.S.

Vanadium. V = (1.2 I. Wts.).—Meta-Vanadic Acid, $\text{HVO}_3 = 100.208$ I. Wts.). and Sodium Meta-Vandate, $\text{NaVO}_3 = 122.20$ (I. Wts.). Of these the last has been used in chlorosis, phthisis, and rheumatism as tonics and antiseptics.—P.J. i. 98,603. *Dose*, $\frac{1}{2}$ grain (0.002 Gm.) or the quantity injected hypodermically. Soluble in water. 2 in 1; decomposes in the presence of organic matter. Preparation of, and other directions re pharmacology of Vanadates.—P.J. ii. 99,4493; i. 00,46; B.M.J.E. ii./99,91; improves appetite and nutrition.—B.M.J.E. ii. 01,88. **Vanadine**.—A liquid preparation of French manufacture, said to contain a vanadium salt and sodium chloride. Is used for gastralgia and dyspepsia. Two drachms of solution of Vanadic Acid, strength 0.915 Gm. per litre in pulmonary tuberculosis, chlorosis and neurasthenia. For local application, solution of 0.5 Gm. in 1 litre in skin affections, or better this diluted with 3 to 10 parts of Glycerin. Cicatrization rapidly ensues. In urethritis, swab out with tampon soaked in this solution.—B.M.J.E. i./07, 16; M.A. 1903, 38. There is a difference about the '0.5 Gm.' but we think that is what is intended.

Vanillin. Methylprotocatechuic Aldehyde. $\text{C}_6\text{H}_3\text{OH.OCH}_3.\text{COH}$. 4 : 3 : 1 = 150.92 (150.064 I. Wts.). Occurs in white acicular crystals, having a strong odour if obtained from *Fanilla planifolia* (*Orchidaceae*), U.S. (the cured full-grown but immature fruit), but is also obtained as a derivative of coniferine, a glucoside obtained from coniferous woods, or is made from several orthodihydroxybenzene derivatives (U.S.) Soluble in alcohol, ether, and oils, sparingly so in water. Use suggested in atonic dyspepsia as an excitomotor stimulant. For employment as test, r.p. 894. **Solutio Vanillin**.—Vanillin 30 grains, Alcohol 90% to 1 ounce. For ordinary purposes $\frac{1}{2}$ drachm will flavour a pint of medicine. (Schimmel uses same strength, but in a mixture of water 1 and alcohol 24). C.D. says may colour with Caramel or blend with Synthetic Vanillin, small quantities coumaric benzoic acids coumarin, etc. For note on manufacture of Vanillin vide Caspari. Vanillin is also manufactured by the oxidation of eugenol.—P.J. ii./06,377. **Fupyrine**. Syn. Para-Phenetidin-Vanillin-Ethyl-Carbonate. $\text{C}_{19}\text{H}_{21}\text{NO}_5$ or $\text{C}_6\text{H}_4(\text{OC}_2\text{H}_5)_2$. N = $\text{CH}_3\text{C}_6\text{H}_3(\text{OCH}_3)_2$. $\text{O.COOC}_2\text{H}_5 = 340.63$ (345.178 I. Wts.). *Dose*, 15 to 30 grains. Soluble in Alcohol 90%, Insoluble in water. Has antipyretic properties. For methods of manufacture and reactions of Vanillin, see Allen, vol. II., part 3, 1907. p. 107, et. seq. **Essence of Vanilla** 1 in 8 by

macerating Vanilla Beans 1 finely ground with Sand 1, in a mixture of Water 2, and Alcohol 90% 6. From this is prepared *Glyl* and *Syl Vanilla* q.v.

Verbascum Thapsus: P. Dan. Great Mullein (*Scrophulariaceæ*). Has been used in phthisis; has anodyne demulcent and diuretic properties. Tincture 1 in 8, Alcohol 60%. *Dose*, 20 to 60 minims.

Verbena Officinalis.—**Vervain.** Is a remedy for epilepsy. B.M.J. ii./04, 1599.

Vinca major.—Great Periwinkle Herb. Is astringent, and has been used for menorrhagia. Infusion, 1 in 10. *Dose*, a wineglassful frequently. Liquid extract, 1 to 2 drachms.

Viola odorata.—Has been used in cancer both internally and externally. A liquid extract is prepared (2=1 of fresh leaves). *Dose*.—Internally, 1 teaspoonful. May also be rubbed in locally. A fomentation of the leaves is also said to have given relief. The various species of *Viola* have similar properties. The herbaceous parts of the plant are mucilaginous, emollient, and slightly laxative. The root acts (in dose of 30 to 60 grains) as an emetic and cathartic. 'Princess of Wales' violet leaves are preferred. Contains glucosides amounting to 5% of the fresh leaves to which activity is probably due—not *Violaquercitrin* previously stated to be a constituent. The leaves may be carefully dried at 50°C. and powdered. The powder (20% of the fresh leaves) for administration in cachet and for making infusions and poultices. **Liquor Violæ Glucosidi.** *Dose* ½ ounce thrice daily. Is manufactured by macerating the fresh leaves two days in alcohol 90%, then percolate with alcohol to extract completely. Distill off most of the alcohol, and make up to volume with water (containing alcohol 30%) so that 1=1. Violet preparations in over 50 cases have relieved the pain, fetor, and size of malignant growths.—B.M.J. i./06,382. No alkaloid has been detected nor Salicylic Acid.

The drug controls offensive discharges. Large doses are said to cause indigestion and render urine antiseptic. A non-alcoholic solution of the active principles had anæsthetic action to the conjunctiva and sciatic nerve endings. Is contra-indicated in feeble heart and where the liquor causes dyspepsia. Give hypodermically ½ to 1 drachm twice daily.—L. ii./06,1318. **Syrupus Violæ.**—Macerate fresh flowers 2 in alcohol 90% 1, 8 hours, press and add water to 2, filter and add syrup 18. **Ionone.**—Artificial violet perfume is made by action of alkalis on a mixture of Citral and Acetone in presence of water. P.J. ii./06,377.

Viola tricolor, U.S.—Flowering plant of Wild Pansy. Is stated to contain Glucosides similar to the above. Is used externally as an ointment, and a poultice. *Dose*, 10 to 60 grains in infusion. An infusion in milk 1 in 10, very useful in acne vulgaris. The plant contains Salicylic Acid, and according to Wachs, *Violaquercitrin* $C_{27}H_{30}O_{16}, 2H_2O = 641.41$ (646.272 I Wts.).

Viscum album.—Mistletoe (*Loranthaceæ*). The berries are said to be emetic and purgative. The plant contains Viscin, a kind of birdlime—Japanese Birdlime, which has been used as a plaster and is largely employed for making sticky fly-papers. Has been given for epilepsy and hysteria.—L. i./04,111. *Dose*, in powder, 10 to 60 grains. Is said to be an ingredient in Elepizone. Recommended for chorea.—W.W.W. Ancient uses, etc.—B.M.J. ii./06,1875. **Hæmoptysis** arrested by 13 grain (?) pills.—M.A. 1908,23.

In albuminuria is of value. Solid extract used, 0.1 to 0.3 Gm. per diem. Acts best when blood pressure and tension is high.—B.M.J.E. ii./08,24.

★**Guipsine Pills** stated to contain 0.05 Gm. of active principles of this drug.—L. i./09,925. Fresh mistletoe contains a volatile alkaloid and two saponins and emetic and cathartic resin. The preparation is stated to contain all these excepting the resins. Guipsine lowers arterial tension due to a central vasomotor action, and to be without any depressing action on the heart itself. For use in arterio-sclerosis.—B.M.J. ii./09,1288. We have known it to be of service.

Xanthoxylum, U.S.—Dried bark of *Xanthoxylum Americanum* (Miller), Northern Prickly Ash; or of *Fagara Clava-Herculis* (Linné), small (Southern) Prickly Ash (N.O., *Rutaceæ*). Fluidextractum 1=1. Average dose, 30 minims. Hydro-alcoholic. Stimulant employed in rheumatism.

Xanthoxylum Capense. *Syn.* KAFFIR, UM-NUNGU-MABELE; DUTCH, PAARDE-PRAM. Knob-wood; Wild Cardamom. The Kaffirs use an infusion of the root bark. Draughts of this infusion are taken whilst eating the flesh of animals that have died from anthrax. In these conditions Dr. W. Anderson Soga states—"So far as I know no death has resulted from eating of such deadly carrion."—C.D. i./10,115.

Yerba Santa (*Eriodictyon glutinosum* or *E. californicum*)—Leaves are aromatic and sweetish, often agglutinated together; they are stimulant in bronchitis, phthisis, and other catarrhal affections. Fluid extract, 10 to 40 minims. Is sold combined with malt extract, as ★Malto-Yerbine. *Dose*, 1 to 4 drachms. Composition and preparations.—P.J. 1890,540; L. i./98,1114. *E. californicum* is Official in U.S. Fluid extract 1=1. *Average dose*, 15 minims. Constituents of *E. californicum*.—P.J. i./06,331. Contains crystalline body Eriodictione $C_{15}H_{17}O$ (OCH_3) (OH)₄.—P.J. i./07,457.

⑤ **Yohimbine Hydrochloride**, $C_{20}H_{30}N_2O_4HCl(?) = 419.61$ (422.728 I.Wts.).—The salt of an alkaloid obtained from Yohimbehe or Yumbehoa bark, is a reputed aphrodisiac. 1% solution, *dose*, 5 to 15 minims. ⑥ Tablets contain $\frac{1}{15}$ grain. *Dose*, 1 thrice daily; may be increased to five. It has erotic powers.—B.M.J.E. i./01,103; i./05,23.

If the internal administration not successful, injections of 7 to 15 minims ($\frac{1}{2}$ to 1 Cc.) of a 2% solution may be tried.

A few drops of a solution $\frac{1}{2}$ to 1% strength act as an anæsthetic when applied to the cornea. There is no mydriasis, and the anæsthesia lasts for an hour.—L. i./05,1012. 25 Cc. of a 1% solution may be injected subcutaneously for causing local anæsthesia, which lasts for an hour or two. It cures impotence.—B.M.J.E. i./05,23.

Corynanthe Yohimbi (true Yohimbi bark) contains at least 4 alkaloids totalling 0.3 to 1.5%.—P.J. ii./07,783.

⑦ ★**Aphrodine Tablets** contain Yohimbine (Spiegel) for stud purposes. Yellow Tablets contain 0.001 Gm., grey 0.01 Gm., and red-coloured 0.1 Gm. *Dose* according to kind and weight of animal.—C.D. i./08,13.

Experiments on bitches seem to show that Yohimbine possesses the property of affecting ovarian nutrition by inducing a constant supply of blood to the ovaries. Mammary secretion was also stimulated. When excessive doses are given nervous irritability is produced. Foreign experiments on male animals indicate a marked aphrodisiac effect.—P.J. ii./09,184.

SYNOPSIS OF THE INDIAN AND COLONIAL ADDENDUM (1900) TO THE BRITISH PHARMACOPEIA 1898.

ABBREVIATIONS.—*L., India; A.C., African Colonies; Au.C., Australasia Colonies; E.C., Eastern Colonies; M.C., Mediterranean Colonies; N.A.C., North American Colonies; W.I.C., West Indian Colonies; P.I., Pharmacopœia of India, 1868; E.P.I., Economic Products of India, 1889-96; Pg.I., Pharmacographia Indica, 1890-93; I.D.C., Indigenous Drugs Committee Rept., Simla, 1909.*

Drug or Preparation.	Dose.	Source and where official.	Description, part used, or menstruum and strength.	Properties and References.
Acaciæ Cortex , (BLACK WATTLE BARK from <i>A. decurrens</i>) Decoctum	..... ½ to 2 oz.	<i>A. arabica</i> and <i>decurrens</i> . I., Au.C., E.C.	Dried bark kept for one year...	Astringent, suitable as gargle or lotion = Oak bark.—E.P.I. i. 21; Pg.I. i. 550, 556.
Acalypha Ext. Liquidum	..... 5 to 30 m. 1 to 4 dr.	<i>A. indica</i> I., E.C. (<i>Euphorbiaceæ</i>). <i>A. Vasisa</i> . I., E.C. (<i>Acanthaceæ</i>)	Water, 1 in 16 Fresh or dried herb Alcohol 90%, 1=1 Fresh juice, ¼ th alcohol 90% Fresh or dried leaves Dried leaves, alcohol 60%, 1=1 Fresh juice Dried leaves, perc. alc. 60% 1 in 8	Expectorant, emetic, laxative=Senega or Broom.—P.I. 205; E.P.I. i. 62
Adhatoda Ext. Liquidum Succus Tinctura	..... 20 to 60 m. 1 to 4 dr. 30 to 60 m.	<i>A. repens</i> (<i>Triticum repens</i>). Au.C., E.C. [N.A.C.] <i>A. scholaris</i> I., E.C., and <i>A. constricta</i> . (<i>Apocynaceæ</i>) Au.C.	Dried rhizome..... Water, 1 in 20 Boiling water, ¼ alc. 90% 1=1 Dried bark Boiling water, 30 minutes, 1 in 20 Alcohol 60%, macerate 1 in 8	Expectorant and antispasmodic, contains Vasicine, a bactericide.—P.I. 162; E.P.I. i. 109; P.J. 1888, 841; Pg.I. iii. 291; L. ii./co, 327. The dried leaves are smoked for asthma. Useful expectorant.—I.D.C. Diuretic and aperient.—Pg.I. iii. 50. Contains tritacin, a carbohydrate similar to inulin. Useful in gonorrhœa. <i>Flavoring</i> .—Syl Lavand; Aq. Anethi. Tonic, in dysentery and malaria.—P.I. 137; E.P.I. i. 197; Pg.I. ii. 386 p. 691. Dose of Tr. A. Constricta is less, 5 to 20 m.—P.J. i./oi, 362. Of value in mild cases, but drachm doses of Tincture of no avail in reducing temperature.—I.D.C. Stomachic and bitter tonic=Chiretta.—P.I. 161, 459; E.P.I. i. 240; Pg.I. iii. 46. p. 708. Of some value in mild malarial cases, but useless in severe cases. A good tonic.—I.D.C.
Agropyrum , TRITICUM or COUCH GRASS Decoctum Ext. Liq. and U.S. Alstonia , (DITA BARK from <i>A. scholaris</i>) Infusum Tinctura	..... ½ to 2 oz. 1 to 2 dr. ½ to 1 oz. ½ to 1 dr.	<i>A. paniculata</i> . I., E.C. (<i>Acanthaceæ</i>). ½ to 1 oz. ½ to 1 dr. ½ to 1 dr.	Dried plant Boiling water, 15 minutes, 1 in 20 Alcohol 20%, 1 in 2. Alcohol 60%, percolate	
Andrographis (CHRYAT, KIRYAT) Infusum Liquor Concentratus Tinctura	..... ½ to 1 oz. ½ to 1 dr. ½ to 1 dr.			

Aristotechia .....	.....	<i>A. indica</i>	Dry stem or root	Tonic stimulant = Serpentry. A remedy for snake bites.—P.I. 198, 461; E.P.I. i. 315; Pg.I. iii. 168.
Liquor Concentratus Tinctura	‡ to 2 dr. ‡ to 1 dr.	(<i>Aristolochiaceæ</i>) <i>A. montana</i>	Alcohol 20 %, 1 in 2 Alcohol 70 %, percolate 1 in 5 Dried flower heads	Arid stimulant = <i>Arnica rhizome</i> . (Vinure U.S. 1 in 5 diluted alcohol.) Mild tonic, stomachic.—Pg.I. i. 269.
Arnica Flores (U.S.) ..	‡ to 1 dr.	<i>N.A.C.</i> <i>Auran-</i> <i>tium</i> I., E.C.	Alcohol 45 %, percolate 1 in 10 Fresh and dried peel of fruit (<i>Rutaceæ</i>)	Tonic (in malaria), Anthelmintic (=Quassia)—P.I. 65, 443; Ghosh found useful as poultices in ulcers and eczema.
Auranti Cortex Indicus .....	.....	<i>Meliss</i> <i>Asadir-</i> <i>achta</i> I., E.C.	Dried bark of stem	Mild astringent.—P.I. 46; E.P.I. i. 120. Fresh fruit useful in dysentery.—Li./04, 66. In dyspepsia.—Ghosh.
Asadirachta Indica , NEEM, or MARGOSA BARK	‡ to 1 oz. ‡ to 1 dr.	(<i>Meliaceæ</i>) <i>Egle marmelos</i> , I., E.C.	Cold water, 15 minutes, 1 in 100 Alcohol 45 %, macerate 1 in 10 Fresh half-ripe fruit	Tonic. Extract known as 'Rasol' in India. P.I. 12. Fully described.—P.J. ii./04, 473. In intermittent fever.—Ghosh.
Bela Fructus ,	1 to 3 dr.	(<i>Rutaceæ</i>) <i>B. aristata</i> , I., E.C.	Cold water, ¼th alc. 90%, 1 = 1 Dried stem	Stimulant, narcotic, masticatory.—P.I. 208; E.P.I. vi. pt. 1, 254; Pg.I. iii. 183. Externally in sore throat.
Ext. Liquidum	‡ to 1 dr. ‡ to 1 dr.	(<i>Berberidaceæ</i>) <i>Piper betle</i> , I., E.C.	Alcohol 20 %, 1 in 2 Alcohol 60 %, percolate 1 in 10 Dried leaves. The fresh leaves are contained in PAN (Beng.). —Ghosh.	Astringent.—P.I. 73. Contains Tannin Compound powder 3 in 4.
Berberis .....	.....	(<i>Piperaceæ</i>) <i>B. frondosa</i> , I., E.C.	Inspissated juice from stem ..	Contain Moodooga Oil. Anthelmintic like Santonin.—P.I. 79, 446; E.P.I. i. 550; Pg.I. i. 454.
Liquor Concentratus Tinctura .....	.....	<i>B. frondosa</i> , I., E.C.	Seeds	Tonic, emetic.—E.P.I. ii. 43; Pg.I. ii. 428. For dysentery. Alternative in syphilis and rheumatism.—Ghosh.
Betel	10 to 20 gr.	(<i>Leguminosæ</i>) <i>C. procera</i> and <i>C. gigantea</i> , I., E.C.	Dried kernels freed from testa ..	Pills containing this, with turmeric, etc., against cholera in India.—Li. i./09, 637. In mild cases of dysentery certainly does good, but tendency to produce vomiting.—I.D.C.
Butea Gummi, BUTEA GUM, BENGAL KING.	{ 3 to 10 gr. Emetic: 30 to 60 gr. ‡ to 1 dr.	(<i>Asclepiadaceæ</i>) <i>Garcinia mor-</i> <i>ella</i> I., E.C.	Root Bark freed from outer layer ..	Cathartic = Siam Gamboge.—P.I. 30; E.P.I. iii. 476; Pg.I. i. 168.
Butea Semina .....	.....	<i>Acacia catechu</i> , I., E.C., N.A.C.	Alcohol 60 %, percolate 1 in 10	Astringent = Pale Catechu, 'Gambier'—P.I. 62; E.P.I. i. 42; Pg.I. i. 552, 557.
Pulvis .....	.....		
Calotropis .....	.....		
MYDAR .....	.....		
Tinctura .....	.....		
Cambogia Indica	‡ to 2 gr.			
Catechu Nilgrum	5 to 15 gr.			

Drug or Preparation.	Dose.	Source and where official.	Description, part used, or menstruum and strength.	Properties and References.
Catechu —(<i>continued</i>).				
Trochisci	1 gr. in each			
Cissampelos	1 to 2 oz.	<i>C. pareira</i> .	Dried root	Tonic, diuretic=Pareira root.—P.I. 7 ;
Decoctum	1 to 2 dr.	I., E.C.	Water 1 in 8	E.P.I. ii. 328; Pg.I. i. 53. Contains
Ext. Liquidum		(<i>Menispermaceæ</i>)	Boiling water, percolate, concentrate, 1/4th alcohol 90%, 1=1	Beberine, formerly called Pelosine.
Coscinum				
Infusum	1 to 1 oz.	<i>C. fenestratum</i> .	Dried stem	Tonic=Calumba.—P.I. 10; E.P.I. ii.
Liquor Concentratus	1 to 1 dr.	I., E.C.	Boiling water, 30 minutes, 1 in 20	578.
Tinctura	1 to 1 dr.	(<i>Menispermaceæ</i>)	Cold water and alc. 90%, 1 in 2	
Cucurbitæ Semina Præparatæ, MELON PUMPKIN SEEDS	3 to 4 oz. bruised with water or milk	<i>C. maxima</i> . M.C.	Alcohol 60%, macerate 1 in 10	Anthelmintic—P.I. 97; E.P.I. ii. 639.
		(<i>Cucurbitaceæ</i>)	Fresh ripe seeds deprived of testa and tegmen	Give first a saline purge and afterwards Castor Oil. The oil expressed from the seeds 1/2 ounce, repeated at 2 hours also efficient.—(Josh.
Daturæ Folia		<i>D. fastuosa</i> var. <i>alba</i> and <i>D. metel</i> . I., E.C., W.I.C.	Dried leaves	Anodyne=Belladonna and Stramonium.—E.P.I. iii. 34, 40.
Daturæ Semina		<i>D. fastuosa</i> var. <i>alba</i> , I., E.C. (<i>Solanaceæ</i>).	Seeds	Diuretic and narcotic = Stramonium seeds.—P.I. 175, 460; E.P.I. iii. 34; Pg. I. ii. 585.
Embella	1 to 4 dr.	<i>E. ribes</i> and <i>E. robusta</i> , I., E.C.	Dried fruit	Anthelmintic, like Kousso or Male Fern.—E.P.I. iii. 242; P.J. 1887, 171; 1888, 601, 305; Pg. I. ii. 349. In one case stated failed as a Vermicide.—I.D.C.
Extractum Glycyrrhizæ Spirituosum	1 to 1 dr.	I., E.C.	Extract of Liquorice 2, Alcohol 90% 1, Water <i>q.s.</i> to 4	Keeps better than B. P.
Gossypii Radicis Cortex		<i>G. herbaceum</i> . I., E.C., N.A.C., W.I.C.	Dried root bark (<i>Malvaceæ</i>) ...	Emmenagogue=Ergot.—Pg. I. i. 224. p. 354.
Decoctum	1 to 2 oz.		Water, 1 in 5	
Ext. Liquidum	1 to 1 dr.		Alcohol 90%, Glycerin 1/4th, 1=1	

* Contains about 2.5% Embelic Acid $C_{18}H_{35}O_4$ —yellow crystals soluble in alcohol, etc. a tæniifuge in dose 3 to 6 grains (0.2 to 0.4 Gm.) with Castor Oil both before and after.

Grindelia (<i>Compositae</i>). Ext. Liquidum	10 to 20 m.	<i>G. squarrosa</i> and <i>G. robusta</i> . A.C., N.A.C.	Dried leaves and flowering tops. Alc. 40 1. Water <i>q. s.</i> to 3, with Sodium Bicarbonate 1 = 1 Gummy exudation from wood	Sedative and antispasmodic. p. 354.
Gummi Indicum (GHATI or GUATTI GUM) Mucilago	<i>ad lib.</i>	<i>Amogonius latifolia</i> . I., E.C. (<i>Combretaceae</i>) <i>H. quinque- striata</i> . A.C. <i>H. spinosa</i> . I., E.C. <i>Plantago ovata</i> . I., E.C. (<i>Plantaginaceae</i>) <i>Ipomoea heder- acea</i> . I., E.C.	1 to 3 of water Five-striped or Australian leech	Demulcent 1 = 2 Gum Acacia. — E. P. I. i. 257; Pg. I. i, 553; ii, 12. = European Leeches.
Nyctrophila Decoctum	‡ to 2 oz.	<i>Plantago ovata</i> . I., E.C.	Dried herb (<i>Acanthaceae</i>)..... Water, 1 in 10 Pinkish boat-shaped seeds	Demulcent and diuretic. — P. I. 102; E. P. I. iii, 316; Pg. I. iii, 36. Much valued as demulcent = Linseed or barley. — P. I. 182; Pg. I. iii, 126.
Isopagula Decoctum	50 to 150 gr. ‡ to 2 oz.	<i>Plantago ovata</i> . I., E.C.	Dried seeds	Purgative and Anthelmintic = Jala p. — P. I. 155, 459; P. I. iv, 496; Pg. I. ii, 530. Useful purgative, hydragogue. Sug- gested dose 60 to 120 grains. — I. D. C. = Pulvis Jalapæ Compositus.
Kaladana PHLEBITIS NIL	30 to 50 gr.	<i>Ipomoea heder- acea</i> . I., E.C.	Kaladana 5, Acid Potassium Tartrate 9, Ginger 1 Alcohol 70%, percolate 1 in 5 Prepared as Resina Jalapæ, B. P.	Equivalent of the portion of Jalap Resin, insoluble in ether, Constituent to ex- tent of 8%. Useful hydragogue. — I. D. C. Stimulant diuretic, p. 710.
Pulvis Compositus	20 to 60 gr.	(<i>Convolvulaceæ</i>) <i>Ipomoea heder- acea</i> . I., E.C.	Decorticated and dried rhizome Semi-alcoholic, 1 to 1	Astringent = Kino. p. 705.
Tinctura Kaladanæ Resina PHLEBITIS NIL	‡ to 1 dr. ‡ to 8 gr.	<i>Piper methysti- cum</i> . Au.C. (<i>Piperaceæ</i>) <i>Eucalyptus</i> var. <i>M. phalerata</i> . I., A.C., E.C. (<i>Coleoptera</i>)	Exudation from stem	Vesicant = Cantharides, contains Can- tharidin 1 to 1.2 % — P. I. 277, 467; E. P. I., iv, 209. = Acetum Cantharidis. = Emplastrum Cantharidis. = Emplastrum Calefaciens. = Liquor Epispasticus.
Kava Rhizoma Ext. Liquidum	30 to 60 m.	<i>Piper methysti- cum</i> . Au.C. (<i>Piperaceæ</i>) <i>Eucalyptus</i> var. <i>M. phalerata</i> . I., A.C., E.C. (<i>Coleoptera</i>)	Exudation from stem	
Kino Eucalypti BOTANY BAY KINO	5 to 20 gr.	<i>Piper methysti- cum</i> . Au.C. (<i>Piperaceæ</i>) <i>Eucalyptus</i> var. <i>M. phalerata</i> . I., A.C., E.C. (<i>Coleoptera</i>)	Exudation from stem	
Mylabris		<i>Piper methysti- cum</i> . Au.C. (<i>Piperaceæ</i>) <i>Eucalyptus</i> var. <i>M. phalerata</i> . I., A.C., E.C. (<i>Coleoptera</i>)	Exudation from stem	
Acetum Mylabridis		<i>Piper methysti- cum</i> . Au.C. (<i>Piperaceæ</i>) <i>Eucalyptus</i> var. <i>M. phalerata</i> . I., A.C., E.C. (<i>Coleoptera</i>)	Exudation from stem	
Emplastrum Mylab- ridis		<i>Piper methysti- cum</i> . Au.C. (<i>Piperaceæ</i>) <i>Eucalyptus</i> var. <i>M. phalerata</i> . I., A.C., E.C. (<i>Coleoptera</i>)	Exudation from stem	
Emplastrum Mylab- ridis Calefaciens		<i>Piper methysti- cum</i> . Au.C. (<i>Piperaceæ</i>) <i>Eucalyptus</i> var. <i>M. phalerata</i> . I., A.C., E.C. (<i>Coleoptera</i>)	Exudation from stem	
Liquor Epispasticus Mylabridis		<i>Piper methysti- cum</i> . Au.C. (<i>Piperaceæ</i>) <i>Eucalyptus</i> var. <i>M. phalerata</i> . I., A.C., E.C. (<i>Coleoptera</i>)	Exudation from stem	

Drug or Preparation.	Dose.	Source and where official.	Description, part used, or menstruum and strength.	Properties and References.
Mylabris (<i>continued</i>)				
Unguentum Mylabridis				= Unguentum Cantharidis.
Myrobalanum (BLACK or) CHERULIC MYROBALANS		<i>Terminalia chebula</i> , L., E.C. (<i>Combretaceæ</i>)	Mylabris <i>vice</i> Cantharides in B.P 1898, 1 in 10	Purgative, astringent = Galls. P.I. 88; E.P.I. vi. pt. 4, 33; Pg. I. ii. 1.
Unguentum	½ to 1 dr.		Dried immature fruits	= Gall Ointment. p. 701.
Unguentum cum Opio		<i>Carum copiticum</i> I., E.C. (<i>Umbellifera</i>).	Benzoeated Lard, 1 to 4	= Gall and Opium Ointment.
Oleum Ajowan	½ to 3 m.	<i>A. hypogaea</i> , L., A.C., Au. C., E.C.	Above with Opium 7·5 %	Aromatic, carminative, contains Thymol. —P.I. 99; Pg. I. ii. 116. p. 669.
Oleum Arachis (P. Helv.)			Distilled from fruit	
EARTH-NUT, GROUND-NUT or PEANUT OIL		<i>G. procumbens</i> (leaves) or <i>Betula lenta</i> (bark), N.A.C.	Expressed from seeds	= Olive Oil —P.I. 74, 446; E.P.I. i. 236; Pg. I. i. 494. Mild, laxative and nutritive.
Oleum Gaultheriæ	3 to 10 m.	<i>Andropogon citratus</i> , L., E.C., W.I.C.	Distilled Oil..... (N.O. <i>Ericaceæ</i> or <i>Betulaceæ</i> .)	Consists almost entirely of Methyl Salicylate, stimulant and diuretic. p. 67, 555.
Oleum Graminis Citrati			Distilled Oil from entire herb... (N.O. <i>Graminaceæ</i>).	Carminative, with agreeable odour, contains Citral, Citronellal, &c.—E.P.I. i. 243; Pg. I. iii. 456.— <i>c.f.</i> Ghosh
INDIAN OIL OF VERBENA or LEMON GRASS		<i>Taraktogenus kurzii</i> , L., E.C. (N.O. <i>Biraceæ</i>)	Expressed from seeds	Alterative and emetic; used for psoriasis eczema, and leprosy. —P.I. 26; E.P. I. iv. 193; Pg. I. i. 142. p. 491;
Oleum Gynocardia	5 to 60 m.	<i>S. indicum</i> , L., A.C., E.C., N.A.C.	Paraffin 4, Soft Paraffin 5, Oil 1	Demulcent = Olive Oil.—P.I. 150.
Unguentum			Expressed from seeds	E.P.I. vi. pt. 2, 507; Pg. I. iii. 26. p. 192.
Oleum Sesami			(N.O. <i>Pedaliaceæ</i>).	Aromatic, yields an oil resembling, Sassafras Oil.—P.J. 11, 99, 165.
Sesame Oil			Dried bark	
Oliveri Cortex OLIVER or BLACK SASSAFRAS BARK		<i>Cinnamomum oliveri</i> , Au. C. (<i>Lauraceæ</i>)	Alcohol 60 %, percolate 1 in 10	Tonic, antiperiodic, aperient.—E.P. I., vi. pt. 1, 229; Pg. I. iii. 10. In dyspepsia and bilious fever.—Ghosh. Inferior to quinine as antiperiodic.—I. D. C.
Tinctura	½ to 1 dr.	<i>P. kurroa</i> , L., F.C. (<i>Scrophulariaceæ</i>)	Dried rhizome.....	
Picrorhiza	10 to 50 gr.		Alcohol 60 %, percolate 1 in 1	
Ext. Liquidum	20 to 60 m.		Alcohol 45 %, macerate 1 in 8	
Tinctura	½ to 1 dr.			

Drug or Preparation.	Dose.	Source and where official.	Description, part used, or menstruum and strength.	Properties and References.
Podophyllin Indian Rhizoma INDIAN PODOPHYLLUM RHIZOME Resina P. Indici Tinctura P. Indici	..... ½ to 1 gr. 5 to 15 m.	<i>P. Emodi</i> , I., E.C. (<i>Berberidaceæ</i>)	Dried rhizome and roots Indian Rhizome by B.P. process Alcohol 90 % 1 gr. Resin in 30 m.	Cholagogue, cathartic. — P.I. 12; E.P. I. vi. pt. 2, 301; Pg. I. i. 69. p. 557. Rich in Podophyllotoxin. Powerful purgative, quite equal to the Amerlican. — I.D.C.
Sappan.....	.....	<i>Cæsalpinia sap.</i> <i>Pun.</i> I., E.C. (<i>Leguminosæ.</i>) <i>T. cordifolia.</i> I., E.C.	Heart wood Water 1 in 20, with Cinnamon 16 Stem collected in hot season ... (N.O. <i>Menispermaceæ</i> .)	Astringent = Logwood. — P.I. 79; E.P. I. ii. 11; Pg. I. i. 500. = Decoctum Hæmatoxyli. Tonic, contains Berberine = Calumba. — P.I. 9, 435; used freely in Ceylon as stomachic diuretic, for rheumatism and women's complaints. — Ph. Notes. = Liquor Calumbæ Concentratua. = Tinctura Calumbæ.
Decoctum Tinospora , (<i>GULANCHA</i>)	½ to 2 oz.	I., E.C., N.A.C.	Cold water, 30 minutes 1 in 10 Treated as Calumba 1 in 2 Alcohol 60 %, macerate 1 in 5 Jalap 8, Scammony 2, Turpeth 1, Alcohol 60 %, percol. to 100	Purgative. Eau-de-Vie Allemande is similar. In chronic rheumatism, etc. Ghosh advises, c.f. p. 433. Aromatic tonic = Cusparia. — P. I. 47, 442; E.P. I. vi. pt. 4, 67; Pg. I. i. 260. = Infusum Cuspariæ.
Infusum Liquor Concentratus Tinctura Tinctura Jalapæ Composita	½ to 1 oz. ½ to 1 dr. ½ to 1 dr. ½ to 1 dr.	<i>T. aculeata</i> I., E.C. (N.O. <i>Rutaceæ</i>) <i>Ipomœa turpethum</i> , I., E.C., N.A.C. <i>T. asclepiadica</i> I., E.C.	Dried root bark Boiling water, 15 minutes 1 in 10 Alcohol 20 %, percolate 1 in 2 Dried root and stem (N.O. <i>Convolvulaceæ</i> .)	Expectorant, emetic = Ipecacuanha. — P. I. 142, 458; Pg. I. ii., 437.
Toddalia	1 to 2 oz. ½ to 1 dr. 5 to 20 gr.		Dried leaves..... (N.O. <i>Asclepiadaceæ</i> .)	Purgative = Jalap. — P. I. 156; E.P. I. iv. 493; Pg. I. ii., 527. Is official in Fr. Cx.
Infusum Liquor Concentratus Turpethum TURPETH (or TURBETH Root) Typhorrhæ Folia	½ to 2 gr. Emetic: 15 to 30 gr.			

NOTE.—* It was shown that the Indian contained twice as much resin, but only half the quantity of cryst.-picropodophyllin (to which cathartic action is due). — Umney Y.B.P. 1892, p. 398. Not desirable to use it (J. Moss). The drug requires investigation for *P. Off.* 'Fall-dug' *P. peltatum* is preferred in America. — C.D. ii./09, 385.
T. A. Henry says action of both is due to Podophyllotoxin (purgative) and Podophyllo-resin (purgative and cholagogue). The Indian is richer in the former. The amount of it can be determined (J.O.S. 1898, 73, p. 209), but not the Podophyllo-resin with accuracy. *P. Emodi* is at least as valuable as the *peltatum* therapeutically. It is being cultivated in India so as to give a more constant yield of podophyllin. — C.D. ii./09, 487. *P. peltatum* yields between 3 and 7% resin—latterly it has fallen off. — C.D. ii./09, 522.

Urginea INDIAN SQUILL	{ 10 to 30 m.	<i>U. indica</i> and <i>Scilla indica</i> , I., E.C.	Younger bulbs, soon after flowering. (N.O. <i>Liliaceæ</i> .)	{ Expectorant, stimulant, diuretic. = Squill.—P.I. 241; E.P. L. vi. pt. 4, 214; Pg. I. iii., 478.
Acetum	4 to 8 gr.	Contains about 5% of opium.	Dil. Acetic Acid, macerate 1 in 8	= Acetum Scillæ.
© Pil. Ipec. cum Urginea	4 to 8 gr.		Urginea, dried <i>vice</i> Squill in B.P. preparation	= Pilula Ipecacuanhæ cum Scilla.
Pil. Urgineæ Comp.	½ to 1 dr.		Urginea, dried <i>vice</i> Squill in B.P. preparation	= Pilula Ipecacuanhæ Composita.
Oxymel Urgineæ.....	½ to 1 dr.		Urginea 5, Acetic Acid 5, Water 16, Honey <i>q.s.</i>	= Oxymel Scillæ.
Syrupus			Vinegar of Urginea 1, Sugar 38	= Syrupus Scillæ.
Tinctura			Alcohol 60 %, macerate 1 in 5	= Tinctura Scillæ.
Valerianæ Indicæ Rhiz- oma	.....	<i>V. wallichii</i> . I., E.C.	Dried rhizome and rootlets	Stimulant, antispasmodic = Valerian.— P.I. 120; E.P. I. vi. pt. 4, 219; Pg. I. ii. 238.
Tinctura Ammoniatata	½ to 1 dr.		N.O. <i>Valerianaceæ</i>	= B.P. Tinctura Valerianæ Ammoniatata.
Viburnum, BLACK HAW (U.S.)	.....	<i>V. prunifolium</i> . I., E.C., N.A.C.	As Tr. Valerianæ Ammon.	Antispasmodic, diuretic, nervine tonic.
Ext. Liquidum	1 to 2 dr.		Bark (<i>Caprifoliaceæ</i>)	For dysmenorrhœa and threatened abortion. <i>Flavoring</i> .—Syl Menth.
(Fluidextractum U.S.)	(30 m.)	(<i>V. opulus</i> U.S. has similar properties.)	Alcohol 70%, 1 = 1	Pip., Syl Lavand; Syrup Aurant.
			(1 = 1 <i>Hydro-alcoholic</i>)	Pip., Syl Lavand; Syrup Aurant.
			Elixir Viburni Prunifolii, B.P.C.	Liquid Extract 12½, Compound
			Tincture of Cardamoms 7½, Aromatic Elixir to 100. Uterine sedative also used in dysmenorrhœa, and in other ailments where a uterine tonic and sedative is required. Tincture 1 in 2 Alcohol 60%. <i>Dose</i> 2 to 4 drachms.—L. ii./09, 204.	
			A compound Elixir B.P.C. has Liquid Extract 50, Dry Extract of Hydrastis 175, Oil of Coriander 0.5, Oil of Caraway 0.5, Glycerin to 100. Dissolve the oils in the Liquid Extract and add the other ingredients.	

Further notes on Indian drugs.—P.J. ii./00, 600, 701; i./03, 91 *vide* also I.D.C.

ALTERNATIVE PREPARATIONS

Sanctioned by the Medical Council for use in India and the Colonies.

Adeps Induratus.—In hot climates Lard may be employed deprived of a portion of its oil by pressure.

Aquæ Olei Anethi, Anisi, Carui, Cinnamomi, Fœniculi, Menthæ Piperitæ, Menthæ Viridis, Pimentæ.—Each of these waters may be made by triturating the corresponding Oil with twice its weight of Calcium Phosphate and 500 times its volume of Distilled Water, and filtering the mixture. In hot climates these may replace the B.P. *Aquæ*. (U.S. employs approx. 8 x weight of talc instead of Calcium Phosphate.)

(A series of Flavoring Agents entitled respectively *'Glyl' and *'Syl' Flavorings which we have devised should commend themselves to workers in Tropical Countries, v.p. 348.)

Emplastra.—In the Tropics more or less Hard Soap, Indurated Lard, or Yellow Bees-wax may be used in preparing the Plasters of the Pharmacopœia or Addendum where otherwise they would be too soft for convenient use; but the official proportion of the active ingredient must in all cases be maintained.

Extracta Liquida.—Any Liquid Extract liable to ferment in the Tropics, defined in the text of the Pharmacopœia or Addendum containing less than one-fourth of its weight of Alcohol (90 per cent.), may have this increased to one-fourth of the weight of the Extract.

Limonis Cortex Siccatus.—In the Tropics dried Lemon Peel may replace fresh Lemon Peel from *Citrus medica* var. *B-Limonum* (*Rutaceæ*). [*Limonis Succus* (fresh) is U.S.]

Suppositoria.—More or less White Bees-wax may be used in place of an equivalent amount of Oil of Theobroma, when otherwise they would be too soft for convenient use in the Tropics.

Syrupus Rhoëados.—The quantity of Alcohol may be increased or doubled, replacing an equivalent quantity of water.

Unguenta.—In the Tropics these may be made harder or softer according to the needs of the climate, but the official proportion of the active ingredient must in all cases be maintained.

·PATENT' OR PROPRIETARY MEDICINES.

Several 'Patent' Medicines are mentioned incidentally in the text. The 'British Medical Journal,' the 'Lancet,' etc., from time to time have published results of investigations and analyses, and reference to their pages is made below in each instance. Considerations of space have usually obliged us to mention only the ingredients which have undoubted therapeutic effect. The reader is referred to the original source of our information for further details where they are not provided *in extenso*. With regard to the great majority of medicines, it should be carefully borne in mind that there are other ingredients which, though for the most part flavourings or colourings, may in some cases be considered to be medicinal. Our list must not be considered complete, and although care has been exercised to state therein what appear to be the chief ingredients, it should be regarded as merely suggestive, our readers (except in the instance just mentioned) being referred to our authorities for fuller information. Differences have occasionally been found to exist between two 'samples of the same' 'Patent' Medicine, so that the composition of some of them may be found to vary from time to time.

Again it should be carefully noted that the composition of a proprietary article in one country does not necessarily convey a correct impression of articles sold under the same name in other countries.—B.M.J. i./10,339.

The majority of those 'Patents' to which we give B.M.J. references are described in 'Secret Remedies, what they cost and what they contain,' a work issued by the British Medical Association, to which we would refer our readers. In some instances we give this work as our only reference.

It has been seriously considered whether the sale of Proprietary Preparations should not be under better control than that at present existing.—P.J. i./07,210,700,769; ii./07,161,204. More or less effective control exists in America, France, Italy, Portugal, Russia, and other countries, and in these countries as well as in Austria, Belgium, Brazil, Holland, Hungary, Norway and Sweden the practice of medicine and of the treatment of diseases and injuries of the body by unqualified persons is forbidden.

Regarding German legislature *vide* B.M.J. i./08,960. *c.f.* also 'Lancet,' i./08, 1086.—A £500 licence was advocated. C.D. i./08,599 pointed out that medical quackery is on the whole more prevalent in Germany than with us, and that it is on the increase in spite of public exposure and strict police supervision.

It appears that barefaced and ignorant quackery is rampant in Germany owing to the repeal of old laws which prohibited the practice of medicine by others than educated practitioners. Influential parties in Germany are agitating for a check on quackery in its most pernicious forms.—B.M.J. ii./08, 170. Spread of education appears to be the crux of the matter. *c.f.* P.J. ii./09, 323. Questions in Parliament.—B.M.J. ii./09,721,813,905,1707.

"The Government reaps a very rich harvest from secret preparations and remedies or nostrums. They have a government stamp on them, and the Treasury gets many thousands a year out of them—wrongly, I think. The Government does not think so, however."—Coroner Dr. F. J. Waldo.—P.J. ii./09,303.

Campaign against Proprietaries in Austria. Plan suggested was that they should be advertised only in medical periodicals and that labels and containers bear name of article and name of manufacturer only without reference to disease.—P.J. ii./09,686.

Existing conditions and reasons for pleading for legislature against the "Uncontrolled Manufacture and Sale of Proprietary Medicines and Foods." Desirability of adopting the method of enforcing the labelling of such with a full statement of contents as required by the Pure Food and Drugs Act in America.—'State Regulation of Proprietary Medicines and Foods.' B.M.J. ii./08,574.

LIST OF 'PATENTS' WITH REFERENCES.

*Abbey's Salt.—(Aperient) Tartaric Acid, Sodium Bicarb., Magnesium Sulphate and Sugar.—L. ii./03,1493.

Albukola.—A German specialty containing 35 parts of Saccharated Iron Carbonate, 15 parts Calcium Phosphate, 25 parts Arrowroot, Albumen and Lecithin, the Lecithin being about 8%.—B.M.J. ii./08,204.

***Allen's Antifat.**—70 minims liquid extract of Fucus in the ounce.—B.M.J. ii./07,209.

***Antexema.**—Soft Paraffin 35·4, Boric Acid 1·5, Gummy Matter 12·4, Water 50·7.—B.M.J. i./08,942.

Antidipso.—(Drink cure) Chlorate of Potash and Sugar.—L. ii./03,1493.

White Powders.—Potass. Brom. 24·5, Milk Sugar 75·5%. Coloured Powder.—Potass. Brom. 35, Milk Sugar 65%.—B.M.J. i./09,910.

Anti-fat.—See Allen's above.

***Antineurasthin.**—Tablets would contain approximately Dry Yolk of Egg 3·8, Dry White of Egg 5·4, Dry Separated Milk 57·8, Gum 2·0, Potato Starch 22·7, Moisture 8·3%, Aromatic substances traces.—B.M.J. i./09,544; see also P.J. i./08,644.

Claim that the preparation is a food, not a medicine, therefore exempt from Stamp Duty.—L. ii./08,1319.

Appeal decided this is a medicine, not a food, hence must be stamped.—P.J. ii./09,184; B.M.J. ii./09,1298,1319.

***Antipon.**—(Obesity) contains 32 grains per ounce of Citric Acid.—B.M.J. ii./07,25.

Armbrecht's Coca Wine.—Alcohol 15·05, Glucose 20·8, Coca Alkaloids 0·006%, *inter alia*. Wineglassful represents about 14 minims of Liquid Extract of Coca.—B.M.J. i./09,1307.

Asandrin.—Perfumed Solution of Quinine Sulphate with Precipitated Sulphur.—L. ii./08,104.

Baillie's Pills.—(Aperient and Liver Pills) Aloes, Colocynth, Oil of Cloves and Soap.—L. ii./03,1493.

***Balsam of Aniseed.**—See Powell's.

Bandon's Wine.—Alcohol 12·75%, Glucose 13·1, Phosphorus calculated as Phosphoric Acid 0·54, Antimony minute trace.—B.M.J. i./09,1309.

Baring Gould's Antirheumatic Pearls.—Gelatin Perles or Capsules containing white powder, analysis of which showed Acetyl-Salicylic Acid 85%, Milk Sugar 15%.—B.M.J. ii./08,1112.

***Beecham's Pills.**—(Aperient) Aloes, Ginger and Soap.—L. ii./03,1493. Quantities as follows were found:—Aloes 0·5 grain, Powdered Ginger 0·55 grain, Powdered Soap 0·18 grain in a pill.—B.M.J. i./09,32.

Beecham's Cough Pills.—In spite of the statement that these do not contain Opium results obtained pointed to the formula: Morphine 0·0035 grain, Powdered Squill 0·1 grain, Powdered Aniseed 0·3 grain, Ammoniacum 0·3 grain, Extract of Liquorice 0·4 grain.—B.M.J. ii./08,1699. According to this analysis these pills would be ©.

Bell's *Fairy Cure.—Powders each containing Acetanilid and Phenacetin each 1·16 grains, Caffeine 0·38 grain.—B.M.J. ii./06,28.

Bendle's Meat Port Nutrient.—White Capsule Brand. Wineglassful (2 ounces) contains Alcohol 3·25 drachms, Meat Extract 22 grains, Glucose 70 grains.—B.M.J. i./09,796.

***Bile Beans.**—Cascara, Rhubarb, Liquorice, Peppermint Oil, gelatin coated.—L. ii./03,1493.

***Birley's Anticatatarrh.** Analysis showed presence of: Sugar 74, Tartaric Acid 1·15, Phosphoric Acid 0·07, Alcohol trace, Water to 100. No free phosphorus could be detected, but odor suggested a trace.—B.M.J. ii./08,1286.

Blair's Gout Pills.—Active ingredient is Colchicum.—L. ii./03,1493. Quantities found indicated Powdered Colchicum Corm. 2·1 grain, Burnt Alum 0·35 grain in one pill.—B.M.J. ii./08,1110.

***Bovril Wine.**—According to analysis a wineglassful (2 ounces) would contain Alcohol 3½ drachms, Meat Extract 4·4 grains, Glucose 88·0 grains.—B.M.J. i./09,795.

© Bow's Liniment.

© ***Bromidia.**—(Neuralgia) Potassium Bromide, Chloral, Hyoscyamus, Cannabis Indica, Aniseed Oil, Syrup and Water.—L. ii./03,1493.

© ***Brompton Consumption and Cough Specific.**—The formula is approximately Liquid Extract of Ipecacuanha 0·75, Tincture of Opium 1·3, Treacle 75, Water to 100.—B.M.J. ii./08,506.

***Buer's Mulla Piles Cure.**—Ointment: Galls and Hamamelis, with Lanolin basis. Powder: Precipitated Sulphur and Magnesium Carbonate.—L. ii./03,

1493.—*Later report.*—*B.M.J.* ii./08,86.—*Anhydrous Lanolin* 66·5, *Beeswax* 1·5, *Water* 32·0%. *Powder.*—*Precipitated Sulphur* 14·9 grains, *Calcined Magnesia* (partly carbonated), 23·6 grains.

★*Bunter's Nervine.*—*Creosote*, *Chloroform*, *Camphor*, *Balsam of Tolu* and *Alcohol.*—*L.* ii./03,1493.

Burgeaud's Wine.—*Alcohol* 11·80%, *Glucose* 18·9%, *Alkaloids* (*Cinchona*) 0·01%. *A wineglassful* represents about 2 minims of *Liquid Extract of Cinchona.*—*B.M.J.* i./09,1308.

★*Burgess' Lion Ointment.*—*The following is similar.*—*Lead Plaster* 13, *Beeswax* 20, *Resin* 11, *Olive Oil* 12, *Water* 6, *Lard* to 100.—*B.M.J.* ii./07,393.

★*Bynin Emulsion of Cod Liver Oil with Hypophosphites.*—*Oil* 34·6%, *Reducing Sugars* (as *Maltose*) 9·0%, *Protein* 1·2%, *Hypophosphite* in very small quantity.—*B.M.J.* i./10,30.

★*Bynol.*—*Oil* 12·9%, *Reducing Sugars* (as *Maltose*) 52·2%, *Protein* 4·6%, *Diastatic Power* 22.—*B.M.J.* i./10,30.

★*Californian Syrup of Figs*—*Senna* (active constituent), *Syrup of Figs* and *Cinnamon.*—*L.* ii./03,1493.

★*Capsuloids.*—*Result of analysis indicated for the contents of the Capsules.*—*Hæmoglobin* 1·97 grains, *Olive Oil* and *Oleic Acid* of each 0·54 grains, *Balsam of Peru* and *Purified Storax* 0·17 grain in one Capsule.—*B.M.J.* i./08,833.

Carnabyn.—*Alcohol* 17·2, *Total Solids* 13·4, *Nitrogen* 0·26, (equivalent to *Protein* 1·7), *Ash* 0·7, *Reducing Sugar* (as *Glucose*) 9·2%.—*B.M.J.* ii./09,562.

Carnrick's Liquid Peptonoids.—100 parts contained *Alcohol* 20, *Total Solids* 18·8, *Nitrogen* 0·8 (equivalent to *Protein* 5·0), *Ash* 0·8, *Reducing Sugar* calculated as *Glucose* 7·7, *Cane Sugar* 2·4.—*B.M.J.* ii./09,562.

(Requires spirit license, but objection is not raised to its sale in small quantities by chemists when ordered by a medical man).

★*Carter's Little Liver Pills.*—*Podophyllin* $\frac{1}{2}$ gr. and *Aloe Soc.* $\frac{1}{2}$ gr. in each pill.—*L.* ii./03,1493.

②★*Chlorodyne, Dr. J. Collis Browne's.*—(Coughs, etc.) *Chloroform*, *Ether*, *Morphine*, *Cannabis Indica*, *Capsicum*, *Peppermint* and *Treacle.*—*L.* ii./03,1493; ii./06,1390. Does not now contain *Hydrocyanic Acid*. *Pane* found practically 2 grains actual *Morphine* in 1 ounce.—*Pharm. Form.*

★*Clarke's Blood Mixture.*—*Potassium Iodide* 52·5 grains, *Spirit of Sal Volatile* 10 minims, *Spirit of Chloroform* 67 minims, *Simple Syrup* 50 minims, *Burnt Sugar* q.s., *Water* to 8 ounces.—*L.* ii./03,1493; *B.M.J.* ii./07,530.

★*Cockle's, James, Pills and Barclay's Pills.*—*Aloe*, *Colocynth* and *Rhubarb.*—*L.* ii./03,1493.

Cotandin Compound.—*Cascara*, *Hydrochloric Acid*, *Water.*—*L.* ii./08,104.

★*Coleman's Wincarnis.*—*Wineglassful* (2 ounces) would contain *Alcohol* 3 drachms, 8 minims, *Meat Extract* 10·5 grains, *Glucose* 159 grains.—*B.M.J.* i./09,795.

Collie's (Dr.) Ointment.—*A similar Ointment was made by using following formula:*—*Black Resin* 12, *Beeswax* 2, *Crude Petroleum Jelly* 26, *Tallow* 20, *Lard* 40.—*B.M.J.* ii./08,1112.

★*C.B.Q. Post's Tablets* we understand are exempt from *Poisons' Schedule* 1908. *Analysis made in 1908* showed that each tablet contained $1\frac{1}{2}$ grains of *Potassium Iodide*, a small quantity of *Salicylate*, a vegetable *Extract* and *Magnesia*, also a small quantity of *Alkaloid* which was not identified.—'Secret Remedies.'

①★*C.B.Q. Liniment No. 1.* (No. 2 not poison).

②*Compound Quinoleum* contains *Tinctures of Capsicum*, *Cantharides* and *Cinchona* with *Resorcin.*—*L.* ii./08,104.

★*Congreve's Elixir.*—(Cough Mixture).—*L.* ii./03,1493.

Analysis of the Elixir showed 28·5% by volume of *Alcohol* together with resinous material similar to the resins of *Benzoin*, *Storax*, *Tolu* or *Balsam of Peru*, *Sugar* about 1%. *Alkaloid* under 0·001%.—*B.M.J.* ii./08,505.

• *Carton round the bottle* states 'no poison whatever' and this we have reason ourselves to believe.

★*Coza Powders.*—*Average weight* $1\frac{1}{2}$ grains, 90% *Sodium Bicarbonate*, 5% each *Cinnamon* and *Cummin.*—*B.M.J.* i./09,909.

Cremalto.—*Stated to be a combination of sterilised Devonshire Cream.* *Analysis* showed *Fat* 11·7%, *Reducing Sugars* (as *Maltose*) 56·3%, *Protein* 4·1%, *Ash* 1·3, *Water* 26·7%, *Diastatic Power* of water-soluble portion 6.—*B.M.J.* i./10,30.

Crevoisier's (Asthma) Preparation.—*Belladonna*, *Foxglove*, *Stramonium*, *Sage* and *Potassium Nitrate* in equal parts.—*L.* ii./03,1493.

★*Crosby's Balsamic Cough Elixir.*—*Contains inter alia Invert Sugar*

58%, Alcohol 10·6%, Acetic Acid 0·3% (see B.M.J. ref.) Sulphuric Acid corresponding to 44 minims of the official dilute Sulphuric Acid in one ounce.—B.M.J. ii. /08, 1699.

Curio Wafers.—Acetanilide 3·28 grains, Phenacetin 3·28 grains, Caffeine Citrate 1·64 grains each.—B.M.J. ii. /06, 27.

***Cuticura.**—Hard and Soft Paraffins, slightly perfumed with rose and coloured green.—B.M.J. i. /08, 943.

***Cuticura Resolvent.**—Potassium Iodide, Sugar and Glucose, Extractive Alcohol and Water.—B.M.J. i. /08, 941.

Dalby's Carminative.—Rhubarb, Magnes. Carb., Glycerin, Sugar, Peppermint Oil, Dill Oil, and a small quantity of Laudanum.—L. ii. /03, 1493. Proprietors say not a poison.

Davis' Famous Female Pills.—Inter alia, Powdered Savin 1½ grains in each with Sulphate of Iron. B.M.J. ii. /07, 1651. Proprietors say not a poison. A mixture made by them contains Gossypium.—ibid.

ⓈDill's Diabetic Mixture.—Formula found to be Sodium Bicarbonate, 7·4, Extract of Hydrastis 1·5, Resin, Resinoids and other extractive 2·20, Alcohol 35, Water to 100.—B.M.J. ii. /08, 1875.

Dipsocure.—Powders 4·2 grains. Composition,—Acetanilide 6, Potassium Bromide 35, Milk Sugar 59.—B.M.J. i. /09, 909.

Dixon's Pills.—(Aperient, Liver) Tarazacum, Podophyllin, Jalap and Soap.—L. ii. /03, 1493.

***Doan's (Back-ache Kidney) Pills.**—1. White-coated aperient Dinner Pills—Podophyllin, Aloin, Rhubarb and Peppermint. 2. Brown-coated (Back-ache) Pills—Oil of Juniper and a resinous constituent (? Benzoin).—L. ii. /03, 1493. B.M.J. ii. /06, 1646 gives as similar to the Dinner Pills a pill composed of Podophyllin, Aloin, Peppermint Oil, Jalap, Capsicum and Henbane Extract (this formula would of course be Ⓢ); and for the Backache Pills, Juniper Oil, Hemlock Pitch, Potassium Nitrate and Pœnugreek—in both instances with excipients in addition. Parry has also reported on harmlessness of.

***Doan's Ointment (for piles)** Calomel 36·0, Zinc Oxide 11·2, Phenol 1·3, Beeswax 2·3, Soft Paraffin 49·25.—B.M.J. ii. /08, 87.

***Dodd's Kidney Pills.**—A Pill containing Cascarella, Jalap, Soap Potassium Nitrate, Sodium Bicarbonate, Hard Paraffin, Turmeric and Wheat Flour is stated to be practically identical.—B.M.J. ii. /06, 1646.

Dumas', Madame, Pills.—Iron, Canella, Aloes, Pennyroyal.—B.M.J. ii. /07, 1655.

Dusart's Wine.—Alcohol 16·85, Glucose 12·8, Iron 0·09, Calcium 0·07, Phosphorus calculated as Phosphoric Acid 0·03%.—B.M.J. i. /09, 1309.

Eau de Blano de Perles.—Contains inter alia about 15% Lead Carbonate.—Murrell.

***Eade's Pills.**—(Gout and Rheumatism) Sodium Salicylate, Quaiacum and Aloes.—L. ii. /03, 1493.

ⓈEau de Fleurs de Lys contains a trace of Corrosive Sublimate.—Murrell.

Egg-o-Tone consists largely of Epsom Salts, Borax and a little Quinine Sulphate. L. ii. /08, 104.

***Eno's Fruit Salt.**—(Aperient) Sodium Bicarbonate, Tartaric Acid and Citric Acid.—L. ii. /03, 1493.

ⓈEspey's Syrup for babies was found to contain Cocaine.—L. ii. /08, 104.

***Eureka Consumption Cure** appears to consist principally of Eucalyptus Gum (red gum) with a moderate proportion of Wood Tar and a little Eucalyptus Oil, —B.M.J. ii. /09, 247.

Fell Reducing Treatment.—Tablets would contain, according to analysis, Extract of Bladder Wrack 0·07 grain, Milk Sugar 0·91 grain (each Tablet had average weight 1 grain).—B.M.J. ii. /08, 1568.

ⓈFellow's Compound Syrup (of) Hypophosphites contains poison.—L. ii. /06, 1399—vide also p. 533.

***Fenning's Children's Cooling Powders.**—Average weight 3·4 grains. Analysis showed powder to consist of Potassium Chlorate 70, Powdered Liquorice 30%.—B.M.J. ii. /08, 1022.

***Figuroids.**—The large tablets contained by analysis Sodium Bicarbonate 38·9, Tartaric Acid 13·1, Sodium Chloride 3·8, Phenolphthalein 1·2, Formamine (Hexamethylene Tetramine) 2·0 grains. The small Tablets 11·9, 15·9, 7·6, 0·5 grains respectively of the first four.—B.M.J. ii. /08, 1567; i. /09, 556.

Fitch's Kidney and Liver Cooler.—A solution of Potassium Nitrate.—

B.M.J. ii./06,1617. The strength being 56 grains in a fluid ounce, .e., 14 grains in a dose.—*Secret Remedies.*

Ⓢ **Freeman's Chlorodyne** 'contains less than 1% Morphine and does not contain Prussic Acid.'—*By the Makers.*

***Fucol** is Sesame Oil containing a small quantity of Iodine. It is said to be made from Seaweed.—*B.M.J. i./07,879.*

Ⓢ **Gelineau's Dragées** for Epilepsy are stated to contain Potassium Bromide, 1 in 1000 Antimony Arsenate and 1 in 2,000 Picrotoxin. (Might be viewed as Ⓢ.)

***Genoform.**—Formula of the Tablets is Salicyl-Methylene-Glycol-Ester 95, Starch and moisture 5%.—*B.M.J. ii./08,1113.*

Glendenning's Beef and Malt Wine.—Wineglass (2 ounces) contains Alcohol 3'33 drachms, Meat Extract 3'5 grains, Glucose 93 grains.—*B.M.J. i./09,796.*

***Gloria Tonic.**—(Gout and Rheumatism) Tablets. The following formula was indicated; Potassium Iodide 1'8, Guaiacum Resin 0'8, Ext. Liquorice 1'0, Resinoid (Phytolaccin ?) 0'9, Powdered Liquorice 1'7, Rice Starch 2'0, Talc and Kaolin 2'1 grains. ***Gloria Pills.**—Following was indicated: Extract of Cascara 0'3, Ext. Soc. Aloes 0'5, Jalap Resin 0'07 grain, Flour and excipient q.s. in one pill.—*B.M.J. ii./08,1111; see also L. ii./03,1493.*

(Presumably Ⓢ) **Goat Lymph Tablets** contain Strychnine Phosphate, Zinc Sulphide, Ext. Muira Puama, Avenine and Cannabin.—*L. ii./08,104.*

We understand these Tablets—one brand at any rate—are only supplied to the medical profession.

***Gower's Green Pills.**—Analysis showed Soap (about 36%) an alkaline Salicylate (about 37%), Extractive and vegetable tissue—*i* Cimicifuga.—*B.M.J. ii./08,1112.*

Grey's Specific.—(Obesity) Contains 47'2% Free Sulphur and a Bitter (*i* Gentian).—*L. ii./03,1493.*

Guy's Tonic.—Phosphoric Acid, Tinct. Cochineal, Inf. Gentian and Chloroform Water.—*L. ii./03,1493.*

Hæmatoba (for piles).—Analysis showed it to be an aqueous liquid containing about 0'09% of a bitter amorphous alkaloid and 2'7% of vegetable extractive, including a little of a substance of the nature of a tannin, but not ordinary Tannic Acid.—*B.M.J. ii./08,87.* This may be Ⓢ.

Hair's (Dr.) Cure for Asthma.—A fluid containing 5'6% Potassium Iodide, Tar Water and some Wine.—*L. ii./03,1493; B.M.J. i./07,879.*

***Hall's Coca Wine.**—Alcohol 17'85, Glucose 11'9, Alkaloid 0'0003%, Composition now different from the statement in *L.* April 9, 1892.—*B.M.J. i./09,1307.*

Hamm's Rheumatic, Gout, and Sciatica Cure.—Potassium Iodide 15 grains, Sodium Salicylate 66 grains, Extractive 28 grains, Alcohol a trace, Water to 8 ounces.—*B.M.J. ii./08,1111.*

Hargreaves' Reducing Wafers.—Fucus and Liquorice.—*B.M.J. ii./07,209.*

Harvey's Blood Pills.—Contain among other ingredients about $\frac{1}{2}$ grain each Quinine Sulphate, about $\frac{3}{4}$ grain Potassium Iodide and about $\frac{1}{2}$ grain Rhubarb.—*B.M.J. ii./07,530.*

Hayes, Dr. Harold, Asthma Medicines.—(1) Turpentine and Peppermint in Emulsion, Dose, 20 to 30 drops. (2) A mixture of Potassium Iodide, to which Wine, Hydrochloric Acid and Sugar is added. Dose, 15 minims t.d.s. (3) Iodides of Potassium, Sodium and Ammonium 6'7% in a mixture. Dose, 30 minims in the evening. (4) Solution of Iron Peptonate. Dose, 15 minims t.d.s. (5) Capsules of Quinine Sulphate $1\frac{1}{2}$ grains. (6) Jalap Resin Pills.—*B.M.J. i./07,879.*

Head Powders prepared by Daisy, Ltd., consist of Phenacetin alone.—*Secret Remedies.*

Headache Powders usually contain Acetanilide, 3 grains each.

***Harlene, Edward's.**—Borax 0'5%, Additional Alkali—equivalent to anhydrous Sodium Carbonate 0'04%, Solution of Ammonia (10%), 0'12%, Glycerin 0'4%, Colouring Matter and Perfume a trace, Alcohol 5'7%, Water to 100, by volume.—*B.M.J. i./10,151.*

Healine (for rupture).—Analysis of Pills gave indefinite results. Cf. *B.M.J. ii./08,1193.*

***Hoffman's Harmless Headache Powders.**—Analysis showed Acetanilide 5'02 grains, Cocoa 4'02 grains, Sodium Bicarbonate 1'01, as one powder.—*Secret Remedies.*

***Holloway's Ointment.**—Fresh Butter, Beeswax, Yellow Resin, Vinegar

of *Cantharides*, *Canada Balsam*, *Expressed Oil of Mace*, *Balsam of Peru* or *Liquid Storax*.—Murrell.

We understand, however, from the makers that this contains nothing of a poisonous nature, and is not ©.

***Holloway's Pills**.—(Aperient) *Aloes*, *Rhubarb*, *Saffron*, *Glauber's Salts* and *Pepper*.—*L. ii.*/03,1493.

Hood's Sarsaparilla.—Dose $\frac{1}{2}$ to 2 teaspoonfuls. Contains 19% by volume of *Alcohol* and 7½ grains of *Potassium Iodide* in the ounce, the amount of *Sarsaparilla* being small.—*B.M.J. ii.*/07,531.

Hooper's, Dr. John, Female Pills.—Contain *Iron Sulphate*, *Aloes*, *Jalap*, *Canella*, *Senna* and *Oil of Pennyroyal*.—*B.M.J. ii.*/07,1653.

***Hughes' Blood Pills**.—Contain *Aloes*, *Jalap*, &c.—*B.M.J. ii.*/07,532.

***Hughes' XL Reducing Pills** have *Fucus* 2·2 grains as basis with a little *Potass*, *Iodide* and *Iron Phosphate*, also *Ginger* and *Liquorice*.—*B.M.J. ii.*/07,150.

***Hughes' XL Reducing Lotion** contains 13½ grains of *Bromide* and 9½ grains *Iodide of Potash* to the ounce, *inter alia*.—*B.M.J. ii.*/07,150.

Indian Tincture.—*Capsicum*, *Cannabis Indica*, *Ether* und *Methylated Spirit*.—Murrell.

© **Injectio Brou**.—*Zinc Sulphate*, *Sugar of Lead*, *Laudanum*, *Tinct. Catechu* and *Water*.—Murrell. *Pharm. Form.* says:—*Zinc Sulphate* 15 grains, *Lead Acetate* 30 grains, *Catechu Tincture* 1 drachm, *Tinct. Opii Crocat.* (q.v.) 1 drachm, *Water* to 6 ounces, is generally adopted in making imitations.

***Irristum**.—A Syrup of *Phosphate of Iron* with *Quinine*.—*B.M.J. ii.*/07,1658.

I.R.S. Compound Golden Tablets.—Contain *Ferrous Sulphate* and *Sodium Carbonate*.—*B.M.J. ii.*/07,1658.

James' Fever Powder.—*Antimonious Oxide* 1, *Calcium Phosphate* 2.

***Jefferson Dodd's Corrective**.—Contains *Dec.*, *Aloes Conc.* with *Chloroform Water* and *Liquid. Pills* are *Iron* and *Aloes*.—*B.M.J. ii.*/07,1651.

Juvenia.—'Liquid No. 1' Solution containing 2% *Hydrogen Peroxide*, $\frac{1}{2}$ strength of '10 volume.' 'Liquid No. 2' *Paraphenylene Diamine* 0·9%, *Solution of Ammonia* 0·6%, and trace of fixed *Alkali*.—*B.M.J. i.*/10,153.

***Kaputine** (for *Headache* and *Neuralgia*).—Contains *Antifebrin* 6·3 grains in each, with *Sugar* 0·21 grains, and coloured with *Ferric Oxide* 0·05 grain.—*L. ii.*/03,1493; *B.M.J. ii.*/06,28.

Kargon Compound contains *Fluidextract of Buchu*, *Potassium Acetate*, *Methyl Salicylate* and *Sugar*.—*L. ii.*/08,104.

© **Kay's Essence of Linseed**.—Contains *Poison*.—*L. ii.*/06,1390.

100 parts contained 1·07 parts of *Chloroform*, and 4·3 parts of *Alcohol* both by measure, 67 parts of *Solids*,—about 48 parts of the latter sugar, and the remaining 19 parts consisted principally of the mucilage of decoction of linseed. *Ipecacuanha alkaloids* extracted amounted to 0·007%, and the *Morphine* to 0·021%.—*B.M.J. ii.*/08,1693.

***Kay's Tic Pills**.—*Iron Sulphate*, *Quinine* and *Soup*.—*L. ii.*/03,1493.

© ***Keating's Pectoral Lozenges**.—Corresponded to *Morphine* 0·007 grain, *Ipecacuanha* 0·07 grain, *Extract of Liquorice* 2·1 grain, *Sugar* 13 grains in one lozenge.—*B.M.J. ii.*/08,1009.

***Keene's "One Night" Cold Cure**.—Ingredients found were *Cinchonidine Sulphate* 0·21 grain, *Acetanilide* 0·32 grain, *Calcium Carbonate* 0·25 grain, *Starch* 0·34 grain, *Extractive* and *excipient* 0·87 grain (all figures approximately).—*B.M.J. ii.*/08,1296.

***Kepler Solution of Cod Liver Oil in Malt Extract**.—Analysis showed oil 17·4%, *Reducible Sugar* (as *Maltose*) 42·5, *Protein* 3·4, *Diastatic Powder* 3. —*B.M.J. i.*/10,30.

***Kilmer's (Dr.) Indian Cough Cure**.—Contains *inter alia* (see ref.) 0·5% *Oil of Pumilio Pine*. No *alkaloid*.—*B.M.J. ii.*/08,1698.

***Kidd, J. W. Co. (Dr.) Preparations**.—Tablet A,B., also 18, 45 and 7 examined.—*B.M.J. i.*/09,672.

Kola Wine, Christy's.—*Alcohol* 18·85, *Glucose* 8·6, *Alkaloid* (with characteristics of *Caffeine*) 0·03. Each fluid ounce represents 6½ grains of *Kola*.—*B.M.J. i.*/09,1307.

***Koko**.—*Borax* 1·4, *Glycerin* 1·7, *Formaldehyde Solution* (40%) 0·1, *Perfume* a trace, *Alcohol* 3, *Water* to 100 by volume.—*B.M.J. i.*/10,151.

Lady Webster's Pills.—*Aloes* 2 grains, *Powdered Mastiche* $\frac{1}{2}$ grain, *Red Rose Leaves* $\frac{1}{2}$ grain with *Syrup of Wormwood*.—Murrell.

***Lamplough's Pyretic Saline (Aperient).**—Citric Acid, Potassium and Sodium Bicarbonates.—*L. ii./03, 1493.*

Lane's (Dr.) Catarrh Cure.—Analysis showed Phenol 0.4, Sodium Chloride 3.3, Water to 100.—*B.M.J. ii./08, 1285.*

***Laville's Gout Cure.**—Contains Veratrine.—*B.M.J. i./04, 1296.* Colchicine about 0.08% and Quinine in Alcoholic Solution.—*B.M.J. ii./07, 677* (latter more likely.—*W.H.M.*) Either form would make the preparation \odot .—It is so labelled.

The following is similar, (*Ph. Form 701*)—Quinine 4 drachms, Colocynth Extract 2 drochms, Alcohol 90% 4 ounces, Malaga Wine 15 ounces. Mix and filter. Dose, $\frac{1}{2}$ to 4 drachms in $\frac{1}{2}$ wineglass of water.

The Pills are (*Ph. Form. 744*) Extract of Winter Cherry 3 dr., Sodium Silicate 1 dr. Make a mass and divide into 5 grain Pills. Dose, 4 to 10 daily. Guaiacum Resin a constituent with the Silicate and Winter Cherry and other ingredients.—*Vide Secret Remedies.*

***Lemco Meat Wine.**—A wineglassful (2 ounces) would contain Alcohol 2.75 drachms, Meat Extract 5.2 grains, Glucose 112 grains.—*B.M.J. i./09, 795.*

Levathin.—German proprietary in tablet form, consisting of about 75% Cream of Tartar and 15% of the Sodium Salt and 10% Cane Sugar.—*B.M.J. ii./08, 204.*

***Licoricine.**—Does not contain poison—*L. ii./06, 1360.*

Liebig's Meat and Malt Wine.—*See Lemco.*

***Liquifruta (A Consumption Cure).**—Analysis showed Oil Peppermint Onion or Garlic Oil and Alkaloids, of each traces, Potassium Bitartrate 0.4, Glucose 3.44, Cane Sugar 2.28, Mucilage, Tannin, Extractive, etc., an. water to 100.—*B.M.J. ii./03, 1419.*

Lockyer's Sulphur Hair Restorer.—Precipitated Sulphur 1.3% Lead Acetate 1.6, Lead Sulphate 0.4%, Glycerine 9.6%, Rose Water to 100 by volume.—*B.M.J. i./10, 151.*

Locock's Pulmonic Wafers.—*Lactucarium, Ipecacuanha and Squills.*—*Murrell.* This form would make the preparation \odot .

***McKenzie's (Dr.) "One Day" Cold Cure.**—Analysis showed the Tablets to have composition Clinchontidine Sulphate 0.83 grain, Acetanilide 0.71 grain, Camphor 0.1 Grain, Tale 0.21 grain, Water 0.15 grain.—*B.M.J. ii./08, 1285.*

\odot **Make-Man-Tablets** contain Iron, Arsenic, Valerianic Acid and Hops.—*L. ii./08, 104.*

Maltico.—Described as a 'perfect infant food.' Analysis showed Fat 3.9%, Reducing Sugars (as Maltose) 66.5%, Protein, 16.8%, Ash 4.6%, Water 8.6%.—*B.M.J. i./10, 30.*

Mariana Wine.—Alcohol 36.3, Total Solids 30.3, Ash 0.2, Reducing Sugar (as Glucose) 9.8, Cane Sugar 17.5, Alkaloids 0.025.—*B.M.J. ii./09, 562.*

***Marmola.**—Quantitative determination difficult.

Formula arrived at was—Dried Thyroid Gland 1.4 grain, Phenolphthalein 0.4, grain, Sodium Chloride 0.7 grain, Powdered Fucus Vesiculosus 5 grains, Extractive 2.5 grains, Oil of Peppermint trace.—*B.M.J. ii./08, 1566.* Another analysis, *L. ii./08, 104.*

Martin's Apiol and Steel Pills.—1½ grs. of Aloes in each with. inter alia reduced Iron and Apiol each $\frac{1}{10}$ gr.—*B.M.J. ii./07, 1655.*

***Martin's (Dr.) Miracletts.**—Results of analysis indicated Quinine Valerianate 0.4, Zinc Valerianate 0.1, Ferric Oxide 0.3, Menthol 0.03 grain, Kaolin and Tale 2.3 grains.—*B.M.J. i./09, 31.*

Martin's Mixture Antidiabetique. Apricot Kernel Oil.—*L. ii./08, 104.*

Marza Wine.—Alcohol 17.48, Glucose 7.16, Alkaloid (Quinine or Quinidine) 0.001, Iron 0.005, Phosphorus in combination calculated as Phosphoric Acid 0.03%.—*B.M.J. i./09, 1307.*

Migranol.—10% Solution of Menthol in Acetic Ether with 4% Spiritus Dzondii (*q.v.* in text) with Camphor and some sweet smelling Ethereal Oils.—*B.M.J. i./07, 879.*

Miol.—Analysis showed it to contain Oil 22.4%, Reducing Sugars (as Maltose) 41.3%, Diastatic power 2.—*B.M.J. i./10, 30.*

***Mexican Hair Renewer.**—Precipitated Sulphur 1.4%, Lead Acetate 0.1 (one sample examined contained 0.97%), Glycerin 19.0%, Rose Water to 100 by volume.—*B.M.J. i./10, 512.*

***Monaid Tablets.**—Contain Caulophyllin and Capsicum.—*B.M.J. ii./07, 1656.*

***Morison's Pills.** (For Obesity.)—One contains Aloes, Jalap Resin, Cream of Tartar, and probably Colocynth; the other some Gamboge as well.—*B.M.J. i./07, 832.*

***Mother's Advice.**—Formerly 'Ciefa' and before that 'Tablones.' Contains Pepsin, Diastase and other ingredients.—*B.M.J.* i./09,556.

Mrs. Frost's Anti-Obesity Remedy.—The active ingredient is Extract of *Fucus Vesiculosus*.—*L.* ii./03,1493.

Mrs. Terry's Drink Cure.—Sugar 98% and Sodium Chloride 2%.—*L.* ii./03,1493.

***Munyon's Blood Cure and Munyon's Kidney Cure.**—Granules, entirely Sugar (quantitative determination showed just 100%).—*B.M.J.* i./07,213; ii./07,531.

***Munyon's Catarrh Tablets.**—Analysis showed Sodium Bicarbonate 1.87 grains, Sodium Chloride 1.81 grains, Borax, partly dehydrated, 2.2 grains, Phenol traces, Gum 0.12 grain.—'Secret Remedies'.—*B.M.J.* ii./08,1286.

***Munyon's Special Catarrh Cure.**—Determination showed these pills to consist of 100% sugar.—*B.M.J.* ii./08,1286.

***Munyon's Pile Ointment** consists of Soft Paraffin with trace of Ichthyol, probably less than 0.2%.—*B.M.J.* ii./08,87.

Nelson-Lloyd Safe Reducing Treatment.—The Tablets contained inter alia (see ref.), Bladderwrack Extract and Thyroid gland proteid. Liquid similar.—*B.M.J.* ii./08,1563, or vide Secret Remedies.

***Nervelettes.** Coleman's.—Phosphorus 0.005 grain, and Quinine Sulphate 0.61 grain with vegetable matter 0.3 grain were determined.—*B.M.J.* i./09,32.

Nervol.—Dr. Ray's.—An aqueous extract of indifferent vegetable substances, with Valerian 3%, Alcohol and Glycerin added, also 6% Potassium Bromide.—*B.M.J.* ii./08,294. (See also Ray's Pills)

Neuraline.—Aconite with Chloroform and Rose Water.—Murrell.

***Norton's Chamomile Pills.**—Aloes, Gentian and Chamomile Oil.—Murrell.

***Oquit.**—Analysis of the Tablets showed them to contain Acetyl-Salicylic Acid 66.2, Starch 20, Tale 1.2, Gum 1.5, Extractive 3.1, Moisture 5.0%, Alkaloid a trace.—*B.M.J.* ii./08,1113.

Orange Blossom Specific for Uterine Diseases.—Principal constituents found to be Alum and Boric Acid, the basis being Soft Paraffin.—*B.M.J.* ii./09,1419.

Osborne's Mixture (in epilepsy).—Contains about 20 grains Potassium Bromide in a dose.—*B.M.J.* ii./04,1586.

Ovaltine.—Described as 'composed of Malt Extract, Fresh Swiss Cow's Milk Fresh Eggs, and converted Cocoa, and containing active Lecithin.' Analysis showed Fat 12.3%, Reducing Sugars (as Maltose) 60.0%, Nitrogenous substances calculated as Protein 13.4%, Ash 3.5%, Water 1.5%.—*B.M.J.* i./10,30.

***Owbridge's Lung Tonic.**—Balsam of Tolu, Oil of Aniseed and Oil of Cloves.—*L.* ii./03,1493. Does not contain poison.—*L.* ii./06,1390.

The alkaloids of *Ipecacuanha* were found to the amount of 0.002%. If present in the form of Wine of the official strength this represents *Ipecacuanha* Wine 15 m., Chloroform 2 m. in each ounce.—*B.M.J.* ii./08,1698.

***Oxien.**—Powdered Sugar, Starch and Gaultheria Oil.—*L.* ii./03,1493.

***Oxien Medi-Cone Pile Treatment.**—The suppositories weigh on average 19 grains. Analysis showed Lauryl Acetate 5.6, Creosote about 2; Resinoid substance 3 (showing presence of Tannin), vegetable tissue 1, Hard Paraffin 7, Theobroma Oil 81.4%.—*B.M.J.* ii./04,87.

***Ozerine** (in epilepsy).—Potassium Bromide, Ammonium Iodide with Chloroform Water.—*L.* ii./03,1493; *B.M.J.* ii./04, 1586, gives approximately Potassium Bromide, 120 grains, Ammonium Carbonate 16 grains per ounce (without Iodide), with Chloroform Water, &c.

***Paciderma Crème.**—Zinc Oxide, Calcium Carbonate, Calcium Sulphate, Boric Acid and Bala.—*B.M.J.* i./08,943. q.v. also for Powder and Blood Wafers.

***Page-Woodcock's Wind Pills.**—Aloes, Caraway Oil and Soap.—*L.* ii./03,1433.

Panopeptone.—100 contained Alcohol 20, Total Solids 26.9, Nitrogen 1.14 (equivalent to Protein 7.2), Ash 1.1, Sugar 7.8.—*B.M.J.* ii./09,562.

Parr's Life Pills.—Aloes, Rhubarb, Jalap, Gentian Clove Oil.—Murrell.

***Peps.**—Lozenges weighing 22½ grains and containing 8% Essential Oils.—City of Liverpool Health Report, 1908.

***Perry-Davis' Pain Killer.**—Spirit of Camphor, Tincture of Capsicum, Tincture of Myrrh and Alcohol.—Murrell.

Pfefferman's Carbonic Acid Compress.—The Packet contains a tube of 20 Gm. of soft white paste, which consists of about 30 parts Sodium

Carbonate, 15 parts of Magnesium Carbonate, 10 parts of Soda Soap, 5 parts of Menthol and 40 parts water; also a small square of lint impregnated with Tartaric Acid, and a piece of protective.—*B.M.J.* ii./08,204.

***Phelps Brown's Vervain Restorative.**—Decoction of Vervain (2 ozs. to a pint) 4 drachms, Port Wine 1 drachm, Alcohol 2 drachms, Water to 1 ounce. Dose.—2 drachms. Is 25% alcohol.—*B.M.J.* ii./04,1585. **Phelps Brown's Blood Purifier.**—Nothing in particular found beyond 23% Alcohol.—*B.M.J.* ii./07,531.

***Phosferine.**—Quinine, Phosphates and Hypophosphites.—*L.* ii./03,1493. **Pink Pills.**—Iron Sulphate, an alkaline carbonate, and Liquorice thickly coated with sugar and coloured with carmine.—*L.* ii./03,1493. See also Williams' Pink Pills.

Plant's Cigarettes (For Asthma.)—Leaves of Stramonium, Lobelia, and Green Tea.—*L.* ii./03,1493.

***Powell's Balsam of Aniseed.**—Does not contain poison.—*L.* ii./06,1390. Contained inter alia (*v.B.M.J.*) Benzoic Acid and 0·012% of alkaloid—possibly a Morphine derivative. Evidence in the past has been brought showing this preparation to contain Morphine. Composition has been changed since then.—*B.M.J.* ii./08,1698.

The Manufacturers inform us it contains no ingredient coming within \odot or \oplus . **Powell's Nurse, Remedies for Ladies.**—Sanol Cones = Iron, and Quinine, and Gentian in Cacao Butter basis, &c.—*B.M.J.* ii./07,1656, *q.v.* for others of Nurse Powell's preparations.

Pritchard's Teething and Fever Powders—Dose on lines of Stedman's *v. infra*. Average weight 2·1 grains. Consist of Calomel 47, Antimony Oxide 0·7, Calcium Phosphate 1·4, Milk Sugar 59·9%.—*B.M.J.* ii./08,1022.

Quina Wine.—Alcohol 16·9%, Glucose 22·2%, Alkaloid Cinchona (0·05). "Two measures" represent about 10, to 15 minims Liquid Extract of Cinchona.—*B.M.J.* i./09,1308.

Radium Salve.—The α radioactivity is about $\frac{1}{100}$ part of that of uranium. The β -radiation is too feeble to be detected by a sensitive electroscope.—*B.M.J.* i./09,1128.

Ray's Pills (Dr)—Consist chiefly of Aloes and a small quantity of Soda Soap (see also Nervol).—*B.M.J.* ii./08,204.

Renascin.—Tablets containing chiefly the Chlorides, Phosphates and Sulphates of Potassium, Sodium, Magnesium, Calcium, Manganese and albuminous compounds of Iron and Manganese with traces of Lecithin.—*B.M.J.* ii./08,204.

***Rice's Treatment for Rupture.**—An appliance and 'Lymphol.' Careful comparison indicated following for the 'Lymphol.' Tincture of Capsicum made with strong Alcohol 60, Oil of Origanum 6, Oil of Peppermint 1, Oil of Spearmint 0·3, Red Dye, *q.s.* Rectified Spirit to 100.—*B.M.J.* ii./08,1193.

***Roche's Embrocation.**—Olive Oil, Oil of Amber, Oil of Cloves, and Oil of Lemons.—Murrell.

Rollo's Remedy for Piles.—99% of fatty basis—all ordinary medicinal substances were absent.—*B.M.J.* ii./08,88.

Ruspini's Styptic.—A strong solution of Gallic Acid and Spirit of Roses, with perhaps a little Zinc Sulphate.—Murrell.

Russell's Anti-Corpulent Preparation.—Citric Acid (about 20 grs. to $\frac{1}{2}$ oz. a dose), with Water, and a little Iron. The Pink Tablet = Saccharin.—*L.* ii./03,1493; *B.M.J.* ii./07,25.

***St. Raphael Tonic Wine**—"Quinquina."—Alcohol 16·89, Glucose 11·8, Alkaloid (Cinchona) 0·008. A wine-glassful = about $1\frac{1}{2}$ m. of Liquid Extract of Cinchona.—*B.M.J.* i./09,1308.

***St. Raphael's Tannin Wine.**—Alcohol 14·65, Glucose 14·0, Tannin (as in ordinary Port Wine), Alkaloid a trace.—*B.M.J.* i./09,1309.

***Savar's Coca Wine.**—Alcohol 23·4%, Glycerin 6·1%, Glucose 2·6, Alkaloid (Coca) 0·07%. Dessertspoonful = about 21 minims of Liquid Extract of Coca.—*B.M.J.* i./09,1307.

***Scott's Pills.**—Aloin and Cascara with a soap basis, *L.* ii./03,1493.

***Scott's Emulsion** is stated to have the following composition: Cod-liver Oil 40 litres; Glycerin, 19·875 kilos; Solution of Calcium Hypophosphite 0·8 per cent., 20·450 kilos; Solution of Sodium Hypophosphite 0·4 per cent., 20·150 kilos; Flavouring Essences, 2·970 kilos; Gum, 650 Gm.—*Ph. Notes.*

Seeger's Hair Dye.—*W.* (Brown) Pyrogallol Acid 3·8%, Cupric Chloride (anhydrous) 1·8%, Hydrochloric Acid (*B.P.*) 0·7%, Sulphuric Acid 0·07%.—*B.M.J.* i./10,152.

***Seigel's (Mother) Syrup.**—Quantitative determination indicated—

Dilute Hydrochloric Acid (B.P.) 10 parts by measure, *Tincture of Capsicum* 1·7 ditto, *Aloes* 2 parts, *Treacle* 60 parts, *Water* to 100 by measure.—*B.M.J.* i./09,33.

Serravallo's Tonic Bark and Iron Wine.—*Alcohol* 17·26%, *Glucose* 6·8, *Cane Sugar* 12·2, *Iron* 0·01, *Alkaloid (Cinchona)* 0·05, *Liqueur glass* represents about 3 minims of *Liquid Extract of Cinchona*.—*B.M.J.* i./09,1308.

Serum Bantier, "Anti-gonococcide" is not a serum, but a Solution of *Magnesium-iodo-phenol Sulphonate*.—*L.ii.*/08,104.

Shadeine (Brown).—*Pyrogallie acid* 2·1% *Cupric Chloride (anhydrous)* 1·3%. *Hydrochloric acid (B.P.)* 0·3%.—*B.M.J.* i./10,152.

Singleton's Eye Ointment.—Analysis showed principal ingredient the *Red Mercuric Oxide* 7·4, *Fatty basis* contained inter alia about 4% *beeswax*.—*Secret Remedies*.

***Standard Malt Extract and Cod Liver Oil.**—Stated to contain 25% *Oil*. Analysis showed *Oil* 4·1%, *Reducing Sugar (as Maltose)* 64%, *Protein* 5·6, *Diastatic Power* 74.—*B.M.J.* i./10,30.

***Stearn's Headache Cure.**—Powders each contain *Acetanilide* 3·92 grains, *Caffeine* 0·98 grain, *Milk Sugar* 4·9 grains.—*B.M.J.* ii./06,27.

Stedman's Teething Powders.—Average weight 2·4 grains. For a child under 3 months the third of a powder; from 3 to 6 months $\frac{1}{2}$ a powder; when above 6 months a whole powder. The powder consists of *Calomel* 29% and *Sugar of Milk* 71%. A trace of *alkaloids* (not identified) *B.M.J.* ii./08,1022.

***Steedman's Soothing Powders.**—*Calomel* and *Starch*.—*L.ii.*/03,1493. Average weight 2·8 grains each. Consisted of *Calomel* 27, *Sugar* 22, *Maize Starch* 51·5, *Ash* 0·5%. Directions similar to *Stedman's* above.—*B.M.J.* ii./08,1022.

Stevens Consumption Cure.—Formula appears to be approximately *Rectified Spirit of Wine* 23·7 parts by measure, *Glycerin* 1·8 parts, *Decoction of Krameria* 1 in 3 to 100 parts by measure, or it may be made with *Tincture of Krameria*.—*B.M.J.* ii./08,508. See also *ibid* i./09,672.

Stomagen.—Light brown powder containing 5% *Bismuth Subnitrate*, *Pepsin*, *Milk Sugar*, *Condurango Bark*, *Angustura Bark* and *Ginger*.—*B.M.J.* ii./08,204.

Tablones.—see *Mother's Advice*.

Tatcho.—*Borax* 2·7%, *Glycerin* 2·5%, *Quinine* 0·006%, *Formaldehyde Solution* (40%) 0·35%, colouring and perfume a trace, *Alcohol* 2·4%, *Water* to 100, by volume.—*B.M.J.* i./10,151.

Taylor's Anti-Epileptic Medicine.—Formula ascertained was *Tincture of Iodine* $\frac{1}{2}$ m., *Potassium Bromide* 13 grains, *Ammonium Bromide* 4 grains, *Water* to 1 ounce. Dose, —1 teaspoonful thrice daily.—*Secret Remedies*.

Teetolia Treatment.—29·3% by volume *Alcohol*, 2·3% *Alkaloid* principally *Quinine*.—*B.M.J.* i./09,911.

***Therapion No. 3.**—Results indicated *Cumpher* 2·5, *Glycerin* 24, *Powdered Liquorice* 40, *Calcium Glycerophosphate* 1·8, *Extract of Gentian* 5, *Extract of Dumbiana (?)* 8, *Alkaloid* 1·006, *Water* to 100.—*B.M.J.* i./09,32.

The Manufacturers inform us 'non-poisonous.'

Toris Root Compound.—Contains *Sodium Salicylate*, *Potassium Nitrate* and *Sugar*.—*L.ii.*/08,104.

***Townsend's, Old Dr. Jacob, American Sarsaparilla** is similar to the official *Liquor Sarsa Comp. Conc.*, but without *Liquorice* and with addition of *Sugar*.—*B.M.J.* ii./07,530.

***Towle's Pennyroyal and Steel Pills.**—Contain about 14 grains *Dried Iron Sulphate*, *Capsicum* 86 grains, *Pennyroyal Oil* 3 minims, excipient q.s.,—in 100 pills.—*B.M.J.* ii./07,1653.

Trench's Remedy for Epilepsy.—Contains about 9 grs. *Potassium* and 1 grain *Ammon. Bromide* ('concentrated form is 15 grains *Potass. Brom.* in a powder for a dose).—*B.M.J.* ii./04,1586.

Trommer's Elixir.—Stated to contain the active enzymes of *Malt*, *Glycerophosphates*, and what is described as the "alkaloidal" extractive of *Cod livers*.—*L.ii.*/10,863.

Trommer's Malt Extract and Cod Liver Oil.—*Oil* 29·9%. *Reducing Sugars (as Maltose)* 41·4%, *Proteid* 2·4%, *Diastatic Power* 35.—*B.M.J.* i./10,30.

***Trilene Tablets (For Obesity).**—*Sugar* and a vegetable constituent of unknown nature.—*L.ii.*/03,1493. Minute quantity of *Fucus* amongst other ingredients, 87% *Sugar*.—*B.M.J.* ii./07,209.

***Tuberculozyne, (Derk P. Yunkerman Co.) No. I.** *Potassium Bromide* 3·4, *Glycerin* 12·0, *Cassia Oil* 0·1, *Tincture of Capsicum* 0·17, *Cochineal Colouring* q.s., *Caustic Soda* 0·06, *Water* to 100 gave an exactly similar liquid.

No. II. Glycerin 18, Essential Oil of Almonds 0.1, Burnt Sugar q.s., Water to 100 fluid gave an exactly similar liquid.—*B.M.J.* ii./08,508.

Bernard Dyer stated the remedy, from analysis of the two samples supplied, consisted chiefly of glycerin flavoured with cinnamon in one sample and almond in the other. One was slightly alkaline and contained phosphates and potassium, the other was slightly acid with minute traces of copper. He understood the solutions were mixed before taking, and said that the amount of copper taken per day would be about $\frac{1}{160}$ grain. The cost of the treatment was stated to be £2.—*C.D.* ii./08,220.

⑩ ***Tucker's Asthma Cure.**—According to Dr. Wilcox, Home Office Analyst, in the action against the "*Lancet*," January 1908, this contains Cocaine 2.28 grains, Atropine 0.87 grain, Sodium Nitrite 15.25 grs. per ounce, 20-30% Glycerin and a trace of Balsam or Benzoin.

A solution of Cocaine Nitrite 1.028, Atropine Nitrite 0.581 in Glycerin 32.16 and Water to 100 is said to produce good results when used in an atomiser. The Nitrites in question are not very stable salts.

Another analysis says Atropine Sulph. 0.15, Sodii Nitris 0.6, Glycerin 2.0, Water 15.00.—*B.M.J.E.* i./09,43.

Vasey, for the "*Lancet*," found in one sample Cocaine 1.03 grains, Atropine 0.52 grains, Sodium Nitrite 16 grains; in another, Cocaine 1.47 grains, Atropine 0.66 grains, Sodium Nitrite 24.46 grains.—*C.D.* i./08,112; *B.C.D.* i./08,73, c.f. also *L.* ii./03,1493.

The alkaloids in such a mixture may be determined by means of Platinic Chloride and estimating the Nitrogen in the precipitate,—then differentiating Cocaine from Atropine by precipitation with Potassium Dichromate Solution in strong Hydrochloric Acid.

Another method would be to soak up the fluid in a paste of Lead Oxide and Magnesium Oxide, extract repeatedly with Chloroform, filter, evaporate to dryness, weigh total Alkaloids, then titrate with N/100 Acid (using Phenolphthalein); this gives the amount of Atropine; finally titrate with Methyl Orange, which gives Cocaine.

Van Vleck's (Dr.) Absorptive Plasma.—Formula approximately: Powdered galls, 6 parts, Menthol 1 part, Crude Petroleum Jelly to 100 parts. Ditto Food Cones weigh 21 grains. Analysis showed wheat flour 28, Oil of Theobroma 68%, Water 4%, Van Vleck's Pile Pills.—Analysis showed small quantities of Powdered Capsicum, Powdered Liquorice, and Maize Starch, and other ingredients. For further information, vide *B.M.J.* ii./08,88, 89.

Van Vleck's Catarrh Balm.—Analytical results gave formula: Phenol 0.6, Sandal Wood Oil 0.5, Oil of Pumlilio Pine 0.1, Eucalyptus Oil 1.2, Soft Paraffin to 100.—*B.M.J.* ii./08,1283.

***Vana.**—Alcohol 19.2, Glucose 20.0, Alkaloid (cinchona) 0.23, Calcium 0.01, Phosphorus (combined) as Phosphoric Acid 0.13. A wineglassful = about 3 minims of Cinchona Extract (Liq.).—*B.M.J.* i./09,1308.

Varalettes (Bishop's Gout) showed presence of Lithium Citrate and a small quantity of what appeared to be piperazine with the usual effervescing basis. —"Secret Remedies."

⑪ ***Vars, Dr., Kidney Pills (Flexible Capsules)** contain inter alia Peppermint Oil, Juniper Oil, Potass. Nit., Powdered Squill, Henbane and Taraxacum Extract.—*B.M.J.* ii./06,1646.

Veno's Lightning Cough Cure.—Analysis showed inter alia (vide ref.) 0.23% resin, resembling that of *Grindelia robusta*. It is alkaline, so is the Liquid Extract of *Grindelia*, *I. C. Add.*—*B.M.J.* ii./08,1699.

Veno's Seaweed Tonic.—The following almost identical: Leptandrin 10 gr. Sodium Phosphate 33 gr., Liquid Extract of Cascara 45 minims, Conc. Inf. Rhubarb (1 to 7) 1 dr., Conc. Inf. of Senna (1 to 7) 2½ dr., Water, &c., to 3 ounces. Dose, 1 drachm.—*B.M.J.* i./07,213.

***Vibrona.**—Alcohol 19.30%, Glucose 6.4, Cane Sugar 5.2, Alkaloid (Cinchona Alkaloids, less Quinine and Cinchonidine) 0.02.—*B.M.J.* i./09,1308. Slight revision of statement.—*B.M.J.* i./09,1491.

Vigral.—Total Solids 50.8, Nitrogen 3.8 (equivalent to Protein 24.0), Ash 16.0%.—*B.M.J.* ii./09,563.

Vilixir.—(Liquid).—Sulphur precipitated 3.2%, Lead Acetate 1.8%, Glycerin 5.7%, Rosewater to 100 by volume. **Shampoo Powder:** Borax 4.6, Powdered Soap 24.4, Sodium Carbonate (partly exsiccated) 71.0%.—*B.M.J.* i./10,152.

Vin Regno (Pearson's Liebig's Beef Wine).—A wineglassful (2

ounces), contain Alcohol 2.5 drachms, Meat Extract 2.6 grains, Glucose 65 grains (Quinine not identified).—*B.M.J.* i./09,796.

Vin Urané Pesqui.—Analysis showed *inter alia* in 100 parts by measure, Alcohol 8.75, Glycerin 3.55, Total Solids 2.92, Uranium equivalent to Crystalline Nitrate 0.02 ($=\frac{1}{15}$ grain in fluid ounce, or $\frac{1}{3}$ grain in the daily dose).—*B.M.J.* ii./08, 1875.

Vinsip (Liquor Hæmoglobin Co.).—Alcohol 8.6, Total Solids 20.2, Nitrogen 2.9 (=Protein 18.2), Ash 1.0 in 100 fluid).—*B.M.J.* ii./09,562.

***Virol.**—Analysis showed it to contain Fat 12.3%, Reducing Sugars (as Maltose, 59%), Diastatic power nil.—*B.M.J.* i./10,30.

Visnervin.—Sugar, Chocolate-Coated Pastils weighing about 1 Gm., consist chiefly of flour, sugar, vanilla, and albumens.—*B.M.J.* ii./08,204.

***Warner's Safe Cure.** Potassium Nitrate (about 10 grs. to the ounce) and various diuretic herbs.—*L.* ii./03,1493. A mixture made with Potassium Nitrate 50 grains, Alcohol 5 drachms, Gaultheria Oil $\frac{1}{4}$ minim, Liquid Extract of Taraxacum 10 drachms, Glycerin 4 drachms and Water to 8 ounces is almost identical.—*B.M.J.* i./07,213. An Extract of Liverwort Leaves, 30, Nitre 15, Glycerin 45, Alcohol 60, with some Wintergreen Oil. Pills,—Aloes, Soap, Marsh Mallow, and Liquorice.—*B.M.J.* ii./08,1377.

See also formula presented to German Government authorities by manufacturer.—*M.P.*, Sept. 29,09,347.

Weidhaas Hygienic Institute. See *B.M.J.* i./09,824.

***Welch's Female Pills** (Kearsley's original Widow Welch's Female Pills) —Contain Iron Sulphate, Sulphur, Liquorice, Turmeric with excipient.—*B.M.J.* ii./07,1654.

Whelpton's Pills.—Rhubarb, Aloes, Ginger, Ipecac., and Soap—*L.* ii./03, 1493.

***Williams' (Dr) Pink Pills for Pale People.**—Contain Potassium Carbonate, Iron Sulphate and traces of Manganese Oxide and 'Neuramin' (supposed to be a combination (?) of lecithin, hæmatin and smilacin); the last is from Sarsaparilla; also a substance containing Emodin. Some Arsenic is contained in some.—*B.M.J.* i./07,879.

The quantities found indicated following formula—exsiccated Sulphate of Iron 0.75 grain, Potassium Carbonate 0.66, Magnesia 0.09, Powdered Liquorice 1.4, Sugar 0.2, in one pill.—*B.M.J.* i./09,32. So also *B.M.J.* i./10,213.—Formula may have been altered.

Wincarnis, see Coleman's.

***Winslow's, Mrs., Soothing Syrup.**—Previously contained poison, but in November, 1909, was altered—does not come within provisions of Poisons and Pharmacy Act, 1908.

© Woodcock's Cough Pills are stated to contain Morphine.

Woodward's Gripe Water.—Magnes. Carb. Solution, Dill Oil, Sugar and a trace of Alcohol.—*L.* ii./03,1493.

Yunkerman.—See Tuberculozyne.

***Zam-Buk.**—Eucalyptus Oil 14%, Pale Resin (Colophony) 20%, Soft Paraffin 55%, Hard Paraffin 11%, Green colouring matter, a trace.—*B.M.J.* i./08,944.

***Zip Ointment.**—Calomel, Lead Acetate, Lead Oleate, Oil (probably Olive), Croton Oil, Oil of Lemon Grass, Paraffin Ointment.—*B.M.J.* i./08,944.

***Zotos.**—Capsules (sea sickness preventive), contained 6.3 grains, pinkish powder consisting of 76.9% Chlorbutol (Syn. *Chloretone), and 23% Lactose.—*B.M.J.* ii./09, 1419.

***Zox Powders.**—Average weight $4\frac{1}{2}$ grains. Consists of Acetanilide only.—*B.M.J.* ii./08,1112.

Over £2,300,000 paid by the Public for Patent Medicines during the financial year ending March 31st, 1906.—*B.M.J.* i./07,209.

The amount of Revenue derived from Medicine Stamp Duty in the year 1907-8 was £234,142, an increase of £10,000 compared with 1905-06.—*B.M.J.* ii./09,813.

A number have been examined at Berlin. For list of titles vide *Am. Jl. Ph.* 1907, p. 42.

Consult also *Medizinische Specialitäten* by Carlowa and for recent Foreign Proprietaries abstracted from *Deut. Med. Woch.*—*B.M.J.* i./07,832, 879, 940, 1973, 1488, 1550; i./08,1124, 1432; ii./08,1376. Vide also *M.P.C.*, Sept. 29,09 for other works on the subject.

PHYSIOLOGICAL STANDARDISATION.

This method of testing is employed in those instances in which the drug contains no definite crystalline, easily isolated, active principle, *e.g.*, an alkaloid capable of extraction.

It consists in "determination of the change in function induced in living organisms by the administration in the state of minute division of such inorganised substances as do not act merely as foods, for the purpose of identifying and adjusting the strength of drugs; this may be either qualitative or quantitative."

The physiological action of a drug is the affinity it possesses for certain constituents of the protoplasm of the cells of particular organs of the body. Thus Ergot has a specific action on the uterus. Cocaine has affinity for nerve endings, and Strychnine acts similarly on the protoplasm of the spinal cord. Furthermore, as a result of the elective principle, drugs, according to their specific action on the organs, are designated stimulant, depressant, or irritant. The animals used for physiological determination should obviously be of the same species and weight, and should have been grown and kept under similar conditions. It is often useful to divide the small animals (*e.g.*, frogs) into classes according to weight, and use these in 'batches' for experimental investigations. Much comparative work has been done with various heart tonics, *e.g.*, Digitalis and Strophanthus (1) by direct application of a solution to the laid-bare frog's heart, and (2) injection intravenously or subcutaneously into dogs, rabbits, &c.

The quantitative test is based on the fact that the killing power of heart tonics for 'similar' frogs is constant per unit of body weight. Comparisons are made between effects produced by the sample preparation under examination and a standard preparation, *e.g.*, a tincture made from genuine Kombé Strophanthus.

In the matter of Ergot Preparations, when these are given in suitable doses to cocks they produce a blackening of the comb—the blackening being proportional to the quantity of the drug administered and the rapidity of absorption. Reliable comparative results are said to be procurable on these lines by using a standard preparation against the one to be tested (but we question the valency of the comparison of this action with that on the uterus of a pregnant woman.)

Suprarenal Glands and Adrenalin.—Standardisation of these has been effected against a standard freshly made 1 in 1,000 Adrenalin Solution. Adrenalin produces a transitory rise in blood pressure, and the rise is proportional to the amount of actual Adrenalin injected. For outline of technique see N.S.D., 1906, 1732. *See also body of work for all the above preparations, and for the latest methods of interpreting results v.p. 299 et seq.*

For a résumé of recent work on this subject, *vide* "Notes on Physiological Testing," by A. C. Crawford, *Am. Jl. Ph.*, July, '08, 321.

VACCINES AND ANTITOXINS.

Treatment with Antitoxic Serums has, with a few exceptions, *e.g.*, that of diphtheria, given place, especially in this country under the guidance of Sir A. E. Wright, to inoculation with the dead causative organisms, *i.e.*, 'Vaccination,' as the name is now understood, this treatment being dependent on the estimation, concurrently, of the Opsonic Index.—*c.f.* p. 802, *et. seq.*

Sir A. E. Wright puts the question whether it is not possible to achieve and maintain an increased output of protective substances apart from periodic blood examinations?—

It is impossible, he says, to foresee the effect a vaccine will have when injected into a healthy person. It may be safely predicted that 100 million staphylococci injected into a patient with an isolated furuncle will produce

an immediate positive phase, and 250 million 3 or 4 days later will probably cure the case. Also that in a case of ordinary erysipelas, 2 million streptococci will abort or arrest an incipient streptococcal lymphangitis.

In the case of tuberculin, however, it would be necessary to employ almost minimal doses of vaccine if a hard and fast dosage is to be arranged irrespective of blood examinations. A method of control (Opsonic Index Estimation) is essential. Clinical symptoms may be erroneous, particularly where the 'voyage' is a protracted one, without guiding landmarks. Special training,—'organisation' of the medical profession will be necessary to carry out all the bacteriological work connected with diagnosis and preparation of vaccines.—Sir A. E. Wright, Pr., May, 1908, 565.

With the exception of antidiphtheritic and antitetanic serums, the question is asked whether the preparation of the various antibacterial serums is based on exact scientific principles.—L. ii./09, 359.

With regard to the **Antitoxin** treatment, Behring showed that toxins produced by the diphtheria bacillus when injected into an animal effected an immunity, and that the serum of this animal induced immunity to the disease when injected into another, and that it could be employed for treating the disease in the human body.

The antitoxins contained in this animal blood serum probably combine chemically with the toxins circulating in the blood and tissues of the sick person, they by so doing neutralise the power of the toxins, and thus the human body is recuperated.

Ehrlich considers in his "**Side Chain**" theory that the protoplasmic molecule is in the nature of a chemical with its central radical, and a number of lateral groups or side chains (Receptors), each of which according to its character is capable of combining with certain bodies, *e.g.*, food stuffs, toxins and every blood or cell poison existing.

The Toxins of diphtheria and tetanus are extra-cellular "soluble" toxins excreted by the bacteria, found in the fluids in which they are cultivated, But in the case of typhoid and plague, the toxins are apparently inherent in the bacterial cell; in this case there are two substances involved—first, an immunising body existing in the serum *after* treatment with the bacterium; the other, the "**complement**" which is present in normal serum in small quantity.

This accounts for the fact that antityphoid serum can only neutralise a small lethal dose of the typhoid bacillus, and possesses little curative effect—the complement being absent, bacteriolysis, *i.e.*, destruction of the bacilli cannot proceed.

The absence of success with the antityphoid and anticholera sera in man may be due to the fact that the "complement" in man is not met by an appropriate immune body in these sera. It has been suggested to employ in these diseases an injection of fresh serum at the time of administering the antitoxin so as to increase the amount of the complement.

On the entrance of toxic microbes into the blood-stream substances are at once generated, which cause the white corpuscles to devour the specific microbes with greater assiduity than before. The toxins generated by the microbes have to be neutralised and the microbes exterminated, or at least kept under. The specific antidote to the specific toxin must be generated by

the organism. Furthermore defence against the multiplication of the microbes must be set up—either killing or crippling them. In particular this is effected by the production in the blood-stream of substances which incite the white corpuscles to exterminate (devour) the infecting bacteria. This state of things would appear paradoxical, though, of course, hypotheses explain these responses of nature—this automatic system of defence against microbic life. In such diseases as diphtheria and tetanus, where the onset is rapid, medical aid gives nature time to bring her defensive forces into action by injecting antidote grown by nature under favourable circumstances. Similarly in the prophylactic treatment the physician by sterile inoculations, *e.g.*, in typhoid, rouses the latent defensive power of the organism (though in health at the time).—Lord Justice Fletcher Moulton, "Causation in Health and Disease."—L. ii./09, 1049.

The problem of infection and immunity and the speculations of Ehrlich are fully entered into in Allbutt's System of Medicine, Vol. II., part 1, which should be consulted.

The human organism is supposed to employ two forms of bactericidal substances—one type circulating in the blood, passing thence into the exudation that forms round the microbes, the other existing only inside the phagocytes. The first act in particular on cholera vibrios, typhoid bacilli and their congeners; the other destroys anthrax bacilli, pyogenic microbes, etc. The nature of the substances destroying bacteria is also assumed to differ in conformity with these two different functions of the organism. The 'humoral' bactericidal substances are complex and comprise a substance which renders them amenable to the substance which kills them. Ehrlich gives the name *amboceptor* to the preparatory substance and *complement* to the destroying substance. Washed white corpuscles, though not containing any complement, may yet give rise to it. Metchnikoff showed by experiment that they do contain a substance acting exactly like 'complement'—it is a very unstable body. Washing, refrigeration, etc., destroys it, hence methods of investigating the state of bactericidal substances of the white corpuscles are invalid. Metchnikoff believes that white corpuscles contain in addition an *anticomplementary* body, just as the myxomycetes yield an acid substance capable of digesting foreign bodies in their vacuoles, whilst on the slightest pressure they yield an alkaline one.—Metchnikoff on Immunity. M.P. July 28/09, 86.

Sera in general are Polyvalent*, *i.e.*, a mixture of several strains of the bacterium have been employed for inoculation, so as to ensure the best all-round and uniform results.

In the preparation of Antiserum the toxin is injected subcutaneously into the animal, *e.g.*, the horse, with strict aseptic precautions. Some reaction, rise in temperature and malaise occur. Further injections are made at intervals. The quantity injected is gradually increased, and subsequently the injections may be intravenous. The blood is removed from the animal by the aid of a large sterilised cannula, from the jugular vein, 6 to 12 litres may be collected in sterile flasks. The clot is allowed to form by standing

* Under the name Polyvalent Serum, Darier and Deutschmann proposed a 'Universal Serum.' Axenfeld says "further experiments necessary," *vide* B.M.J. ii./08, 738.

24 to 48 hours, and the serum is decanted into sterile bottles after the addition, by some manufacturers, of 0·3% of Trikresol or 0·2% of Phenol.

The diseases treated in the following pages are in alphabetical order as nearly as practicable. For further directions consult the index.

Antitoxins neutralise toxin, *e.g.*, Diphtheritic and Tetanus Antitoxin.

Antibacterial Sera act directly upon bacteria by bacteriolysis, *e.g.*, Sclavo's Anthrax Serum.

Coming now to the more detailed consideration of Vaccines the following table giving dose and time for repetition which we have arranged should be useful for reference :—

Table of Vaccines.

Arranged alphabetically.

VACCINE.	APPROXIMATE DOSES.	TIME FOR REPETITION OF DOSES.
Acne Bacillus	5 million (initial) increased to 20 million.	7 to 10 days.
Catarrh (Combined Vaccine for Colds).	75 to 250 million.	In treatment about 10 days. For immunising 3 months.
Cerebro - spinal Meningitis.	2 to 5 million (initial).	Every day or other day.
Coll Bacillus	10-25 (initial) up to 500 million.	In acute, every 2-3 days. In chronic infection 7-10 days.
Friedländer's Bacillus.	75-125 million (initial) up to 500 million.	10-14 days in treatment, 3 monthly immunising.
Gonococcus.	25 to 50 million, increased to 1,000 million.	10 to 14 days.
Influenza Bacillus.	10-50 million (initial) up to 1,000 million.	In acute, 2 or 3 days, in chronic 7-10 days.
Micrococcus Catarrhalis.	50 to 500 million.	7 to 10 days.
Pneumococcus.	25 to 50 million (initial) up to 500 million.	As Influenza.
Staphylococcus.	100 million (initial) up to even 5,000 million.	7-14 days.
Streptococcus.	10-25 million.	As Influenza.
also S. Conglomeratus and S. Rheumaticus.	} to 500 million.	
Tuberculin T.R. (also Bovine and mixed).	0·00001 Cc. upwards (English dosage).	10-14 days.
Typhoid (Agar Culture).	50 millions (initial) to 1,000 million.	As B. Coll.
" (Broth Culture).	500-1,000 million (initial) for immunising.	Double dose in 10 days

VACCINES are (1) killed Bacterial Emulsions (cultivations) *i.e.*, micro-organisms + toxins, *e.g.*, Anti-colon Bacillus Vaccine, or (2) containing the toxins only, *e.g.*, Mallein, or (3) fluids of animals suffering from an infective disease, *e.g.*, 'Calf Lymph.' *c.f.* p. 817.

Killed bacterial emulsions from a young Agar culture are prepared in Normal Saline containing 0·25% Lysol or Phenol, *c.f.* above. Physicians using these preparations must be guided by the makers' guarantee as to strength, purity and method of administration.

It has been suggested, not without reason, that the inoculation, and

probably the reinoculation of the blood-stream with attenuated virus *ad lib.*, may result in destroying vitality of the being, and that some new plague will arrive to crush the race so rendered void of resistant force!

Some interaction between the tissues and the dead micro-organism occurs by which Opsonins and other antibacterial substances are liberated into the blood stream. The reaction, by reason of the minute dose of dead bacteria and the magnitude of the response in the tissues, may be compared with the prolonged action of enzymes. The Antitoxins in a *serum* probably act simply by neutralising an equivalent amount of toxin—any further action being due to the presence of dead micro-organisms in the serum, which act as a feeble vaccine. This would explain the lack of result with sera except in diphtheria, where the development is limited, and in which the destructive power is in the toxins poured into the circulation. The theory of immunisation depends on the human being having a sufficiency of antibacterial substances to kill off the infecting organism. If the latter gains access and colonisation begins the destruction of a portion of the invaders strengthens the defending force. This phenomenon—auto-inoculation—*vide* later) is best seen in the pneumonic crisis, or in the rise of protection after a crop of boils. The protection may be lasting as in small-pox, or very transient, as in tuberculosis.—A. Butler Harris. *Pr.* /09,647.

The bacterial invasion, if there be no tissue destruction or undue paralysis of function of the nervous system, may, starting from the death of a few of the bacteria in question, lead to self immunisation and recovery and the introduction of a bacterial vaccine may form the turning point, producing, as it does, the reinforcement for the defending forces that was necessary. The introduction of an appropriate vaccine into the circulation tends to produce a negative phase—the opposite occurring if injected into the tissues. The degree of benefit is more or less proportional to the *slowness* with which interaction between tissues and vaccine takes place. *Rest* after inoculation is necessary for a good upward flow of Opsonic Index—exercise on the other hand produces a sharp negative phase and tends to promote rapid absorption into the circulation of fluids introduced into the tissues.

Though a special study at present, Vaccines may largely replace the pharmacy of the past. Inoculation of the virus of an infective disease in suitable dose raises resistance of the patient towards the particular disease—the principle in question has been employed for the last 100 years in vaccination. Vaccine treatment in general practice.—M.P. Nov. 17,/09,p.520.

“Based as vaccination is on the theory of more active phagocytosis, rendered possible by an increase of opsonin, the results must to a certain extent, be dependent on two factors, namely, (1) the phagocytes and (2), the facility with which opsonin can arrive at the site of infection. Good results ought, therefore, to be obtained in those situations where phagocytes are naturally present. Of cells generally, the chief phagocytic activity is no doubt to be attributed to the polymorphonuclear leucocytes, but many other cells are endowed with this property. Probably the cells lining the alveoli of the lungs possess phagocytic properties as great as any in the body; and their anatomical position is such that plasma can easily pass from the blood-vessels to the alveoli. They are, therefore, ideal situations for the hagocytosis of organisms.”—*Pr.*, May, '08, 675.

As regards immunising power of the Vaccines the following is approximately their order of merit, commencing with the most potent:—

Pneumococcic Vaccine.
 Streptococcic "
 Gonococcic "
 Typhoid "
 Catarrhal organism Vaccines (excluding Influenza).
 Acne and Staphylococcic Vaccines.
 Dysentery Vaccine.
 Cerebro-Spinal Meningitis Vaccine.
 B. Coli Vaccine.
 Influenza Vaccine.

Acne.

The Acne Bacillus may alone be the cause of acne, especially of the non-pustular forms,—in the majority of cases, however, it is associated with the Staphylococcus.

Acne Bacillus Vaccine is prepared. *Initial dose* 5 millions, may be increased to 10 and even 20 millions with advantage.

Ampoules are prepared each containing these doses.

Acne is due to a specific Bacillus. In 44% of the pus films examined only acne bacilli were found (Gram-staining). Acne bacilli with Staphylococcus were present in 53%. The bacillus stains less deeply than the cocci. The bacillus grows with difficulty on artificial media. By far the most suitable medium for growing the organism is ordinary Nutrient Agar containing 1 to 5% *Oleic Acid*. The pyogenic nature of the bacillus in question is substantiated. Vaccine prepared from a three weeks' culture on the above medium. Not all cases improve with a stock Vaccine; in some an antogenous Vaccine is necessary. *Dose* varied from 4 to 10 millions. Intervals between inoculations 1 to 2 weeks. The guide as to treatment was the appearance of fresh lesions, either during the period of low resistance following the positive phase when too long an interval was allowed, or in the next two or three days after an inoculation indicating too large a dose used. By watching and working the dose up till it just fails to show any "negative phase" clinically great benefit from the Vaccine may be obtained.—A. Fleming—L.i./09, 1035; see also *Annus Medicus*, L.ii./09, 1886.

A patient after a few doses of *Staphylococcus Aureus* and *S. Albus* vaccine was almost completely cured. Renewal doses from time to time necessary. Good results always follow vaccine treatment of acne. Desirable to give 250 millions of mixed Staphylococcal Vaccine at once, whilst special vaccine is being prepared, then continue with the latter. Having once found the dose which suits patient it is desirable to adhere to that dose throughout.—M.P. Nov. 17, '09, p. 520, but *vide antea*.

Anthrax.

Vaccines have been prepared by cultivating the bacillus under conditions unfavourable to its growth, by which the toxicity is greatly reduced, but they are not on the market. The following serum has been considerably used:—

Anti-Anthrax Serum (Sclavo's).

Each tube contains 10 Cc.

An Antibacterial Serum, stimulating the activity of the phagocytes. Prepared by immunisation of asses at Siena in Italy.—(Legge).—L. i./05, 65.

The earlier the treatment can be commenced the more easily can the infection be combated.

Dose.—In three or four different parts of the skin of the abdomen, injections of 10 Cc. each are made at one time. After 24 hours if there has been no improvement either in the general or local condition further injections of 20, 30, or 40 Cc. are to be made (*i.e.* 8 tubes in all may be required for one case).

A rise in temperature following on the injection of the serum is to be regarded as a favourable indication.

Sometimes a rash develops three to eight days after treatment, with or without febrile symptoms. If it occurs it is unimportant.

The Serum will keep for two years in the dark—a slight deposit in it is negligible.

Technique of the Injections.—Disinfect the skin with a little Ether, and then with a 2 per 1,000 Sublimate solution, or with Ether Soap, *q.v.*

After injection wash the site of injection again and apply a drop or two of Collodion.

For intravenous injection in severe cases 10 Cc. repeated after 2 or 3 hours if necessary into, where possible, one of the superficial veins at the back of the hand, distended by pressure on the forearm.—*L.ii./05,803.*

"Uneventful" recovery from an "untreated" case. Another case "freely excised" under anæsthetic terminated fatally.—*L.i./08,1007.*

Anthrax cases cured by serum.—*L.ii./05,473, 1329; B.M.J.i./05.16,296; ii./05,108; L.i./05,1137, 1420.*

Six cases amongst wool workers.—*L.ii./09,1662.*

Asthma.—'BRONCHIAL ASTHMA.' An organism isolated, apparently accountable for. Corresponding Vaccine employed in dose of 25 millions and upwards with good result in one fourth of the cases treated. The bacillus (not often found) is described as to morphology and cultural properties. It is apparently responsible for the spasmodic dyspnœa.—*B.M.J. ii./09, 1049.*

Blackwater Fever.

[Practical notes on treatment:—Calomel 5 to 10 grains, Effervescent Saline. Intravenous injection of normal Saline Solution, Quinine in nutrient enema (not milk), also Digitalis, and Strychnine in the same form.—*B.M.J.ii./07,1324.*

A case in which there was invariably an attack on taking Quinine,—patient had had malaria.—*B.M.J. ii./06,1258; L. i./07,807.*

Investigation showed that all Sulphates lower the number of inorganic molecules in the blood, hence tending to bring the corpuscles to their hæmolytic point. Chlorides (Quinine Hydrochloride, Calcium Chloride, &c.) tend to increase the resisting power of the blood.—*B.M.J.E., ii./08,65.*

Blackwater fever may be brought on by quinine and by antipyrin in people who have suffered previously from it or malaria.—Sandwith, *B.M.J. ii./09,1801.*

Cancer, Sarcoma, and other Malignant Tumours.

Imperial Cancer Research Fund, Seventh Annual Report. The Third Scientific Report published Oct., '08, forms the most complete exposition of results of the modern investigation of cancer. Experiments by the injection of **Trypsin** gave entirely negative results. No evidence proving hereditary transmission had been obtained (mice experiments). The law of age incidence in mice holds good in a manner comparable with that for mankind. No evidence at present to show that the disease in nature is conveyed by the transference of living cancer cells. Fifty mammary carcinomata under propagation in the laboratory, all different. A much larger variety of malignant

new growths exists than formerly supposed. Further detailed investigation as to manner in which animals may be rendered resistant to the inoculation of cancer. It was found that cells, whether cancerous or normal, which had been killed or disintegrated in any case, such as by chemical properties, or by heat, cold, crushing, &c., were entirely deprived of their power of conferring resistance,—this in complete contrast to that obtained when the organisms of infectious disease were similarly killed or disintegrated, as in those the products retain poisonous properties and powers of inducing resistance. The action of Radium on normal and cancerous tissues without causing disintegration was of *special interest*. After applying Radium for an interval *within which no structural alteration could be observed in the tissues, they might be completely deprived of their powers of growing and immunising*. Abolition of vital properties with retention of histological structure and intactness of the cells. Experiments showed that the power to elicit these biological reactions was internally bound up with and dependent on the vital activities of the cells themselves. Until now the parallel behaviour of the normal and cancer tissue in these respects almost excluded the possibility of Radium having selective action on cancer tissue. Pending *proof of existence of selective action exaggerated hopes should not be disseminated*. The general hospitals of England and Scotland had provided details of 13,000 cases which had been examined microscopically. Data from outlying parts of the Empire included in particular search for peculiar forms of *chronic irritation* associated with occurrence of malignant new growths in native races. A few and most interesting point from Egypt was the occurrence of cancer of the skin of the chest on the triangular area of skin left bare by the clothing worn by the Fellahin.

Seven years ago no one would have conceived it possible that portions of the *mammalian organism could be kept growing* for a period four times the length of life of the whole animal. While some chance opportunity may yield results of immediate practical moment, the outlook in therapeutics in the meantime is directed to preventing dissemination or metastasis.—E. F. Ashford, General Superintendent's Report.—B.M.J. ii./09, 151.

At the 1907 Annual Meeting of the Fund it was stated that of 1,806 cases reported from India, 1,513 affected surface of the body, and only 76 were internal. 335 occurred in persons living on vegetable diet, and 608 in those on mixed diet, mainly fish. Universal in vertebrate animals. The chance of a man who reaches 35 eventually dying of cancer is 1 in 12, of a woman 1 in 8, the figures for the two sexes are approximating as time advances.

The cancer cell growing in a previously normal mouse induced an increase in the amount of physiologically active Hydrochloric Acid during digestion. A transplanted fragment of tissue no larger than a pin's head is able to influence the whole economy of the normal animal in this way. Mice which had been apparently completely protected against the inoculation of cancer had developed the disease spontaneously.—B.M.J. ii./07, 26.

The mitosis of the cells of malignant neoplasms has been found to be heterotypic, whereas that of all somatic cells with one exception, and of the cells of benign tumours is homotypic. The mitosis of normal reproductive tissue is also heterotypic. Cancer occurs in nearly all vertebrata, not in the higher ones only. The malignant growths in all are identical. Transmissibility from one lower animal to another of same species possible. Cancer is transmissible to others and has an external origin. Contamination by food, excretion of all who die from cancer essential.—L. i./08, 80.

Some cancer researches.—L. i./05, 983 (Handley).

Etiology of carcinoma; *Plasmodiophore* found in carcinomatous tumours. Culture and staining of the parasite.—L. i./05, 215; B.M.J. i./05, 920.

Histological features of carcinomatous tumours demonstrated by an improved Ammonia-silver process.—L. ii./07,358.

Carcinoma as a parasitic disease.—B.M.J. ii./05,1565.

Plimmer's bodies, which were considered peculiar to cancerous tissues, are also present in healthy reproductive tissues. This disposes of the idea hitherto held that Plimmer's bodies are parasitic organisms.—C.D. i./05,793.

On the nature of malignant growths.—B.M.J. i./05,1277.

Cancer, editorial on the 'age' of. There is no actual increase in death rate.—B.M.J. ii./05,594.

The Colonies and cancer research.—L. i./05,655.

Discussion on cancer in Berlin.—L. i./05,1160.

Various cancer cures, Editorial.—L. i./06,1187.

Experiments on mice. Action of Mercuric Chloride, Iodide, Potassium Cyanide and Ammonium Fluoride on tumours. Chemical analysis of 300 tumours showed preponderance of Potash Salts and nucleo-proteid content associated with high virulence and rapid development.—B.M.J. ii./06,1548.

Sarcoma in rats and carcinoma of the breast in mice contagious.—B.M.J. ii./06,1558.

It has been asserted that cancer may be absent in certain countries. The importance of this being proved is enormous for if this is due to some definite cause some positive step in prevention might be obtained. The Cancer Research Fund has already announced that malignant diseases are found in the cow, horse, dog, pig, sheep, mouse, cat, fowl, parakeet, giant salamander, cod-fish, gurnard, and trout. These facts have an important bearing.

The final victory over cancer will not be solely by the knife.—B.M.J. ii./06,1681.

In diagnosis of cancer of the stomach Hydrochloric Acid must be persistently absent from stomach contents—distinction from gastric ulcer and dyspepsia.—B.M.J. i./07,746.

The dried powdered healthy human liver (but not the healthy lung) has been found to possess radio-activity—will blur a photographic plate. *Cancerous lung* does, however.—H. H. Riddle, Daily Press, May 20, '08. (Research at Middlesex Hospital) see also p. 607.

Diagnosis and Operative Treatment of Cancer of the Breast.

Immersion of a piece of growth removed at the operation in 5% Nitric Acid Solution for a few minutes, and then washing same in water will enable the surgeon to distinguish between a localised mastitis and a carcinomatous condition. The difficulty is to determine how far the induration is dependent on sclerosed fibrous tissue and how far on epithelial proliferation. The acid treatment renders the epithelial elements opaque by coagulation of the protoplasmic epithelial cells, while the connective tissue elements are rendered more or less translucent and gelatinous. Amount, arrangement and distribution of the epithelial elements enable one to say whether one is dealing with a carcinomatous state or with a mastitis associated with a simple hypertrophy of the ultimate globules of the gland parenchyma.—Sir W. Watson Cheyne.—B.M.J. ii./08,972.

Recurrence of cancer has been cured by "X" ray treatment, hence recommended as prophylactic.—B.M.J. ii./08,976.

Impaired mobility of the overlying skin is often found early in cancer of the breast, and is of great diagnostic value.

Pelvic examination prior to operation should never be omitted. The earliest visceral deposits may be found in the pelvic cavity. The liver is usually the first part of the body to be attacked.—B.M.J. ii./08,978.—S. Handley who says he has spent more time and work in the actual laboratory investigation of breast cancer than anyone in this country of recent years.

The 'only chance' doctrine of present day surgery is responsible for much disappointment to the public and discredit to surgery.—B.M.J. ii./08,980.

Technique of cancer operations with reference to danger of cancer infection.—B.M.J. ii./o8,1005.

Protozoan origin of tumours. The authors state they can demonstrate in many tumors bodies that are obviously protozoa, as also portions of a life cycle.—B.M.J. ii./o9,868.

(An Encyclopædic treatise on Protozoa.—Na., Mar. 3/10, p. 1.)

Possibility of a causal parasite cannot be denied. Coccidia theory not tenable. Actual results in treatment with Atoxyl — nil. Glycolytic ferment producers not to be regarded scientifically.—B.M.J. ii./o8,1509.

A real increase of cancer cannot be proved. The stomach is the seat of the disease in nearly 22% of the fatal cases in males in England and Wales. In females the generative and mammary organs are affected in more than $\frac{2}{3}$ of the total cases. Whether cancer is transmissible by heredity in man has not been settled one way or the other. Importance of animal (mice) experiments being conducted under identical condition is emphasized. Old mice are not such good 'soil' for tumours as young ones. Animals can be rendered unsuitable for inoculation and growth of cancer by treating them with malignant new growths, or with normal tissues of their species. After exposure to Radium for an interval not long enough to cause any naked eye, or microscopic alteration in the tissues, they may be completely deprived of their immunising or growing powers.

Cancer cells, even when of the same organ have been resolved into a larger number of varieties able to maintain the individuality than was previously conceivable. *No evidence has been obtained in favour of embryonic explanation of etiology, nor any analogy with known forms of infective disease.* At the present time the number of different kinds of tissues being propagated separately make it possible that the majority of the tissues, once they have acquired cancerous properties may be grown and segregated—in other words—a living animal can be analysed into many of its component parts.

Cancer is not limited to white men. It is not, as usually supposed, rare in any quarter of the globe. 25,000 deaths annually from it in Japan.

Old mice (and human beings) are more susceptible than the young. Location of the disease due to irritation is dwelt upon. Strong arguments against infective causation of the disease given. Mice and rat cancer distinct. Bashford, 16th Inter. Cong. of Medicine, Budapest.—L. ii/o9,691; B.M.J. ii/o9,797.

Leader on the ferment treatment of Cancer in support of Shaw Mackenzie's work. Entitled to consideration.—M.P., July 21/o9,50.

Parasitic origin doubted. Cancer held to be 'a biological syndrome (symptom complex) caused without any extrinsic specific parasite or irritant by intrinsically arising mechanical forces, which are excessive in degree when the muscular mechanisms of the body, especially those of equilibrium and respiration are chronically used other than to maximum or, at least, very high efficiency.' The power is expended unproductively being transformed into energy of undue cell growth. This forms the local irritant factor. The same low efficiency use of the muscular mechanisms (especially of equilibrium and respiration) which cause irritation (much power lost and wasted in doing internal work) result in impaired oxygenation of the blood, defective aspiration, etc., and general splanchnic stagnation, intestinal toxæmia and non-elaboration of essential internal secretions, alexins, opsonins and ferments. Perfect cell tissue becomes impossible. Thus arises a cachexia, which may precede or follow the local proliferation. When these two factors, the epithelial proliferation and the cachexia are at work each

reacts on and intensifies the other. Each produces its own poisons in ever increasing bulk,—the biological syndrome is complete, and advances to the fatal end. Scanes-Spicer.—B.M.J. ii/09,1151.

An investigation '*in vitro*' to throw light on the nature of cancer. The existence of an exciter of reproduction of human lymphocytes is *inter alia* pointed out. A mixture of Methylene Blue and Atropine excites amœboid movement in leucocytes. So does the blood of a cancer-patient. The same mixture will cause lymphocytes to extrude flagella with a particle of chromatin at their ends. The plasma of a cancer patient does the same. The authors showed that the extrusion of chromatin appears to be a phenomenon which occurs in cancer cells and that cancer cells appear to produce "something" that aggravates the disease,—the 'something' is possibly chromatin.—B.M.J. ii/09,1212.

Chemical irritants said to favour onset of cancer, particularly some coal-tar products.—B.M.J. ii/09,1215.

Following on this, **Sulphurous and Sulphuric Acids** are blamed as cancer producers. SO_2 is introduced into all wines and preserved fruits because it counteracts acetic fermentation. Organisms morphologically identical with *Plasmodiophora brassicæ* have been found in cancerous tumours, which organism has been stated by the Board of Agriculture to be fostered and encouraged by Sulphuric Acid manures. Scrotal cancer is found amongst guano workers, chimney sweeps and coal-tar workers. Guanos have now to be extracted by means of Sulphuric Acid. If no connexion between these Acids and cancer the deductions depend on extraordinary series of coincidences. Convinced as to parasitic nature of cancer.—B.M.J. ii/09,1716.

Cancer cannot grow in acid medium,—on the contrary, acids, *e.g.*, **Acetic Acid** in weak solution as douche twice daily in a case of cervix uteri was curative.—B.M.J. ii/09,1441.

The Sulphuric theory is thought to be built on rather slender formation. There is little doubt that workers in certain coal tar compounds do develop cancer frequently, but this is hardly sufficient to base a theory on.—B.M.J. ii/09,704.

In inoperable cancer the **thyroid gland** has been removed as the best means of ameliorating the disturbing factor. There would seem to be increased thyroid activity in carcinomatous sufferers.—L. ii/09,1138.

Diagnosis of Cancer by examination of the blood:—

Antitryptic Index.—*The power of any given serum to inhibit tryptic digestion compared with that possessed by a normal standard serum.* The Antitryptic Index was found to be raised in 94% of cases of malignant disease. The reaction is, however, not specific, as most processes involving cell destruction produce a heightening of the index. There are several methods of obtaining the results, one chemical, another electrical, and a third by estimating viscosity of the serum.

Gastric ulcer can be distinguished from carcinoma of the stomach by the test. The electrical method registers more definitely than the chemical one,—details of procedure. The negative evidence afforded by a normal antitryptic index is of great value in excluding malignant disease.—B.M.J. ii/09,1220.

The finding of a normal antitryptic content is of the greatest value in excluding a diagnosis of cancer. A raised content often assists in distinguishing between an innocent neoplasm and a malignant one, but does not justify a positive diagnosis of cancer.—B.M.J. ii/09,969.

The viscosity method of estimation depends on the changes of viscosity taking place during the process of digestion. Yields very reliable results.—*B.M.J.* ii./09,1058.

The electrical conductivity method is described. *L. i.*/09,968. During a tryptic digestion the rise of electrical conductivity of the digest is an accurate method of following the course of the reaction, and with it extremely small quantities of serum can be used.

Coley's Fluid.

Is prepared by cultivating the *Streptococcus* of erysipelas in bouillon ten days. *B. prodigiosus* is added, and the two are grown together for ten days. The culture is then killed at 80°C.

In Coley's experience of 500 cases had only three deaths.

Toxin treatment of inoperable cancer entitled to more careful consideration. *B. prodigiosus* has a curative effect on tumours, and intensifies the virulence of the toxins of erysipelas, hence a mixture of the toxins of this and the *streptococcus* employed.—*L. ii.*/09,173.

The method was founded on the occurrence of retrogression in, and disappearance of, inoperable sarcomata as a sequel to attacks of erysipelas. The results obtained with these toxins varied from failure to success. Six weeks to three months' treatment generally sufficient. 8 minim doses thrice weekly usually employed.—*B.M.J.* ii./09,144.

Tumour (? sarcoma) disappeared under 23 injections of Coley's Fluid.—*L. i.*/09,1456.

Results within the last two years, due to improved method of preparing the toxins, have been better than before—52 personal successes, and at least twice the number in the hands of others. Hopeless sufferers in the last stages of inoperable sarcoma show signs of improvement. Tumours steadily disappear. Restoration to life and health.—*Pr. Nov.* '09,589.

The Lister Institute now supplies 'New' Coley's Fluid (of red colour) in phials of 2 Cc. Dose— $\frac{1}{4}$ minim at first, diluted with sterile distilled water, gradually increased until a temperature of 102 to 104°F. is produced, injected into the tumour or elsewhere,

Cancer Serum, Doyen's.

Doyen claims cancer is associated with *Micrococcus neoformans*. Cultures are made from portions of tissues removed. Not to be regarded scientifically.—*B.M.J.* ii./08,1509.

For further methods of treatment of Cancer consult the Therapeutic Index.

Catarrh, Nasal and Tracheal.

The organisms responsible for acute nasal catarrh appear to be the *B. Septus*, *B. Influenza*, *B. Friedländer*, *Pneumococcus*, *M. Paratetragenus*, and *M. Catarrhalis*,—the last of these being the most common cause where tracheitis is the prominent symptom. The organism responsible should be determined, and as a general rule a "stock" Vaccine may be injected (50-75 million organisms), preferably in the evening,—the "negative phase" (p. 803, *et seq.*) is over in 12 to 18 hours. Chronic Nasal Catarrh is often due to *B. Friedländer*.

For treatment, if *B. Septus* is at work, and if sore throat is troublesome, a gargle or spray of Potassium Chlorate (2 to 5%) should be used.

Combined Vaccine for Colds (Allen—Wimpole Institute) is a special preparation, combining the prevalent organisms as above.

Ampoules for Hypodermic Use contain 75, 125, and 250 millions of organisms each respectively.

Initial dose.—The contents of 1 tube containing 75 millions of each organism, in acute attacks or 125 million in chronic colds.

If initial dose be 75 millions, a further 125 millions may be given 10 days later. 250 million after a further 14 days usually secures immunity for 3 to 4 months, when its repetition is advised.

This Vaccine is designed not only to hasten convalescence from an acute attack of "cold," being given when the sub-acute stage of thick mucous secretion has been entered upon, but also to secure immunity from future attacks. An injection every three months, combined with daily treatment of the nose with an Antiseptic douche, has secured complete immunity from colds in numerous subjects previously extremely prone to such attacks.

Friedländer's Bacillus Vaccine (Wimpole Inst.).

Ampoules for Hypodermic Use contain 125, 250, and 500 million organisms each respectively.

For use in treatment of nasal catarrh, alkaline antiseptic douches being used as adjuvants; should prove of benefit and prevent the recurrence of fresh attacks of "cold" so far as this organism is concerned. The Opsonic Index is usually above normal and between 1.2 and 1.4. The *initial dose* of the "Friedländer" vaccine is 75 to 125 millions. This will usually bring the Index up to 2.5 or over; improvement then ensues.

To be repeated or increased at 10 to 14 days' interval.

Uncomplicated chronic nasal catarrh is very often due to *B. Friedländer*, when the Eustachian tube and middle ear are involved to the *M. Catarrhalis*, when the antrum or sinuses are involved to the *pneumococcus* and *B. Influenzæ*.

Micrococcus Catarrhalis Vaccine. For use in tracheitis and bronchial catarrh, which are in many cases due to this organism.—L. ii./o8, 1661.

The *initial dose* of 50 millions may be increased if necessary to 125 millions in 7 to 10 days.

Where trachea and bronchi are badly affected 250 or 500 millions of this Vaccine often act in a marvellous way.—L. ii./o8, 1665.

Chronic tracheal catarrh is usually due to infection by this organism or *M. paratetragenus*, to which secondary infection by staphylococci, streptococci, pneumococci, and other organisms may be added.

Cultivation from the trachea show that Gram-staining *Cocci* are present in 78% of normal throats, and 68% of catarrhal throats. Experiments on the author of the paper tended to show that lack of food and clothing and excessive exercise did not predispose to taking cold—on the contrary, warmly clad and well fed he took cold later. Maximum Opsonic Index after digestion of the main meal and after day's exercise. The organisms may be present in a certain number of cases, showing no pathological features; increase of virulence and lowered resistance of the tissues may then light them up into activity. Each organism produces its own type of cold. Multiple infection also to be considered.—R. W. Allen, L. ii./o8, 1589, 1594, 1956.

Fifty cases of "common cold" in the epidemic raging at the end of 1908 showed 90% to have been due to *pneumococcus*, either alone or complicated by *M. Catarrhalis* or *M. paratetragenus*, or both. Dose or pneumococcus vaccine, not to exceed 50 million for a first injection may be combined with 50-75 million of *M. Catarrhalis* or *M. paratetragenus*. Ten days later a double dose.—R. W. Allen, L. i./o9, 500.

M. Catarrhalis is well known as a cause of common colds and the more serious influenza, bronchitis, and pneumonia. Causes very irritable cough with scanty viscid expectoration. It grows best on blood agar, and produces no acid in glucose broth.—Distinction from *M. paratetragenus*, a coccus of variable size widely observed in epidemics during previous two winters. *B. Septus* causes a mild pharyngitis with painful throat, muscular pain, with, however, no temperature and little or no nasal catarrh,—probably a common cause of stiff neck and muscular rheumatism. *B. Friedländer* occurs in many acute and chronic colds,—cause of very profuse coryza.—Benham, B.M.J. ii./09, 534.

M. Catarrhalis and *M. paratetragenus* appeared to be the causal factors principally in colds in the winters 1907-8 and 1908-9. Characters of both described in detail. Results with Vaccines confirm those of R. W. Allen.—B.M.J. ii./09, 1338.

Vaccines by the mouth.—These Cold (and other) Vaccines are occasionally ordered to be taken *by the mouth* on an empty stomach.—Recent work by Latham and Spitta showed that equally good results can be obtained by this means as by injection.

Vaccines were given by this method to H.M. the late King Edward VII. *vide* Daily Press, May 13/10.

Queen Alexandra (Daily Press May 24, 1910) stated that the late King had never felt better in health and spirits than after the treatment which had been given to prevent his contracting influenza or pneumonia—it kept him in excellent health for 15 months.

The procedure is *subjudice*. Cf. Tuberculin, pp. 797, 800.

Cerebro-Spinal Fever, or Cerebro-Spinal Meningitis. *Syn.* Malignant Purpuric Fever, Petechial Fever, Spotted Fever. This disease recently attracted considerable attention in New York, where it was responsible for great mortality. A diplococcus, evidently *Diplococcus intracellularis meningitidis* (Weichselbaum), has been isolated from the cerebro-spinal fluid, and from the brain membrane, and the purulent exudate. It has been found in the nose in coryza and in rhinitic and otic discharges, and so it may be advantageous to resort to periodical ablutions of the nasal and buccal passages of the sick and their attendants. The organism resembles the gonococcus in its shape, in being intracellular, and in its non-staining by Gram's method, but has been cultivated without the presence of albumen, this marking it off sharply from the coccus of gonorrhœa.

It is an acute epidemic disease, characterised by profound disturbance of the central nervous system, indicated at the onset chiefly by shivering, intense headache or vertigo, or both, and persistent vomiting; subsequently by delirium, often violent, alternating with somnolence or a state of apathy or stupor; an acutely painful condition with spasm—sometimes tetanoid—of certain groups of muscles, especially the posterior muscles of the neck, occasioning retraction of the head, and an increased sensitiveness of the surface of the body. Throughout the disease there is marked depression of the vital powers; not unfrequently collapse; and in its course an eruption of vesicles, petechial, or purpuric spots, or mottling of the skin, is apt to occur. If the disease tend to recovery, the symptoms gradually subside without any critical phenomena, and convalescence is protracted; if to a fatal termination, death is almost invariably preceded by coma. After death the enveloping membranes of the brain and spinal cord are found in a morbid state, of which the most notable signs are engorgement of the blood vessels, usually excessive, and an effusion of sero-purulent matter into the meshes of the pia mater and beneath the arachnoid.

The organism is best grown on **Nasgar Medium**. *C.f.* p. 902. 'Chapasgar' as cultivation medium. Ascitic Fluid 1 part to 2 parts of 3% Agar. The ascitic fluid is heated to 55° C. and mixed with Chapoteaut's Peptone, quantity not stated. The organism is Gram-negative in tissues, and Gram-variable in cultures.—L. ii./08,472.

The name 'Spotted Fever' given to this disease is a misnomer, as the spots are by no means constantly in evidence.—M.A. 1906,557.

Treatment may be by Antipyrin, Phenacetin, and Opium.

Hydrotherapy in the form of the tub bath @ 98° is recommended by Aufrecht. All cases bear stimulants well.

A paper on cerebro-spinal meningitis in the Northern Territories of the Gold Coast. No drug seems to have any specific effect. Calomel and a counter-irritant in the form of Liquor Iodi or Liquor Epispasticus over the cervical spine gives some relief to the headache. Cardiac tonics advisable, Phenacetin and Caffeine if temperature unduly high. Chlorodyne gives great relief. Spinal puncture and removal of as much fluid as will pass away gives relief. Further points on diagnosis are given. Steps and precautions to prevent spread of outbreaks.—L. ii./08,1218.

Numerous recoveries with Wassermann's Serum.—L. i./09,1080.

Repeated lumbar puncture and injections of Lysol or one of the Silver Salts, or even permanent drainage of the spinal canal, recommended as therapeutic measure.—L. i./07,874.

1% Lysol Solution used, cure resulted.—L. ii./08,478.

Gordon's Memorandum on cerebro-spinal meningitis to the L.G.B. Characters of the *Meningococcus* detailed. It will not grow at a temperature below 25° C. No soluble toxin found in cultures, therefore probably intracellular. *M. Catarrhalis* likely to be confused with it.—L. i./07,598.

Opsonic Index determinations were conducted in 8 cases at Great Ormond Street Hospital by Wright's method, the emulsion being made from cultures on blood serum. A high index indicates presence of the disease, but a normal index does not negative its presence.—L. ii./07,16,704.

A vaccine was found of value.—L. ii./07,220.

Simon Flexner's Official Report on the epidemic.—B.M.J. ii./06,1023.

A case of influenzal meningitis. Pfeiffer's organism (the influenza bacillus) obtained from fluid.—L. i./07,87.

Two clinical types of the meningococcus distinguishable by cultural, agglutinative, phagocytic and clinical characters.—L. ii./08,728.

Introduction by spinal injection of a highly immune Serum obtained from the blood of patients recovered from the disease injected with their own serum taken on the sixth or seventh day of illness has been used as curative agent. Suggested use similarly in trypanosomiasis.—B.M.J. i./09,1177.

Heterologous agglutinins, in particular those present in the blood serum of cerebro-spinal fever and typhus fever. The presence of these points to caution necessary in stating that 'a certain micro-organism is actually infecting an individual, even though it is found in his alimentary canal, and there are specifically absorbable agglutinins for it in his blood serum.'—B.M.J. ii./09,866.

Discussion on (B.M.A. Meeting). Meningitis due to Weichselbaum's Coccus, the causal agent of epidemic cerebro-spinal meningitis. Other forms of meningitis due to other bacteria. Diagnosis. Points of difference between Weichselbaum's Coccus and Still's Diplococcus. Serum (*vide infra*) would ultimately be as useful as that of diphtheria. Flexner's Serum to be used intra-spinally, subcutaneously useless. Still's organism thought to be only a variation. B.M.J. ii./08,1334.

Anti-meningococcus Serum is supplied in 10 and 25 Cc. vials.

Dose.—10 Cc. repeated once or twice within a few days. If very severe 30 Cc. or more should be given every day for 3 days. Stated to ward off the relapses.

Quite recently good results have been obtained with Flexner and Jobling's Antimeningitis Serum. In preparation of this a horse is inoculated with cultures of diplococcus in the usual manner for serum making.

Intra-spinal injection is made under chloroform. A rigid and comparatively large trocar is used. After puncture as much fluid as will do so is allowed to run out. If the amount of fluid is not great it can often be increased by raising the patient's head and shoulders.

Dosage.—If the case is very severe, and especially if pus is found in the fluid obtained by lumbar puncture, 30 Cc. or larger doses to be given every day for

three days; (in one case 70 Cc. were injected within 20 hours after admission, with apparently good results). In cases not so urgent better not repeat the injection until after 48 hours. In this way only can the effect of the smaller dose be estimated, as the full effect of a single injection is not always apparent until after 48 hours, or longer. Sometimes a single injection of 30 Cc. is valuable. The largest amount yet given in a single case has been 210 Cc. intra-spinally. No undesirable symptoms follow the use of the serum. Injected hypodermically the serum did not produce any marked effect.

The course of cerebro-spinal fever is distinctly modified by the injection. It is predicted that the disease will, like diphtheria, be one of the most certainly controlled by treatment.—B.M.J. i./08,382.

Percentage of deaths after use. The Serum appears to shorten the disease. Large doses (25 to 40 Cc. desirable), and repeat daily. Results in America good.—L. i./09,910.

For full consideration of the subject see B.M.A. Discussion.—B.M.J. ii./08,1334; L. ii./08,472 *et seq.*

Flexner's Serum mortality 42·3% in treated cases, otherwise treated 80·5% mortality. L. ii./08,1618.

★**Pyocyanase.**—A ferment prepared from *B. Pyocyanus* has been used in an influenza epidemic apparently caused by the *Meningococcus*. One to 3 Cc. of the fluid is to be sprayed into the nasal cavities.—Wien Klin. Woch, June 21, 1906.

Septic inflammation of the throat (in diphtheria) cured in a short time with.—Muench. Klin. Woch.—Ex. C.D. ii./07,923.

Amongst the ferments of which it is composed is a germicide not only fatal to the bacterium itself, but also to many other species. Its germicidal action is stated to be remarkable. It has been employed in diphtheria, scarlet fever, nasal catarrh, mouth diseases and so on.—L. ii./09,1678.

It forms a green fluorescent sterile liquid. It has marked bactericidal properties *in vitro*. It is stated to have certain advantages over chemical disinfecting agents. It has been specially put forward for use locally in diphtheria.

Diphtheria treated by pyocyanase.—L. i./09,560.

Pyæmia due to *B. pyocyanus* successfully treated by a vaccine from patient's organism. Initial dose 40 millions followed by 60 millions at 8 days, with 100 millions 10 days later, and 100 millions two succeeding fortnights,—a striking example of potency of vaccine therapy. Gravity of *B. pyocyanus* infection apt to be disregarded.—B.M.J. i./09,1169.

Still's *Diplococcus* resembles the *Diplococcus intracellularis meningitidis*, probably only an attenuated form.

For an abstract of a lengthy monograph on this disease see L. i./06,1200. An account of the Weichselbaum *Diplococcus*.—L. i./06,1248; *vide also* B.M.J. i./05,989; L. i./07,582.

Cholera.

This disease is marked by the presence of the *Spirillum cholerae*. The prophylactic vaccines of Haffkine have been used with success in India. They are—

(1) weak, (2) strong, by employing a growth of the spirillum the virulence of which has been increased by growth in the peritoneal cavity of guinea-pigs. The dose of these preparations is 1 Cc. The second is injected 3 to 5 days after the first (the weak) one.

Haffkine's inoculation has been used with fairly encouraging results.—Brooke, 106.

The disadvantage of Haffkine's preparation is that it has to be prepared freshly,—the immunity, by reason of the living Vaccine being used, is prolonged.—L. ii./07,113.

Six vibrios of.—B.M.J. i./07,735. For further references *vide* XIIIth Edition. p. 839.

Anti-Cholera Vaccine (Kolle) is supplied in 1 and 5 Cc. vials. Dose.—1 Cc. A standardised emulsion of the killed bacilli with 0·5% Phenol. Some malaise and fever may result on injection; a second dose to be given after ten days. Macfadyen has produced an anti-serum, employing goats.—B.M.J. i./06,507.

Cold Vaccine. See Catarrh.

Anti-Colon Bacillus Serum. Dose.—10 Cc. or more. Is pre-

pared from horses which have been immunised against a number of types of *B. coli* principally from cases of peritonitis and puerperal fever. Supplied in 25 and 50 Cc. vials.

The action of this serum is chiefly bactericidal, though also possessed of antitoxic properties.—L. i./06,71.

In acute coli infection of the kidney Dudgeon advises 25 Cc. of the Serum daily for three days, combined with Calcium Lactate to avoid rashes, joint pains, etc., better in his opinion than vaccines.—Pr. Mar. '09,352.

Investigations on coli and the pneumococci have shown conclusively that these micro-organisms vary in each host; and that probably there are many species which exhibit the same microscopical and cultural appearances. This goes far to explain the failures in the attempt to cure with anti-pneumococcal sera.—A. B. Harris, Pr. /09,648.

Colon Bacillus Vaccine (Wimpole Inst.) is used in the treatment of post-surgical suppuration in abdominal cases, such as sinuses which refuse to heal after operations upon the appendix, gall bladder, kidney, or intestines; also in bacilluria complicating tubercular cystitis, and in endometritis. Initial doses of 10 to 25 million organisms may be repeated at intervals of 7-10 days, and may be gradually increased till 500 millions are being given. If the doses employed cause any disturbance of the general conditions as evidenced by rigors or rise of temperature this must be taken as indication for diminished subsequent dosage.

Discharging sinuses should, if possible, be kept open, as closing is likely to result in rigors and severe constitutional disturbance.

Ampoules, for Hypodermic use, contain respectively 25, 50, 100, 250 and 500 million organisms.

The urine though apparently clear when passed, may of course, be teeming with colon bacilli. Colon bacillus cystitis satisfactorily treated by vaccination.—Lockwood; B.M.J. ii./07,495.

In colitis, experience with, marked benefit.—L. i./09,394.

A case of bacillary infection of the urinary tract treated by the corresponding Anti-colon serum and vaccine after antistreptococcic serum had been found useless.—L. i./09,1681.

The urine may be employed for isolating the organism, and thence preparing Vaccine—some cases reported. It is, however, not necessary to rush to Vaccine Therapy in mild cases, and in any event, even in severe cases usual treatment,—evacuatory, antiseptic (Creosote) Lactic Acid Bacilli and Alkalis should be proceeded with.—L. ii./09,1269.

Remarkable case of recovery. Cystitis, double pyelitis, vomiting and rapid pulse, high temperature, etc. *B. Coli* isolated from the urine and vaccine prepared. 530 and 250 millions successively at intervals. Immediately after first dose improvement set in. Uninterrupted recovery.—L.i./09,1587.

A case of a patient who previously had enteric. *B. Coli* and *Staphylococcus alb.* isolated from urine, and Vaccines prepared. Other similar cases.—*Ibid.*

A case of right ascending pyelitis due to the colon bacillus well treated by 60-300 millions every 10-14 days. Complete success after giving Alkalis and an antigluco-suric diet.—L.ii./09,386.

B. Coli infections of the bladder best treated. 5 to 30 millions used

systematically caused the cystitis to disappear often long before the bacilli have vanished from the urine.—Pr. /09,658.

B. Coli infection of the kidney, if long standing, not satisfactorily treated with Vaccine. Surgical treatment necessary, and will do well if high index maintained.—Pr. /09,658.

Diphtheria Antitoxin. Serum Antidiphthericum. P.G., U.S., F.E.

That of P. Belg. must be marked with the name of the maker, date, and rotation number, also the number of units per Cc. in the vial. Keep in the dark in a cool place. P. Helv. not less than 200 units per Cc. P. Jap. has to be labelled with data similar to that in P. Belg. Must be sterile:—(A) *Serum Antidiphthericum Liquidum* should possess not less than 500 units (Behring and Ehrlich) in 1 Cc. Three classes—No. 1 contains 600 antitoxic units; No. 2, 1,000 a. units; No. 3, 1,500 units. Injected subcutaneously, 0·5 Cc. should not kill a mouse of 15 Gm. weight, nor should 10 Cc. be fatal to a guinea-pig. (B) *Serum Antidiphthericum Siccum* 1 Gm. represents at least 5,000 antitoxic units.

Preparation of Diphtheria Antitoxin.

Consists of the fluid separated from coagulated blood of the horse immunised by inoculation with diphtheric toxin, produced by the filtered culture of the *Bacillus diphtherie* in broth—a surface growth is important. Repeated injections during 4 to 6 months of increasing quantities of toxin up to as much as $\frac{1}{2}$ or 1 litre render the serum of a high antitoxic quality. When the horse's serum reaches the stage at which this combined injection into a guinea-pig of serum *plus* a dose of toxin leads to no symptoms of diphtheria, it is considered to have attained the required potency. The horse is bled about 10 days after the last injection, and the serum prepared for use as a remedy, and as a prophylactic.

This serum combats the disease in the human subject.

The dose of diphtheria antitoxin at present is considered to be at least 1,500 units, 2,000 units may safely be injected whether in the case of child or adult, frequently much more is injected. For prophylactic purposes 500 or 1,000 units may be administered. The immunity caused is claimed to last for 3 weeks. It may be warmed by standing in water at 40° C. for 10 minutes before injection. Avoid injecting air. Give the dose at once without waiting bacteriological diagnosis. Use a sterile glass syringe with small needle. Cleanse skin with ether soap and inject in the flank or between the scapulae.

Lister Inst. says the amount required as initial dose increases with the lapse of time from onset to the time of the injection. If not treated until the second day give 4,000 to 8,000. If untreated till the third day 8,000 to 12,000 units.

U.S. has average dose, 3,000 units. Immunising dose for healthy persons, 500 units.

F.E. requires a minimum content of 200 Ehrlich's units per Cc., i.e., 1 Cc. shall be capable of neutralising 20,000 lethal doses of fresh diphtheritic toxin. According to this Pharmacopœia the *minimum* immunising power must be 100,000 units.

Units of Immunity.

The Ehrlich-Behring Unit refers to the toxin neutralising power of serum, not to the volume of the liquid. A normal serum is prepared for comparative purposes; 1 Cc. of this contains 1 unit of immunity, and 0·1 Cc. of it neutralises 1 Cc. of normal standard toxin.

The strength of sera is ascertained by physiological tests on guinea-pigs weighing, as near as possible, 250 Gm., using mixtures of different quantities of the serum, and a lethal test dose of standardised toxin. The neutralising point is indicated by the animal's death being prevented on the fourth day.—For further details consult Hewlett, P.J.H. 04,377.

Preservation.—The serum retains its activity for 10 months if kept in cool and dark place.

In addition to the liquid sera, **Dried Serum** (F.E.) in amber coloured scales is manufactured by evaporation at a temperature not exceeding 40° C., or by means of Sulphuric Acid *in vacuo*. This is more suitable for export. The scales are dissolved in sterilised water. It is not soluble in hot water (above 50° C.) nor in alcohol. The directions given by each maker should be followed.

By injecting intravenously the toxin circulating in the blood is said to be more effectually and rapidly neutralised.

For this method either complete anaesthesia or cocaine anaesthesia is necessary. The vessel must be isolated, incised, and the blunt needle introduced, and tied in position, and the antitoxin, warmed to body temperature, slowly injected. Ligature either side of the incision if any sign of bleeding; due care must be taken to avoid introducing air bubbles.—Bosanquet.

As higher potencies are now used, and the quantity of serum injected is therefore less, rashes, pain and swelling which sometimes result, are less frequent. Calcium chloride is said to relieve the rash, pain, &c.—Hewlett.

References.

The earliest report of the use of the antitoxic serum is found in the Deut. Med. Woch. of April 27, 1893; this is noted in B.M.J.E.i./93,83. Behring and Kossel were the investigators; they give notes of 30 cases of diphtheria, so treated, of which 24 recovered, or 80%.

First English reported case by Eastes, 5 Cc. of Aronson's preparation in a child of 10 years, with recovery.—B.M.J.ii./94,125. Second,—p. 180.

Post-diphtheritic paralysis is said to have been on the increase since introduction of antitoxin treatment, but this is not *propter hoc*. Antitoxin has, on the contrary, some power in restraining. Does not, however, neutralise the toxic material causing paralysis.—Bosanquet.

Recommended use for diphtheritic ophthalmia.—L.i. 96,712; B.M.J.E.ii./96, 35,83; L.i./97,1606.

Diphtheria attacked a wound and produced death by systemic poisoning.—L.i./05,1130.

In nasal diphtheria, large doses of antitoxin are called for.—Bosanquet, p. 98.

Saline injection as an adjuvant.—L.ii./01,1131.

Sudden death may follow injections.—B.M.J.i./02,1025.

Diphtheria bacilli found in suppuration of the scalp, also in vulvitis and in the pus in empyema, also in the pus from a breast abscess.—B.M.J.ii./07,493.

Diphtheria of the skin—the primary seat of infection being the eyes—thence to the vulva and the lower part of the face, satisfactorily treated with antitoxin.—L.i./08,15.

Hypersensitiveness to 1,000 units injected for prophylaxis.—B.M.J.i./08,147,925.

A case in which 3,000 units of Serum were injected, and in less than 10 minutes patient's eyelids began to swell, involving the whole in less than an hour. Lips thickened and the whole body was covered with an urticarial eruption. 20 grain doses of Calcium Chloride every 2 hours—swelling disappeared in 14 days.—B.M.J.ii./09,95.

Untoward results (Leader) following antitoxin.—L.ii./08,749.

Should be administered with great caution to asthmatic patients, even as prophylactic.—B.M.J.ii./09,356.

Epidemiology of diphtheria—diphtheritis is exceedingly common amongst pigeons—seem to be an important factor in the spreading of the disease.—L.i./08,1143.

Diphtheritic conjunctivitis treated by Behring's Antitoxic Diphtheritic Serum is an established method. If not influenced probably due to treatment having been begun too late, or that a mixed infection is present.—Axenfeld, B.M.J.ii./08,737.

1,550 cases of diphtheria—78 of which (5%) were hæmorrhagic—treated with high doses of Antitoxin. As a rule not more than 1 injection daily,—the maximum at one time rarely exceeding 24,000 units. Subcutaneously preferred. Adreualin given internally.—M.P. Oct. 1309,390.
Oral and Rectal Use of Antitoxin.

Should *not* be given *per anum* or *per os*.—Hewlett, Lecture on Antitoxins, P.J.ii./04,888, Faith in oral administration.—B.M.J.i./06,379. Doubt as to conclusions to be drawn.—B.M.J.i./06,738.

Antistreptococcic Serum in diphtheria is as efficacious given per rectum as hypodermically.—B.M.J.i./07,20.

In local tuberculous diseases and in several cases of phthisis stated to have proved of value.—B.M.J. i./07,20.

In quinsy or bad scarlet fever throats,—per rectum useful.—L.i./09,1636.
Roux's Serum in many medical and surgical cases for which no specific serum has yet been obtained, may benefit. A suggested corollary to Pasteur's Law of Specificity of Serums.—L.i./09,727.

Cupric Ionisation, *vide* Iontophoresis has been employed in a case of local chronic diphtheria of the ears.—B.M.J.ii./09,519.

Bandi's Bivalent Serum used as swabbing in diphtheria.—B.M.J.E.ii./08,95.

Latent diphtheria treated by Vaccines. Petruschky of Dantzic has used injections of cultures mixed with Normal Saline (1 to 100) with good result. The injections were from 0.1 to 0.5 Cc. of the dilution.—B.M.J.ii./09,519.

Boils and septic conditions in young children have been well treated by Diphtheritic Serum. Specific characters of Sera doubted, effect thought to be due possibly to a by product,—a nuclein derivative,—in the serum. Asthma has also been benefited,—dose given 1,000 units repeated at intervals.—Aikman, Guernsey.—B.M.J.ii./09,1016.

Dysentery.

Preliminary experiments on the production of an antitoxin to cure dysentery.—B.M.J.E.ii./01,36; B.M.J. ii./03,1456.

The Lister Institute supplies anti-dysentery serum consisting of the serum of horses which have been immunised against the dysentery bacillus (Shiga, Kruse, Flexner, Duval, etc. types), and the toxic substances elaborated by the bacillus. It is preserved with Phenol 0.3% in 20 Cc. vials.

Dose.—Preventive 20 Cc. subcutaneously; curative from 20 Cc. upwards subcutaneously according to severity. For a grave case 50 Cc. In very grave 80–100 Cc. For a child half these doses. Intravenously not more than 50 Cc. at one time. Stools are stated to return to normal rapidly in successful cases, but treatment to be continued. Pains and temporary rashes may result which need, however, not alarm.

The Serum treatment has lately been more extensively tried, but results are on the whole not convincing. Serum used in three cases with best results.—B.M.J.i./06,680.

In ulcerative colitis, the Serum, which is bactericidal and antitoxic is advised. As much as 80 Cc. given in a chronic case in which recovery ensued, but there was much other treatment.—B.M.J.i./09,769.

Dysenteric Vaccine. For use in acute and chronic dysentery. Should not be given in acute cases between the 4th and 21st day. Interval between doses, which should be progressively increased,—14 days.

Production of immunity against Dysentery Toxin. Bacterial Toxins, *e.g.*, that of dysentery, slowly lose their toxicity in presence of pepsin. Repeated injection of bacillary emulsion so digested confers a very high degree of immunity. A rabbit which had received 3 injections, received seven days after the last, 20 times the minimum fatal dose of untreated emulsion, without any

symptoms whatever. Immunity is produced rapidly,—in six days animals are immune to 6 times the fatal dose. The method is painless, the animals are not ill and the process is innocuous.—Ruffer. B.M.J.ii./o8,1176.

Two cases of chronic dysentery treated with Forster's anti-dysenteric vaccine.—L.i./o8,1410.

Gonorrhœa. In gonorrhœa the **Opsonic Index** is usually 0·6 to 0·7 for the first few days followed by a rise : in chronic cases it is as low as 0·4, continuing subnormal or in some cases it is normal or above, *e.g.*, 2 to 2·5. The estimation of the Index is of great value in determining whether a case is 'cleared up.'

Gonococcal Vaccine (Wimpo'e Institute).—Ampoules, Hypodermic are supplied containing 10, 25, 50, 75, 125, 250, 500 and 1000 million Cocci respectively.

In preparing the Vaccine, cultures are taken from cases suffering from a severe first attack only, which has been untreated by anti-septics.

Dose.—The routine vaccine treatment of acute gonorrhœa is an injection of 25 to 50 million organisms as soon as the discharge begins to decrease. A series of injections is stated to usually free any case of chronic gleet from the gonococcus although it may not succeed in checking the discharge entirely in all cases owing to persistence of secondary infections. Gonorrhœal rheumatism and conjunctivitis are also benefited.

Initial doses of 25 million organisms may be repeated at intervals of 10 to 14 days, and gradually increased until a maximum dose of 500 million organisms has been attained. The discharge often increases during the negative phase for the first day or two,—but should rapidly diminish.

A series of injections will certainly free any case of chronic gleet from gonococcal infection, although it will not, of course, affect any secondary infections which may suffice to maintain a slight discharge.—R.W.Allen.

These latter cases receive considerable benefit from the injection into the urethra night and morning of an ounce of a liquid culture of Lactic Acid Bacilli, *e.g.*, Trilactine Special for Injection. *q.v.*

Fifteen cases of gonorrhœal rheumatism treated by Vaccines with Opsonic Index estimations. Strength of the Vaccine was usually 600 millions. If Opsonic Index below normal initial dose of 300 million gradually increased to 1,000 million.—B.M.J.E. i./o8,4.

Injection of the devitalised Cocci of value, particularly in chronic cases. No harm has been seen to follow the injections. **Dose.**—100 million organisms, and later 1,000 million. Intervals between injections varied from 3 to 7 days. The most constant feature in reaction is the increase in joint pain and tenderness—B.M.J.E. ii./o8,8.

In chronic cases Vaccine treatment appeared to give better results than by any other means.—B.M.J. i./10,508.

Descriptive article on treatment of gonorrhœa with Vaccines.—Summary.—L. ii./o9,80.

Appropriate doses may only give rise to slight headache and malaise some hours after the injection. Commenced with small doses 40–50 million cocci. 0·5 to 2 Cc. of Lister Inst., product employed with promising results.—B.M.J. i./o9,531.

Gonorrhœa should be treated by Vaccine when the acute stage begins to subside,—dose 75 million. After 10 days double the dose. Cases which have gone on some time resist vaccine treatment,—the urethra having become the seat of secondary infection, *e.g.*, with *Staphylococcus Albus* and *Staphylococcus citreus*. Special Vaccines made from such discharge are often useful.—M.P. Nov. 17, '09, p. 520.

A case in which a woman had suffered from multiple arthritis (had

been regarded as osteo-arthritis) quickly cured by doses of 5 to 10 million, —though the gonococcus was not isolated from the vaginal discharge the Opsonic Index to this organism was 4.0. Another patient with same affection; the gonococcus isolated. Treatment as above with excellent results.—L. i./09. 1587.

Anti-Gonococcus Serum.

Dose.—20 Cc. Is supplied in 25 and 50 Cc. vials; is really a polyvalent anti-streptococcic serum.

Results in gonorrhœa. The normal dose of 20 Cc. was doubled.—L. i./06, 1244. Some cases of severe gonorrhœal rheumatism treated, with recovery.—L. ii./07, 1179.

Influenza.

Influenza Bacillus Vaccine (Wimpole Inst.)

This Vaccine is of service in cases infected by this organism: it must, however, be remembered that the infection is frequently a mixed one, and that the other organisms will not be influenced by its use. In cases of slow convalescence from true influenzal cold or influenzal pneumonia initial doses of 50-100 millions are to be advised and may be repeated or increased at intervals of 7 to 10 days. In cases of systemic infection by this bacillus an initial dose of 10 millions may be repeated or increased at each marked rise in temperature or at intervals of 2 to 3 days. In chronic influenza dosage of 1,000 millions may be necessary to effect a cure. For *B. Influenzæ* v. p. 903.

Leprosy.

Hansen's Bacillus.—The specific organism of Leprosy cannot invariably be cultivated outside the human body. The way in which contagion is effected from one being to another has not been conclusively proved.—Ann. Med.—L. ii/09, 1885.

Deycke has, however, recently cultivated, he states, if not the lepra bacillus itself at all events an organism closely allied. From this he has extracted the fatty principle *Nastin g.v.*

The presence of *B. lepræ* in the mosquito (*Culex pungens*) and in the bed bug (*Cimex lectularia*) has been shown.—L. i./06, 1347.

An Albuminoid Metabolic product (chemically altered) of a bacillus, apparently *B. Subtilis*, obtained from decomposing bran-mash gave remarkable results in leprosy. An oxidising agent is necessary in the preparation and growth of the bacillus. This is best supplied by Tannic Acid. The Albumin must be from the vegetable kingdom. The Lactic Acid Bacillus should also be in evidence. The Mash Malt is previously saccharified. The optimum temperature of incubation is 120 to 126° F. Also suggested in tuberculosis and cancer.—L. i./07, 1006, 1081.

Bacteriology and pathological anatomy of leprosy. An account of knowledge of the disease to date (Second International Congress). Importance of recognising possible association of leprosy with other diseases, e.g., tuberculosis in the same individual at the same time.—J. M. H. McLeod.—L. ii./09, 515.

A thorough disinfection of the nose is one of the first essentials in treatment. For this purpose a solution of Ammonium Persulphate 3.7% and Hydrochloride Acid 1% in water was valuable. Inhalation of the fumes of burning Sulphur has also been employed.

For recent cultural methods and staining reactions of the bacillus consult "Therapist," June 15/09.

Malaria (cf. also p. 904).

To combat malaria in India and other places where it is prevalent it is necessary:—

(1) To improve the surface drainage and prevent the formation of puddles where the larvæ can breed, also to remove the vegetation surrounding such, and for the wealthy to do away with or cleanse weekly the ornamental waters in their gardens. Smoke is a wonderful protector against malaria, and it is customary in certain parts to burn dung and such-like during the night in huts and stables.

It has been found that formaldehyde vaporised from tablets of Paraform is of little avail to kill mosquitoes in a room—probably Sulphur Dioxide would do more, or

nitrous fumes made by action of Nitric Acid on copper, or even a little Nitric or Sulphuric Acid strongly heated in the sealed room—destructible fabrics being removed—would be more successful.

(2) Protection by means of wire gauze.

(3) Distribution of quinine (quinine is distributed gratis by the country pharmacists to the poor in Italy).

The young *Culex* larvæ have been proved to survive desiccation for several months. Certain of the adult culices (*Culex impellans*) appear to prefer to attack birds rather than human beings, the avian blood being recognisable on dissection of the insect.

It is a remarkable fact that so far inoculation experiments on all animals excepting man have proved unsuccessful, and in the case of man the inoculation should be intravenous. Experimenters have found, however, that malaria can be produced by allowing infected mosquitoes to bite healthy individuals.

The *Anopheles* larvæ are easily found in the winter in sun-exposed, grass-surrounded pools in the infected districts in India.

The method of killing the larvæ, and, indeed, all other water insects, beetles, &c., is to pour common kerosene on to the surface with the aid of a sprinkling water-can. This forms a scum, which prevents the larvæ from breathing the atmospheric air. They die and sink to the bottom, or are washed up on to the banks in countless numbers. Thirty pounds of oil, costing perhaps 2s. in India, will cover at least 2,000 square yards of water; the dose of paraffin should be repeated about 20 times during the year.

Rice cultivation with the necessary stagnant water is no small source of increase of malarial disease.

Major Ronald Ross, in a recent address, states that in spite of all ascertained facts *re* malaria, in spite of the parasite having been cultivated in the insects over and over again, in spite of the infection having been produced experimentally in men and birds by their bites, &c., &c., not one in 20, even in malarial districts, believes the theory. Extirpation of mosquitoes in tropical countries needs Government action.

There remain a few difficulties to settle in the mosquito theory, *e.g.*, how it comes about that the proportion of infected mosquitoes reported in a certain district was only 1·6%, whereas the percentage of natives suffering from the disease was as high as 48·5%. Again, large tracts of land in Erythrea have no human inhabitants. It is possible to contract malaria by sleeping there in the open for a single night; how does the insect causing that infection (which it undoubtedly does) become infected?

Ross on Malaria in Bœotia, Greece:—

Adult natives of a malarious district become comparatively immune. It is necessary to examine the children. Out of the selected children to the number of 292, in five different parts, 97 showed evidence of malaria, *i.e.*, one-third. The *Anophelines*—the larvæ of *myzomia maculipennis*—were found in the pools. These small surface pools have to be, and are being, removed to rid the land of the scourge.—L. ii./06,1386.

Malaria modifies the effects of drugs, *e.g.*, Belladonna cannot be given to a person impregnated with malarial toxins.—C.D. i./06,205.

Prophylactic treatment by 15 grains of Quinine per week. In the prisons in the Punjab where this was carried out only about 10% took malaria during an epidemic as against 90% of the free population who did not receive it.

Take Quinine systematically and one is absolutely malaria proof. L. i./09,1568. *Vide* Quinine Acid Hydrochloride.

Occurrence of malaria without the agency of *Anophelines*. Outbreak in Picard Island in the Seychelles, *Anophelines* were searched for, but were not found. Up to the present no other mosquito has been shown to be an efficient host for the malaria parasite. Possibly *Culex* or *Stegomyia*, which were present, may in certain circumstances act as carriers, but on the other hand the *Anophelines* may have been borne by ship.—L. ii./09,237; B.M.J. ii.09,99.

Attempts to exterminate malaria-bearing mosquitoes at Mian Mir in India failed.—L. ii./09,428.

Conference at Simla.—L. ii./09,1231,1470. Malarial fevers ordinarily claim one million deaths annually. Recommendations: Scientific Investigation Committee to be appointed; practical measures, extirpation of Anopheles, distribution of Quinine, etc.

The decadence of Greece due to malaria and its consequences.—B.M.J. ii./09,1349.

Recurrence of malaria after 7 years, application of bacteriological methods concerning immunity to protozoa useless.—B.M.J. ii./09,769.

J. Cantlie relates that Quinine, Calomel and Salicylate had no effect on malarial fever and neuritis, whilst a change of air and exercise effected cure. Advice as to climate for malarial sufferers.—B.M.J. ii./09,769.

Malaria, latent, indicated by Urobilin, *cf.* p. 864.—B.M.J. ii./08,1357.

Mediterranean Fever. *Syn.* Malta Fever.

Mediterranean fever is treated chiefly with intestinal disinfectants—benzonaphthol, salol, urotropine, &c. The fever is almost completely wiped out from the Army and Navy by restrictions on goat's milk. (A very large proportion of the goats in Malta are constantly passing *M. Melitensis* in their milk.) If the civil population were sufficiently enlightened to follow suit, there would probably be an end to the disease. Boiling the milk is all that is necessary, and the ortol and peroxide of hydrogen test is becoming popular as a means of proving that this is done where servants cannot be trusted.—Ph. Notes.

The fever is characterised by long irregular pyrexia, frequent relapses, rheumatic complications, constipation, with no ulceration of Peyer's patches. Incubation period 6 to 9 days. Temp. may be 106°, fatal 110°F.—Gould.—B.M.J. i./06,999. Incubation period of.—B.M.J. i./06,975.

Opsonic Index determinations, assisted in diagnosis a case of.—M.P. May 1/07,484
History of the combat with Malta fever. In 1880 Bruce found in the spleen of fatal cases of Malta fever the *M. Melitensis*, and by inoculating this into monkeys proved it to be the cause of the disease. Twenty years afterwards the fever was stopped, and no further diagnosis methods (by Widal's reaction) required.—L. i./09,1238.

Agglutination tests with emulsion of *M. Melitensis*.—B.M.J. i./06,976.

Malta Fever Vaccine has been prepared. Dose $\frac{1}{16}$ square centimetre culture at 7 to 14 days repetition. Marked results in two cases.

Important points in treatment are rest and warmth. A slight walk has been known to produce a marked negative phase, and a chill may cause a sudden drop in the index.—Pr.,/09,660.

Mallein.—A growth of the glanders bacillus in glycerinated broth. This vaccine is used as a test for the presence of glanders in sick horses, and has been injected for the cure of chronic glanders in man. The Mallein of the Lister Inst. for animals is injected in dose of 1 Cc. for diagnostic use subcutaneously in the neck over vertebrae about midway between jaw and shoulder; complete reaction is a rise in temperature of 27° F. after 12 to 20 hours and an extensive hot and painful local swelling.

The temperature reaction is unreliable in all cases in which the temperature at time of inoculation is 2.5° F. above normal. In such cases, if there are any suspicious clinical signs to assist, reliance may be placed on the occurrence of the local swelling.

Mallein is supplied in 3 Cc. bottles.

Glanders in the horse and man, lecture on. Mallein not recommended for the human being.—L. i./06,229.

Human Glanders, six cases. Mallein satisfactorily employed in dose of 10 to 15 minims,—did not produce any untoward results in non-glandrous cases. The Bacilli stain well with Carbol-Thionin blue or Carbol Gentian Violet.—B.M.J. i./09,319. Two cases,—difficulty of diagnosis owing to close resemblance between the ulceration and the tertiary syphilitic ulceration of the buccal and pharyngeal cavities. Both cases were treated for syphilis for a long time.—L. ii./09,1201.

As to treatment, so far nothing has proved of much avail. Cases have been recorded as cured by mercurial inunction,—possibly some good may result from vaccine treatment.—*ibid.*

One grain of Carbolic Acid in pill or mixture every hour, and inject the bubo with a varying quantity of the drug according to the size, etc.—2 to 15

minims. Keep an eye on the urine,—so long as there is a free flow of normal color the Carbolic Acid is doing no harm.—B.M.J. ii./08,599.

The Plague. For the treatment of plague are: 1. Yersin's Curative Serum, also used as a prophylactic. 2. Haffkine's Plague Prophylactic against plague. This contains the dead bodies of the bacilli preserved by 0.5% Phenol, as well as the products of their growth. The immunising substances are contained in the bodies of the bacilli, *i.e.*, in the solid matter in the fluid and in the fluid itself. It is a killed culture of *Bacillus pestis*.

Yersin Curative Serum of the Lister Institute is sent out in 20 Cc. bottles.

Dose.—At the earliest possible moment 50 Cc. intravenously and 100 Cc. subcutaneously (*e.g.*, in the flank) repeated in 12 to 24 hours. 20 Cc. is given as a preventive. The Yersin Serum may be prepared by cultivation of a virulent growth of the bacillus obtained from several epidemics. An emulsion of the growth on physiological salt solution is injected intravenously into the horse in gradually increasing amount—the first few doses having the bacilli killed by heat. Bleeding takes place a fortnight after the last dose. The serum is finally tested for efficacy.

Haffkine's Plague Prophylactic of the Lister Institute is supplied in tubes of 20 Cc.

Protection is afforded probably for upwards of a year. After injection there is local swelling and probably general malaise and heightened temperature. *Immunity* is conferred after 7 or 8 days by an injection.

Dose.—For men 1 Cc., women $\frac{1}{2}$ Cc., for children over ten $\frac{1}{4}$ Cc., under that age $\frac{1}{10}$ to $\frac{1}{15}$ Cc. May be repeated in 10 to 14 days. *Site of Injection*—Subcutaneously in any loose tissue free from veins, *e.g.*, the flank. *Shake the bottle.*

Two tables of results. The number of cases among the inoculated was reduced by between 68 and 100%, and the number of deaths by between 79 and 100% as compared with the incidence of attack and deaths among the non-inoculated in the same place.—L. ii./07,145.

Verjbitski's contribution on the part played by insects in epidemiology of plague, also other Reports by the Advisory Committee appointed by the Secretary of State for India, the Royal Society and the Lister Institute.—B.M.J. ii./08,91.

Rat-flea Plague theory. Clinical experience shows that plague has no preferential temperature, though the Third Report of the Plague Commission sought to establish a "climatic plague temperature" of 85° to 50° F. Calcutta is remarkably free from human fleas; dog fleas are prevalent on the other hand, and rat fleas are seldom or never found. Rat fleas do not bite men, on the contrary they have a strong distaste for the skin of man. Evidence of equally conclusive nature in the opposite direction by a Member of the Commission. Sir Havelock Charles states that it is a fact that there is always an association between rats and plague in India.—B.M.J. ii./08,1357.

'Curative' Serum is not satisfactory. The culture of *B. pestis* killed by heat, to which a minute quantity of Phenol is added, gave excellent results at Kirkee, in India, in epidemic in 1906 (consult article for figures). The dose was from $\frac{1}{2}$ to $\frac{1}{4}$ Cc. Strychnine appears almost specific for the disease.—B.M.J. i./07,928.

In the winter of 1902-3 estimated 10,000 lives were saved by Haffkine's prophylactic. Inquiry into the unfortunate Mulkowal disaster, in which 19 persons under treatment developed tetanus.—L. i./07,299.

Klein's Prophylactic.

This preparation had, however, to be put on one side, one reason being that animals dying of plague are soon invaded with intestinal vibrios, and the heating and drying employed to devitalise the plague bacilli are not sufficient to kill spores of these extraneous organisms.—L. ii./07,143.

Pneumonia.

Pneumococcal Vaccine, (WIMPOLE INST.)—For use in acute and chronic pneumonia, empyemata, generalised infectious periostitis and abscesses, in pneumococcal colds and pneumococcal eye infections.

Ampoules for Hypodermic use are supplied containing 25, 50, 100, 250 and 500 million organisms in each.

This Vaccine is employed in the treatment of empyema, especially in children (in adults, combination with a streptococcal vaccine may be advisable), if laryngeal and catarrh due to this organism; of periostitis, otitis, endometritis, and pyo salpinx, where initial doses of 100 million may be employed at bi- or tri-weekly intervals; subsequently much larger doses. Cases of delayed resolution in pneumonia are benefitted by injections of 50 to 100 millions, while routine treatment of all cases of pneumonia during the first week by doses of 25-50 millions whenever there is a rise in the temperature has been much practised of late.

It might be mentioned that in cases where pneumonia is said to supervene upon influenza, in reality the infection is a double one from the beginning, and much may be done to prevent the pneumonic attack by the administration of 25-50 million doses of Pneumococcal Vaccine as early as possible during the influenzal attack.—R. W. Allen. *f.* pp. 903 907.

Empyema well treated.—L. i./05,1718; ii./07,1451.

Double pneumonia after childbirth,—gradual convalescence and complete recovery on use of Vaccine (initial dose 25 millions) made of combined bacteria from mouth and uterus. Patient desperately ill until 48 hours after the injection, when she seemed to rally.—L. i./09,1454.

24 cases treated by inoculation. Three methods of taking material for examination. Dosage difficult to determine. Near the crisis there is usually definite rise in opsonic power. 20 to 30 million considered suitable as initial dose. Temperature often falls and dyspnoea and delirium decrease at once on treatment. Cases running protracted course greatly benefitted. A Vaccine from a virulent strain probably more useful than an autogenous one. The Vaccine treatment shortens the attack.—B.M.J. ii./09,1050; L. ii./09,471.

The **Opsonic Index** is below normal, whilst the temperature is rising, and whilst the fever is at its highest point at the beginning of the crisis there is a sudden rise, even up to 1·6—if it does not rise the patient's condition is extremely grave.

Pneumococcal cystitis and arthritis successfully treated by vaccine from patient's organism.—L. i./09,1457.

An unusual case of abscess of the appendix treated by pneumo. coccal vaccine.—B.M.J. i./09,1054.

Autogenous pneumococcal vaccines. Cases treated with success—initial dose being 50 million. Often arrests the condition within 12 hours. Successful inoculation for pneumonia is possible. The vaccine should be given as early as possible. Estimation of the index not necessary.—B.M.J. i./09,1530.

Sir A. E. Wright stated that he had been a sufferer from chronic bronchitis for 30 years, which cleared away entirely after a few doses of his own pneumococci.—L. ii./09,472.

Two cases of pneumonia treated with dead pneumococci by the mouth. In 8 hours marked fall in temperature, which was progressive. In one case on the third day, and in the other on the second.—A. Latham, *Pr. Apl.* '08,448.

The opinion is expressed that the treatment by Pneumococcic Vaccine will soon be recognised as safe as the Antitoxin for diphtheria.—Pr. '09,649.

Acute infective endocarditis—the organism being *Diplococcus Lanceolatus* (*pneumoniæ*) of Fraenkel isolated from patient's blood removed from a vein. Initial dose 50 millions and further doses of 50 and 100 millions—this case is believed to be the first of its kind placed on record. A fairly large volume (10 Cc at least) of blood should be taken for culture. Importance of using Vaccine early.—Pr. Aug., '09,203.

In acute pneumonia as yet hardly in position to apply Vaccine treatment.—M.P., Nov. 17th, '09,520.

A case of empyema well treated with Pnuemo-Vaccine.—L.i./05,1718.

Vaccine treatment in two cases. Sinus healed in both.—L.ii./07,1451.

Eight injections of Vaccine in increasing doses at 5 or 6 days interval, contributed to the successful issue of a case.—B.M.J.i/09,651.

Only serviceable Vaccine is one from patient's own pneumococcus. He may be dead or well before it is ready—some antitoxic method wanted.—West, Pr., Apl., '08,431.

Anti-pneumococcic Serum.—Dose, 20 to 30 Cc. into the lumbar or gluteal region as early as possible, repeated the following day, or until temperature falls.

Endocarditis treated with anti-pneumococcus serum.—L. i./05,1338.

Investigations show that the organism varies in each host—this may explain failures in attempting to cure with Anti-pneumo-Sera.—Pr. '09,648.

Pneumonia well treated with injection of 10 Cc. of Antistreptococcic Serum combined with Calcium Chloride and Tincture of Perchloride of Iron internally. Pneumococci, Streptococci and Staphylococci were present in the sputum. M.P., May 22/07,558.

Pane and Renzi's Antipneumococcic Serum.

Supplied in two strengths, Nos. 1 and 2.

Dose, 15 Cc. of No. 1 repeated, if necessary, in 24 hours, is of value, especially in severe cases with high temperature and rapid pulse. Improves tone of pulse where there is great heart weakness. The toxin secreted by the coccus appears to act on the muscles of the heart and weakens it.

Site of Injection.—Subcutaneous tissue of the abdomen.

If patient very weak the Serum may be given per rectum—the bowel being previously washed out by an enema of warm salt solution.

Diagnosis.—In suspected cases examine the fauces for pneumococci. The use of antiseptic gargles may check further infection.—Pres. July, '08,131.

Romer's Serum for pneumonia in children.

Doses of 5-10 Cc., with 2.5 to 5 Cc. a day afterwards. Is a modified form of Pane's Serum, and also of value in influenzal pneumonia.—L.ii./08,251.

Pyorrhœa Alveolaris.—A description of the bacteriology of a large variety of organisms in and treatment for. Opsonic Index estimations were made. It was found that a low index was shown to certain bacteria taken from the mouth in cases having some form of constitutional disturbance, e.g., toxæmia, anæmia, various forms of gastric and intestinal indigestion. Injections of Vaccine.—Kenneth Goadby. L.i./07,633; 819.

Pyorrhœa alveolaris satisfactorily treated by Vaccines of the streptococcus in question (isolated from the pus). Doses of 40 million Cocci at 10 days interval employed.—L.ii./07,1818.

An Emulsion of Sublimed Sulphur in Glycerin was used to cleanse the parts in a case of Streptococcic and Staphylococcic infection of the mouth, sore mouth, with gums red turgid, and cedematous—treated by Serum and Vaccines. It had marked effect on the local inflammation and pain.—Kenneth Goadby, B.M.J.ii/08,477.

Relapsing Fever.—See p. 906.

Rheumatism.—An anti-rheumatic serum (Anti-streptococcic). *Dose.*—5 Cc. has been used abroad. Rheumatism is thought to be due to a form of streptococcic infection.—*c.f.* B.M.J. ii./06, 1781— isolation of a micrococcus. Not to be used when there is pericardial or pleuritic effusion.

The organism produces $\frac{1}{2}$ Gm. of Formic Acid (also Acetic Acid) from a litre of culture. The urine of rheumatic patients contains up to 0.2 Gm. in a day's urine. Salicylates administered decrease the amount. This acid is not known to be produced in like amount by streptococci from any other source. The *M. rheumaticus* produced striking hæmolytic action in test tube experiments.—B.M.J. i./07, 1233.

The various bacteria claimed as causing rheumatism have all failed to conform with Koch's hypothesis. Evidence that it may be of protozoal origin.—Pr. Feb. '09, 250.

No certain method of recognition as yet.—B.M.J. i./09 1162.

Streptococcus Rheumaticus Vaccine (Wimpole Institute) for complications of rheumatic fever. Initial dose 10 millions. Ampoules of 50 and a *special strength* of 100 millions are also prepared.

Septicæmia, Anti-Streptococcic Serum.

Dose.—30 Cc. early in any form of septicæmia, and repeated the same day and daily afterwards. Injections should be made at the seat of inflammation, &c., if any, as in erysipelas, so as to produce good local effect.

It is highly polyvalent. Usually supplied in 10 Cc. phials.

Staphylococci and *Streptococci* have a peptonising effect on the tissue, killing the cells.—Bosanquet.

Special Anti-streptococcic Sera for use in Erysipelas, Puerperal Fever, Scarlatina, Endocarditis, and Rheumatic Fever, are obtainable commercially. It is an anti-bacterial serum, should be polyvalent, and recently prepared.

Anti-streptococcic Serum is prepared by injecting cultures of *Streptococcus* into the horse. In its manufacture the virulence of the organism is increased by passage through a succession of animals.

Finally a dose of 100 to 200 Cc. is reached. The horse is bled and the serum standardised. Not more than 0.5 Cc. of serum should be necessary to neutralise 10 minimum lethal doses of the *Streptococcus* when injected simultaneously into a rabbit.

Uses and References.

Puerperal fever and the varied forms of septicæmic infection following childbirth have been treated in many instances with it with good results.

It has been advised that a few doses of 10 Cc. should be given as prophylactic before operations on the mouth and throat.

Indicated in simple septicæmia or sapræmia.

Erysipelas, endocarditis, puerperal fever, carbuncle, and acute rheumatism have been treated with it.

Streptococcic Infection of eyelids (an unusually large sebaceous cyst) successfully treated by 10 Cc. doses of Serum.—B.M.J. ii./08, 22.

Streptococcic Poisoning, Cases of.—Lockwood —B.M.J. ii./07, 1494.

Streptococcic infection (or mixed Strepto and Staphylo) in sore throat best treated by 5–10 Cc. of Polyvalent Serum combined with swabbing with a solution containing 10 grains of a powder composed of equal parts of Sodium Bicarbonate, Sodium Chloride and Potassium Chlorate in an ounce of water. This solution will dissolve the membrane in question.—B.M.J. ii./09, 196.

In puerperal sepsis if *Streptococcus Pyogenes* found a dose of 30 Cc. of Polyvalent Serum administered, whilst Vaccine in course of preparation. Dose of 100,000 with similar quantity of *B. Coli* given and repeated during positive phase.—L.H. 09, 339.

A case of typhoid complicated with Staphylococcal septicæmia treated with injections of Anti-streptococcic Serum twice daily,—cured.—B.M.J. i./09, 1000.

Erysipelas treated with **Metchnikoff's Serum**. Result favorable.—L.ii./o8,306.

For a number of older references *vide* Edn. XII.

Streptococcal Vaccine (Wimpole Institute) may be employed in periostitis, secondary joint infections, furuncle, erysipelas, empyema (in adults), in nephritis and adenitis secondary to scarlet fever, and also in septicæmia, puerperal fever, and endocarditis when cultures have demonstrated the presence of this organism.

In all but the last three, initial *dose* of 50 million organisms may be repeated at 7 to 10 days interval; should improvement be slow, double or treble doses may be safely used, but only rarely should doses exceeding 250 million organisms be employed. In septicæmia, puerperal fever and endocarditis, the initial dose should not exceed 10 million organisms; fall of temperature is the best indication of improvement, and subsequent rise of the necessity of a further inoculation; injections at intervals of one, two or three days, may be necessary. A dose of 100 million organisms should only rarely be exceeded in these cases.

Ampoules for Hypodermic use are supplied containing 10, 25, 50, 100 and 250 million organisms respectively. For complications of scarlet fever *Streptococcus Conglomeratus* Vaccine is prepared. Initial *dose* 25 millions.

In view of the fact that the Anti-streptococcal Serum has been a failure in a large number of cases of erysipelas, pyæmia, etc. and recognizing that the streptococcus is a very large genus—it may be desirable to prepare an autogenous vaccine.

A case of septic endocarditis successfully treated by inoculations of a vaccine prepared by Prof. Wright from a pure culture of streptococcus obtained from patient's blood.—L. i./o7,501.

Hepatic abscess discharging externally cured by Vaccine made from the *Streptococcus pyogenes longus* obtained from the pus. Initial dose 10 millions,—gradually increased dosage being checked by observation of the Opsonic Index.—B.M.J. ii./o8,1730.

Streptococcus lanceolatus Vaccine employed in a case of an old man with empyema. Injections of 5 millions increased up to 50 millions. Improvement,—expectoration ceased, temperature became normal, gained weight, etc.—B.M.J. ii./o8,1735.

Transient multiple arthritis apparently caused by injection of 25 million dead Mixed Streptococci by mistake in the course of treatment of pyelitis. Recovery under Sodium Salicylate.—B.M.J. ii./o9,142.

Erysipelas.—The routine dose is 2 millions Streptococci every 4 days. Results are remarkably good.—Sir A. E. Wright, L. ii./o8,731.

Erysipelas. Diagnosis can be based on the 'spread of the erythema from a local focus,—true inflammation of the epidermis with exudation of leucocytes,—not merely a transitory erythema due to vascular dilatation, as occurs in cellulitis and lymphangitis.' It is caused by one of the organisms of the Streptococcus class.—*Streptococcus pyogenes* being most frequent.—L. ii./o9,1070.

Staphylococcal Vaccine (*S. albus* and *S. aureus*). Wimpole Institute.

The Opsonic Index to *Staphylococcus albus* and *S. aureus* in suppur-

ative periostitis, osteomyelitis, ulcerative endocarditis, pleurisy, peritonitis, carbuncle, furuncle and various pyæmic conditions is almost invariably below normal, *i.e.*, from 0·2 to 0·8. Injection of Vaccine is often followed by marked reaction—the negative phase being indicated by a crop of suppurative foci which abort in a day or two. The appearance of the second crop points the time for the fresh injection, which is usually required at fresh intervals of 14 and 21 days.

For ordinary Staphylococcal infection a dose can be given without first having recourse to Opsonic estimation. Experiments have shown the amount of the dose required to produce the best result in average cases.—Sir A. E. Wright.—L. ii./08,731.

The insemination of a tube of sloped agar-agar with some of the infected material from any case of acne, sycosis, furunculosis, endometritis, sapræmia or bone suppuration, and subsequent incubation for one or two days at 37° C., or in a warm room, will by the colour of the growth, remove all doubt as to which of these two organisms is responsible for the infection, and insure the choice of the appropriate vaccine. In default of cultures, the mixed vaccines may be employed, or advantage may be taken of the fact that *S. Albus* is undoubtedly the more common variety in acne, to employ the *S. Albus* vaccine. Should a dose of 100 million organisms, followed a fortnight later by one of 250 million not result in any clinical improvement, then the *S. aureus* vaccine should be substituted, or the mixed *S. albus* and *S. aureus*. For two or three days after each injection, the clinical condition becomes, as a rule, slightly worse, it then improves rapidly; after 10 to 14 days slight recurrence may result, the signal for a fresh injection. The initial dose of 100 million organisms may be repeated in about 14 days; a double dose may be necessary upon two or three subsequent occasions, to be followed by still larger doses even up to 4,000 million at intervals of 10 to 14 days. As the cure is completed, reduced doses at longer intervals may be advantageously employed. In sycosis *S. aureus* is almost constantly present, while for the other conditions no working rule can be given and the mixed vaccine is best employed.

Special Vaccines should be prepared in certain cases.

In pyæmic cases large doses up to 1,000 million Cocci may be administered and may have to be repeated at short intervals as the index falls and rises.

In acne, furunculosis, and carbuncle, Staphylococcal Vaccine treatment valuable.—L. ii./07,1449.

Duration of cases of abcess of the breast, etc., containing *Staphylococcus* is materially shortened by vaccination. $\frac{2}{3}$ of a Cc. (600 million Cocci) usual dose. Opsonic Index is raised. Lockwood.—B.M.J. ii./07,494.

Acne of the type with much oily seborrhœa and comedones abundant, inoculation treatment with Staphylococcal Vaccine alone not of much value. According to Whitfield the comedo is not Staphylococcal in origin, but due to the growth of a micro-bacillus in the neck of the pilo-sebaceous follicle.

In the worst form,—acne indurata,—vaccine from patient's own organism desirable. Results are variable. Pr. May /08,699. See also ref. Vaccine treatment in general practice.

Boils, in 9 cases out of 10, 100 million Staphylococci will cure.—Wright, L. ii./08,732.

In carbuncle a Staphylococcal Vaccine should always be used.—Pr. /09, 657.

A carbuncle is less easy to cure than boils because the blood cannot be brought into effective contact with the germs. Administer Citric Acid internally to diminish its coagulability and apply locally a solution of Salt and Sodium Citrate to decalcify the lymph.—Sir A. E. Wright. L.ii. 08,730.

Eczema, acute, when the suppuration is not controllable by ordinary means and the stage of "chronic" pus infection is reached, Vaccine Therapy used with good effect. Staphylococcus is the commonest organism, but should be determined, and Opsonic Index taken for the organism in question. Small dose should be employed, 20 to 100 millions. Repeat in 10 days' time.—B.M.J. i./09,1342.

Eczema, chronic, was found to be associated with *S. Aureus*. Index to this organism was 0.5 and 0.4. A Vaccine from the cultures gave complete cure.—Pr./09,657.

Furunculosis, in cases of general, where boils are appearing first in one place and then in another, no treatment, prior to the introduction of Wright's method, ever proved of much avail; an exception being those cases in which it was possible to identify the cause of the trouble as connected with defective drains.—Whitfield, Pr. May, '08,698.

Suppuration, fronto-ethmoidal, due to Staphylococcus. Small doses, i.e., 10 to 20 million Cocci, act best in some cases, and oral use as efficient as the hypodermic.—B.M.J. ii./08,1150.

Hepatic Abscess.—A case, in which patient had coughed up gallons of pus, arrived in England from India weighing $5\frac{1}{2}$ stones—a mere skeleton. Open air treatment and a vaccine prepared from his organism (*Staphylococcus longus*) obtained from the sputum restored to health (weight $12\frac{1}{2}$ stones). Dose commencing with 5 million and advancing to 100 million. Examination of the blood prior to making the Vaccine showed patient's resisting power to this particular organism was non-existent.

Other cases due to *S. lanceolatus* and *Staphylococcus aureus*.—Hale White and Eyre.—L, i./09,610,1588.

A case of recurrent attacks of fever with endocarditis disturbance (Streptococci infection) every three or four weeks, had an opsonic index falling to about 0.5 or lower just before the attack. After four or five days the curve rose and reached the figure 1.2 or over when the attack ceased,—to recur again after a week or two. Inoculation of a special Vaccine when the index had dropped to its lowest, caused a rapid rise and complete abortion of the attack. The injections were repeated several times with good result. A recurrent case of this kind throws light on the problem of recurrent sore throat with the possible sequel of endocardial infection.—Pr./09,650.

It is obvious that no benefit is likely to result unless a bacteriological examination has demonstrated the streptococcal nature of the disease treated. Some bacteriologists believe that vaccines lose their potency in a comparatively short time.—Pr. May, /08,754.

Scarlatina.—Moser introduced at Vienna a Serum prepared by the inoculation of horses with the products of cultures of streptococci, which he had found in the blood of 60% of fatal cases of scarlatina. All children treated within three days of infection recovered.—B.M.J.ii./02, 1086; M.A. 1904,36.

Anti-streptococcal Serum is used.—B.M.J.E.i./05,83.

A Serum made through agency of three forms of streptococci. The specific organism of scarlet fever is said to be *Streptococcus conglomeratus*. Results gratifying.—M.A. 1906/51,52.

Kerr on the Bacteriology of Scarlet Fever: It is proved that the infecting agent is present in the pharyngeal and faucial mucus. Examination of the *Streptococci*.—L.i./08,995.

It is probable that *Streptococci* in this fever are a secondary infection—the exact cause unknown—the anti-serum may be of use but not specific.—L.i./08,1024.

Streptococcus Conglomeratus Vaccine is manufactured, but so far has not been subjected to a very considerable trial.

In most cases, with or without albuminuria, *Streptococci* are voided by the urine in large quantities in this fever.

Serpent Venom. Anti venene.

In the preparation of this serum the venom is removed either from the living snake or after killing it. This venom is mostly desiccated over sulphuric acid *in vacuo* and a weighed quantity of this is dissolved in sterile water and injected into the horse. The increase in dose proceeds very gradually; the final dose appears to be about 0.6 Gm. of venom, equivalent to the entire yield of 20 average sized snakes. The serum is removed in the customary manner and standardised.

Calmette showed that the venom of all snakes is of a similar nature, and obtained his remedy by the inoculation of horses with the poison of the cobra di capello; his serum possesses a strength of 1 in 20,000; that is to say $\frac{1}{20,000}$ Cc. subcutaneously injected into a hare of two kilos in weight suffices to protect it from snake poison which kills a similar hare in eight hours.

It is claimed that anti-venomous sera are specific even between the venoms of species of the same genus. An account of the serum therapeutics of a number of cases.—L.ii./04,1273. *Vide also* L.i./06,1231.

Calmette has described the hæmolysins of snake poison; in addition to these bodies snake poison contains neurotoxins, which act on the nervous system, and cytolytins dissolving other tissue elements.—Bull. de l'Inst. Pasteur 'T,' v.p. 193.

Dose.—Anti-venene is supplied in tubes of 10 Cc. This amount or as much as 40 Cc. should be injected. The serum should be as fresh as possible. (As much as 400 Cc. intravenously and 10 or 20 times that amount, if subcutaneously, for cobra poisoning.—L.ii./04,1273.) The injection requires to be made at once, or within an hour in man; death seldom occurs from serpent poison under three hours.

The "official" dosage of anti-venene is entirely inadequate; the dose of venom injected by a healthy cobra is about ten times as much as was assumed by Calmette, and therefore the dose required to neutralise the poison should be ten times as much as that recommended by Calmette and Lamb.—Ghosh.

A ligature must be bound above the bite if possible. The wound should be opened up and washed with Chromic Acid or Gold Chloride 1% solution.

Sleeping Sickness see Trypanosomiasis.

Syphilis.

Recent experiments on the cure of syphilis by animal fluids have not given promising results.—c.f. B.M.J.ii./06,1509.

For the *Treponema Pallidum* (old name *Spirochæta Pallida*) see Bacteriological Notes.

It can be found in the eye (Oph. Oct. 1907)—this may give a hint as to how interstitial keratitis, iritis and choroiditis are brought about in later life.—Oph. June, '07, p. 303; L.ii./07,1835.

Wassermann's Test

for the *diagnosis of syphilis* is based upon the principle of the binding or fixing of a certain substance called the complement. Its original technique is so complicated and demands the use of so much serum that its general application is greatly restricted. Several simplifications, all based upon the same principle, have been perfected; that of Hecht modified by

Fleming is the one now in general use. The following are the important essentials:—

1. Human blood serum, whether syphilitic or not, contains a substance the **Complement** (*syn.* **Cytase**, **Lysin**, **Alexine**) which has the power of dissolving Sheep's Corpuscles, *i.e.*, **Hæmolytic action**.
2. This is very unstable and can be fixed, bound or inactivated by heat or by the combined action of an **amboceptor** (*vide infra*) present in Syphilitic Serum and an **Antigen** (*vide infra*).

If Antigen + Syphilitic Serum + Sheep's Corpuscles, be mixed together hæmolysis does not take place.

But if Antigen + Normal Serum + Sheep's blood be used hæmolysis does take place.

Similarly with Syphilitic Serum + Normal Saline Solution + Sheep's Corpuscles hæmolysis occurs.

To follow the last statement one must remember Syphilitic Serum contains Complement as well as Amboceptor, and the Complement was not previously inactivated by adding Antigen.

Antigen A bacillary product).

Is contained in an Extract of an infected organ, *e.g.*, syphilitic liver. An extractive of an ox heart is now used instead. It has no restraining action by itself on the Complement.

Amboceptor, (*Syn.* **Immune body** or **Fixative**) is formed during immunisation, and has no restraining action by itself upon Complement. These *two* together will, however, inactivate Complement in any Serum and so prevent Lysis.

As *Syphilitic Serum* contains *Amboceptor* and *Complement*, in Hecht's or Fleming's method (*q.v.*) of applying the test the Complement is not previously inactivated, and consequently extra Serum is not required in the test (*vide infra*).

Wassermann employed as Antigen a **saline extract of the liver of a syphilitic foetus**, the serum of a rabbit immunised to sheep's red corpuscles as Amboceptor and fresh guinea-pig serum as Complement. The test can be done equally well with saline extracts of normal liver and other organs. Alcoholic Extracts, however, keep better. Alexander Fleming finds Alcoholic Extract of the heart (human, sheep, rabbits, or guinea-pigs) useful (other substances of a lipid nature such as Sodium Oleate, Cholesterin, or Sodium Glycocholate will do also, but Ox Heart Extract is the best).

The natural hæmolytic Amboceptor for sheep's corpuscles in human serum was found to be as useful as that of the immunised rabbit which was dispensed with, but the Complement of the guinea-pigs' serum was still required. Hecht made the serum to be tested supply the Complement as well as the Hæmolytic Amboceptor. He employs small quantities in comparison with the test as originally described.

For the test are required,—

Antigen (OX HEART EXTRACT):—

Heart muscle 1 Gm. is ground up with 5 Cc. Absolute Alcohol and heated at 60°C for one hour and then allowed to stand 24 hours

at 37° C. The supernatant liquor is poured off and diluted with Normal Saline Solution before use in such proportion that while completely binding the Complement of a syphilitic serum it will not interfere with the hæmolytic power of normal serum. Too large a percentage of Alcohol must not be present, as if used hæmolysis will take place when sheep's corpuscles are added even in the absence of serum. No extract should be used which requires to be in a strength exceeding 10%, *i.e.*, Alcohol 1, Extract 1, Normal Saline 9. The strength of the Extract is tested by taking say 1, 2½, 5, and 10% and using each with a syphilitic and a non-syphilitic serum in the manner described. The strength is chosen which will completely prevent hæmolysis with the syphilitic serum, but which will have no effect on normal serum. Heart Extract thus prepared retains its activity for a long period of time.

'Antigen' Sterules are prepared.

Another form of 'Antigen' as above mentioned is

Sodium Glycocholate Solution. but is far less reliable.

Sodium Glycocholate 1, Sterile Distilled Water to 100.

N.B.—This must be fresh, as the solution is favourable to bacterial infection.

Washed Sheep's Corpuscles, from the fresh blood suspended in Normal Saline. Remove fibrin from fresh blood by clotting—rapidly stirring at the time of drawing from the animal. Centrifugalise and pipette off the Serum. (N.B.—A powerful centrifuge is required.)

Add Normal Saline and again centrifugalise several times to free from complement. Finally dilute with Normal Saline Solution making approximately a 10% suspension.

Sterules of Washed Sheep's Corpuscles Suspension are prepared and may be relied upon for a reasonable time.

Method of conducting the Test.—Collect specimens of patient's and control Serum in ordinary 'Widal' Pipettes or Wright's capsules (3-inch pieces of ¼-inch glass tubing drawn out into a 6-inch capillary point and provided with a teat at the thick end) and seal each end; allow to stand for an hour or centrifugalise to separate the Serum.

File and break off the pipettes close to level of Serum.

Break off end of Antigen Sterule and Normal Saline Solution Sterule. Prepare 5 pipettes, as follows:—

1. Antigen 4 volumes, and Patient's Serum 1 volume.
2. Antigen 4 volumes and Control Serum 1 volume.
3. Normal Saline Solution 4 volumes, and Patient's Serum 1 volume.
4. Normal Saline Solution 4 volumes and Control Serum 1 volume.
5. Antigen alone 4 volumes.

The exact volumes are not essential,—it is a good plan to graduate a pipette with a paraffin pencil,—at about ¼ inch from the point, and again 2 inches further up as a guide. Two ½-inch volumes of Serum required for the test can generally be obtained from the sample of blood. Carefully note directions as to dilution of Antigen.

Seal each pipette and incubate at 37° C. for 1 hour after well mixing on glass slide. Then mix with each one volume of the 10% suspension of washed corpuscles, and incubate again for 1 hour at 37° C. Should hæmolysis not

occur in Nos. 1 and 5, but well marked in Nos. 2, 3 and 4, the reaction is positive. Fleming obtains excellent results by this simplified method,—a positive reaction in almost every case of syphilis whether acquired or congenital. His work was principally with eye cases. With regard to cases other than eye affections, primary, secondary and tertiary, all were practically successful.

References.

Parasyphilitic conditions, as instanced by tabes and general paralysis vary somewhat. General paralytics give positive results in every case,—tabetics do not give it in more than 60%. Most of those who failed to give the reaction denied all history of syphilis. When energetic treatment has produced a cure the patient will fail to respond to the test. Time will show whether this is the case,—if so the test will be of very considerable value.—B.M.J. i./09,1238; ii./09,984; L. i./09,1457, 1512.

Objection had been raised to the effect that 'hæmolytic power for sheep's corpuscles was not found in 30% of human serum, and that in 22 known cases of syphilis the reaction had not been obtained in half the number. Fleming had quoted other workers as having found 10% failures. Clemenger finds in 500 observations only 5% which did not possess hæmolytic action—does not think this will detract from value of the reaction—any deficiency can be supplied by adding a small amount of normal hæmolytic serum in these cases.' Clemenger finds that 'in practically all cases of syphilitic lesions, whether primary, secondary or tertiary, a positive reaction can be obtained providing suitable heart-extract is used.'—B.M.J. ii./09,575.

Fleming's method confirmed. 'In over 200 observations the number of serums which did not possess any hæmolytic power for sheep's corpuscles was 4.5%—in such cases addition of fresh normal serum renders the test capable of repetition.'—B.M.J. ii./09,917.

The 'complement-fixation' test depends on the following:—

"Hæmolysis of red corpuscles by serum is brought about by two bodies,—amboceptor and complement acting in conjunction only. The amboceptor is a stable body and is specific,—the amboceptor for the corpuscles of one animal has no action on the corpuscles of an animal of a different species. The complement is not specific and is easily destroyed by keeping or by heat. When red-corpuscles, or micro-organisms, or similar bodies are injected into an animal an immunising response is induced, whereby specific amboceptors are produced. In the same way in many infections specific amboceptors to the infecting organisms are found in the serum of the patient.

"Bordet and Gengou found that if some of this patient's serum was heated to destroy the complement naturally present, and to it was added some of the infecting microbes, and some guinea-pigs' serum (containing complement) then the organisms bound up to themselves in the presence of the specific amboceptor the complement of the guinea-pigs' serum. This binding was shown by the fact that when the mixture was added to a mixture of inactivated hæmolytic serum and sheep's corpuscles no hæmolysis occurred, although the amount of guinea-pigs' serum used when added to this mixture caused complete hæmolysis. Wassermann applied the reaction to syphilis, using the extract of the liver of a syphilitic fœtus, as already mentioned, as his 'Antigen' as a culture of the spirochætæ was not obtainable, and found that in the presence of a syphilitic serum this was capable of binding complement.—Fleming—L. i /09,1513.

Fleming gives a résumé of Wassermann's original method, and shows how the test was gradually simplified, also describes his test tube and pipette methods—(*ibid*).

The test of value where no spirochætae are found.—L. i./09,481.

Browning and Mackenzie's modified method. 125 out of 135 cases of syphilis gave positive reaction, and 107 out of 108 with no evidence of syphilis gave negative result. The control cases included a large variety of acute diseases—pneumonia, enteric, scarlet fever, etc.

The serum of the rabbit, immunised by washed blood corpuscles before referred to, constitutes the immune body. It is not yet possible to say whether or not the fact that a serum yields a positive result is proof of the presence and pathogenic activity of living spirochætae.—L. i./09 1521.

Wassermann's reaction generally accepted not specific, and that it is more probably an increase in the lipid content of syphilitic serum rather than the interaction between a specific body and an Antigen that produces the complement fixation,—possibly this substance is present in all sera and that there is a marked excess in syphilis. Did not obtain such clear results when depending on the hæmolytic action of human serum instead of adding special hæmolytic serum. 200 tests employing rabbit's heart extract. Neisser technique modified employed. Reaction not due to Mercurial treatment.—L. i./09,1523.

Doubts whether lipoids alone responsible for the test—if so they must be present in enormous excess. Unlikely that such a pathological cell activity would only be found in one infection. Wassermann's Technique followed the main. No difficulty in obtaining the 2 Cc. of patient's blood necessary. The objection to Bauer's method of making use of the ambocceptor for sheep's corpuscles normally present in human serum is that the natural ambocceptor varies considerably and in a few cases is practically absent, so that the serum of such an individual could not be tested by the method. 149 cases.—L. i./09,1515.

Original Wassermann, notes on.—B.M.J.E. ii./08,17.

Value of the Reaction (original form) and of microscopic examination of the cerebro-spinal fluid:

The original Wassermann Test regarded as the most specific and reliable. Especially useful when applied to the cerebro-spinal fluid for diagnostic purposes.—Mott. B.M.J. i./09,461.

Wassermann could report 1010 non-syphilitic serums examined without a single positive result. Spinal fluids from 64 cases of general paralysis and other diseases examined at Mott's request—59 of the 64 gave positive result—clinical evidence connecting tabetic and general paralysis with syphilis. Method employed essentially Wassermann's, but ox blood corpuscles used instead of sheep's.—Henderson Smith and Candler. M.J. ii./09,198.

Auto-inoculation and re-infection of syphilis.—J. Hutchinson. L. i./09, 109.

Cytodiagnosis, lymphocyte markedly increased in 80 progressive, parasyphilitic affections.—Mott. L. i./09,489,1354,1666; B.M.J. i./09,1408.

Leader on simplification to the test—drawing particular attention to Fleming's as 'an advance on previous procedures.'—L. i./09, 1693.

900 cases reported on. Visible change in regard to response by those under treatment.—L. i./09,432.

Positive reaction (original Wassermann) in scarlatina the exception not the rule.—B.M.J.E. i./09,28.

Porges' modification of Wassermann, (using Sodium Glycocholate) Positive reaction is definite evidence of past syphilitic inoculation.—HARRISON CAMPBELL. B.M.J. i./09,567,640.

Out of 57 cases in which a clinical diagnosis of syphilis had been made positive reaction was obtained in 50. The syphilitic liver extract kept good for 6 months.—B.M.J.E. i./09,60.

Wassermann modified by using for Antigen dried syphilitic congenital liver. Primary cases marked reaction. All cases of early secondary syphilis positive results; in late secondary or tertiary manifestations results more variable. 50% of para-syphilitic cases positive reaction.—B.M.J. ii./09,325,377.

'Solving the problem of half a dozen variables.' Advances are being made that will speedily bring the test into daily use. No one has projected a simpler rationale than Fleming—room for further simplification of Flashman and Butler's method.—B.M.J. ii./09,1087.

Wassermann's original employed—to be regarded as specific. Necessity for obtaining a comparatively large amount of serum overcome by diminishing amounts of reagents used. With regard to Antigen aqueous extract of liver rich in spirochaetes is best. Some difficulty in interpreting results. Discussion of reliability of the test and theoretical considerations. A lengthy article with bibliography of 74 authors.—B.M.J. ii./09,1019.

In cardiac disease. Positive reactions in a number of cases seemed to indicate that syphilis is an important factor in the production of cardiac disease.—L. ii./09,1159.

Ehrlich showed that hæmolytic amboceptors can be developed in the serums of animals injected with the red corpuscles of other animals of the same species. Experiments by Batty Staw show that it is possible to develop in the serums of animals into which injections have been made of the organs of another animal of the same species, in part at least an increase of the hæmolytic power of the serum. *Emulsions* of different organs seem to have varying power of checking hæmolytic power of these experimental serums,—kidney emulsion most and liver least.—B.M.J. ii./09,1268.

A very readable paper on the test by Chantemesse will be found.—M.F. Sept. 1, /09. The various terms in use are defined with diagrams.

Hecht's modified Wassermann method.—Wien Klin. Woch., 1908, No.50

Staining methods.—Easiest, quickest, and most certain way of diagnosis is to stain the serum,—e.g., by Leishman's stain.—B.M.J. i./09,1117. q.v.

Syphilis Test, chemical.—0.1 Cc. of the blood serum to be tested is diluted with 3 to 4 Cc. of Normal Saline and shaken with 1 drop of Perhydro 0.5 Cc. of the following test is added:—Phenol 0.5 Gm., Ferric Chloride Solution (1 in 20) 0.62 Cc., Distilled Water 34.5 Cc. Normal serum gives a pale green color in the upper layer after this addition, which either disappears on shaking or turns greenish-blue. Syphilitic Serum gives an immediate dark brown color, and the liquid when shaken appears thick.—Pharm. Zeit. 1909, 54, 309 per P.J. ii./09,274; L. i./09,1726.

McIntosh found this test much less active than Wassermann's Test.—L. i./09,1516.

Modern treatment of syphilis.—B.M.J. i./09,336; L. i./09,396.

tetanus Antitoxin, P. Belg. (with potency left to the manufacturer).

In the absence of anti-tetanus serum the injection of 3% phenol solution should be tried.—M.A. 1904,72.

Serum Antitetanicum.—P. Jap. has to be labelled with data as for anti-diphtheria Serum. (A) Serum Antitetanicum Liquidum: 1 Cc. 5 antitoxic units; 0.5 Cc. should not kill, a 15 Gm. mouse nor 10 Cc. guinea-pig. (B) Serum Antitetanicum Siccum 1 Gm.=50 antitoxic units.—P. Helv. also has this preparation.

Preparation.

Tetanus toxin is in many respects similar to a soluble ferment. It is precipitated by alcohol and tends to adhere to precipitates. It is modified or destroyed by the air, sunlight, and comparatively low temperatures.—Dean, *Practical Dict. Med.*, 1902, p. 1683.

The method of preparing this antitoxin consists in rendering animals immune to the tetanic poison by repeated inoculations and increasing quantities of the tetanus toxin. The animals are then bled, the serum is then prepared and by some preserved for supply.

Dose.—Lister Institute advise 30 Cc. urgently intravenously and 100 Cc. subcutaneously—25 Cc. into 4 separate parts of the body, the subcutaneous use being repeated on the 2 following days, and if no improvement the intravenous injected to be repeated. *See also* Intracerebral Injection, p. 790. Even larger doses, as much as 100 Cc., are advised by some makers, repeated on 2 following days.

Prophylactic Injection of 20 Cc. advantageous, especially in deep wounds where likelihood of earth infection.

Potency.

This Antitoxin should possess a potency of at least 1,000,000 Roux units: Cc. should protect 1,000,000 Gm. of guinea-pig against the minimal lethal dose of tetanus poison.—Hewlett.

The incubation period is variable in man. Symptoms may appear in 4 or 5 days, or may be delayed for months.

Amyl Nitrite in capsules is valuable for checking the dangerous spasms of the glottis and respiratory muscles.

Bromide and Chloral may be necessary, and full doses of liquid are advised.

Treatment of Wound.

In addition the wound, if any, should be excised or scraped out and washed with Gram's Iodine Solution.

For veterinary use the Lister Institute supply special instructions.

The horse injected with Tetanus Antitoxin is not rendered permanently immune. Protection is a matter of weeks or months at the outside.

Heat appears to be the most energetic of the conditions which favour the development of tetanus. Recent results from animals.—B.M.J. i./06,108.

Recent successful cases.—B.M.J. i./05,183; M.A. /06,53; B.M.J. ii./06,1260.

Two cases treated with 10 Cc. doses—one died after developing tetanus 87 days after infection. 10 Cc. considered insufficient.—M.P. May i./07,490.

In ophthalmology Antitetanic Serum is occasionally indicated. If tetanus is already set in the effect of the Serum cannot be reckoned upon with certainty.

10 to 20 Cc. should be given as prophylactic in suspicious looking injuries.—M.J. ii./08,737.

A case of tetanus—rapid improvement after large dose—60 Cc. On this dose there was slight reaction and the temperature rising to 99° F. on two days. Chloral and Bromide enemata were effectual in reducing frequency and severity of spasms.—B.M.J. ii./09,470.

Traumatic tetanus treated by 20 Cc. of Antitoxin, subsequently 100 Cc., 50 Cc., 100 Cc., and 20 Cc. with recovery.—B.M.J. ii./09,1072.

Tetanus cured by a number of Phenol Injections. Doses of 2 Cc. of 4% Solution, also 1 Cc. of 5% Solution. Serum being unavailable.—B.M.J. ii./09,1669.

Tetanus, a case of, consequent on a wound on the nose, recovered under 30 Cc. injected into the skin of the abdomen on 3 consecutive days.—L. ii./09,450.

Dry pulverised Anti-tetanus Serum as a Wound Dressing.—Is also dusted on to wounds which may have become infected with dust, mud &c. This may be prevented by dusting the powder on the part in addition to antiseptic dressing. Tetanus may also result in new-born children owing to infection at the umbilicus after birth—sometimes from the use of Fullers Earth.—W.W.W. See also p. 434.

Hydrogen Peroxide is a satisfactory solution to use to wash the wound—*L. tetanus* being an anaerobe.—B.M.J. ii./06,1260.

Intra-Cerebral Injection of the Anti-Tetanic Serum is also practised.

The injection must be very concentrated. The Lister Institute has a special injection with dose 5 Cc. and free from antiseptic.

A blunt needle is used. For a large number of references (recoveries and deaths) see Edn. XII., p. 781.

Trypanosomiasis or Sleeping Sickness.

The disease is endemic on the West Coast of Africa, notably in the Congo basin. It is believed to be caused by the entrance into the blood and cerebro-spinal fluid of the parasite *Trypanosoma Gambiense*. It causes a complete dislocation of the brain functions, a slow inflammatory process goes on in the brain cells for years, gradually the individual becomes languid in the extreme, he has not physical energy enough to walk, speak or even feed himself. The trypanosome of Gambia was first named and described by Dutton, who lost his life in 1905 in West Africa whilst engaged in his work on this disease. The blood or cerebro-spinal fluid of an infected person has been injected into a monkey with result that the animal died with all the symptoms of sleeping sickness. It is transmitted from the sick to the healthy by a tsetse fly (*Glossina palpalis*) and not by other biting flies (*Stomoxys*). In the stomach of this fly the trypanosome multiplies by fission. The parasite was discovered by Castellani in Uganda, but an Englishman, Dr. Adams (1901) first entertained the idea that sleeping sickness was caused by Trypanosomes.

For staining the organism.—See Bacteriological Notes.

Research was instituted by arguing from analogy with the Tsetse-fly disease in cattle. It was found that *Glossina palpalis* can carry the disease for a period of 48 hours from the sick to the healthy.

The *glossina* must be exterminated, but in addition immunisation experiments have been undertaken, the principle being to pass a strain of trypanosome through different races of animals until a certain degree of virulence is lost. Laveran has made preliminary attempts by means of horse serum. A similar process has already been carried out by Koch with success in the allied Indian disease in horses—surra.

The blood of 117 people from districts where sleeping sickness is unknown was found by Bruce and Nabarro not to contain a single trypanosome.

In addition to finding the trypanosomes in the blood, a very useful method is to examine the lymphatic glands; the trypanosomes are here very numerous and motile in incipient sleeping sickness. The fluid is easily removed with a hypodermic needle on puncturing.

The glandular enlargements in sleeping sickness are probably caused by the arrest of the trypanosome in the glands, where, indeed, many of them are destroyed, but whence some escape from time to time into the blood, and thus produce the increase which has been observed in the peripheral circulation. The wearing of clothes is the only reason assigned for the fact that Europeans have been thought to be immune.—L. ii./03,542, 552, 788, 990 (staining); 1673 (cultivation); 1727 (Report of Expedition to Senegambia); P.J. ii./03,839.

The condition of the stomach in sleeping sickness is a marked feature. It

is comparable with the petechial hæmorrhages met with under the endo- and epicardium of the heart in other trypanosomic affections.—L. ii./05,1902.

The trypanosome was found in the spinal fluid of 70% of cases (34) of sleeping sickness—in all of which the spinal fluid was examined. Sleeping sickness presents three stages. Koch's immunising experiments.—Castellani, B.M.J. ii./04,71.

Laveran—a paper on prophylactic inoculations against trypanosomiasis, malaria, and piroplasmiasis.—L. i./06,1198.

Trypanosomiasis and kala-azar (= black fever).—L. i./06,1198.

Discussion on the hæmoflagellates—they have at least four distinct types of life cycle.—B.M.J. ii./07,1320.

Experimental treatment of trypanosomiasis with various Anilin colours.—B.M.J. ii./06,1777.

Trypanosomiasis, Pathology and treatment.—Late J. E. Dutton and J. L. Todd, L. ii./06 1357. Further experiments.—L. i./07,1497.

Trypanoth, Chemistry of.—P.J. i./07,693.

Nabarro and Grieg show sleeping sickness can be conveyed by other species than *Glossina palpalis*.—B.M.J. ii./06,1881.

Meat is one of the cravings of the sufferers. Of 300,000 round the Victoria Nyanza 200,000 have been swept out of existence.—'The Times,' April, 1908.

Nabarro points out that he and Col. Bruce experimentally proved the trypanosome to be the cause of sleeping sickness. It was found constantly not only in the cerebro-spinal fluid, but also in the blood. He also claims credit for having discovered sleeping sickness to be carried by *Glossina palpalis*.—Jl. Trop. Med. July/08,224.

Hodges does not see any need to suppose the existence of any other means than *Glossina palpalis* of spreading the infection amongst human beings.—Sleeping Sickness Bureau, London, L. i./09,483.

Examination of infected villages showed that '*palpalis* villages' are more heavily infected than the '*morsitans*.'—B.M.J. i./09,403.

Prevention of sleeping sickness.—Knowledge is much needed concerning the habits of *Glossina*. Gland palpation is a valuable test in diagnosis. Other biting flies may also transmit trypanosomiasis.—B.M.J. ii./08,1061.

The extermination of the tsetse fly is, however, a labour of Sisyphus. The fly has a marked objection to Citronella Oil. Areas planted with this grass are free from the fly.—L. i./09,701.

Serum Therapy suggested,—i.e., the injection of a highly immune serum obtained from the blood of patients recently recovered,—or rather, as these are few and far between, of patients subjected in the first instance to chemotherapy (Atoxyl, &c.).—L. i./09,716. The injection to be intra-spinal—the serum could be taken from a patient improving. The blood of those suffering from trypanosomiasis contains trypanocidal bodies—the intra-spinal treatment could be combined with chemical treatment through the blood.—B.M.J. i./09,1176.

Liquor Arsenicalis as routine suggested treatment.—B.M.J. i./09,681.

If a fly, three weeks after feeding on an animal suffering from sleeping sickness, were incapable of giving infection, trypanosomes were not found in its stomach. Further, trypanosomes were not found in flies which had been kept from infection, nor in flies fed on healthy monkeys.—B.M.J. ii./09,903.

Potassium Chlorate 0.03 Gm. in $\frac{1}{4}$ Cc. of 1 in 10,000 Saponin Solution efficacious in prolonging life of guinea pig infected with trypanosome. Similarly 1 mgr. of Arsenious Acid in $\frac{1}{4}$ Cc. of 5% Anilin Chloride Solution. By the last mentioned, trypanosomes were made to disappear permanently, but not stated to be a definite cure.—B.M.J. E. ii./09,56.

Observations on various spirochetes show that they divide both longitudinally and transversely, usually one after the other, but may occur simultaneously.—B.M.J. ii./09,1244.

Bagshawe on advances made during 12 months prior to Oct. '09, in prevention and cure of sleeping sickness. Kleine showed that it takes about 20 days in the case of *T. brucei* after the fly has ingested the trypanosome before it is capable of infecting susceptible animals. Bruce confirmed this for *T. Gambiense*. Some flies probably remain infective for the rest of their lives. Bruce introduced fluid swarming with trypanosomes from the gut of a fly, fed 75 days before on an animal infected with *T. Gambiense* and subsequently on healthy animals,—into a monkey. After 8 days the monkey became infected. This indicates some form of development, whether a sexual process or merely multiplication

as seen in cultures is not known. Sleeping sickness does not become endemic except in districts in which *glossina palpalis* is in evidence. That this fly is a transmitter of human trypanosomiasis has been known since 1903. Sexual coitus has been thought by Koch and Kudicke to explain the occurrence of the disease in *palpalis*-free areas. The suggestion that other "auxiliary" flies are responsible in addition is refuted. Diagnosis by direct examination of the blood gave a large percentage of successes, particularly on centrifugalising as also the examination of the glands, cervical and submaxillary, in particular. Gland palpation is employed in preliminary diagnosis. A single dose of Atoxyl will cause marked retrogression in the size of infected glands,—the larger the glands the more likely the existence of trypanosomes within. In the matter of symptoms it would appear that paralysis, paresis, and epileptiform convulsions, which among untreated cases, occurred in small percentage, are now commonly met with, and are often followed by sudden death, which was very exceptional before the use of Organic Arsenic.

Sudden or rapid death seems now to be almost the rule among those treated with full courses of Organic Arsenic.

There are indications that nature is working out a cure for herself by attenuating the virulence of the trypanosome, or by some other factor or combined factors.—L. ii./09,1193; B.M.J. ii./09,767; see also Jl. Trop. Med., Nov. 15, 1909.

Set of appliances for removing blood and staining.—L. ii./09,1220.

The most complete recent *résumé* on the subject may be said to be the "Report on Measures adopted for the suppression of Sleeping Sickness in Uganda, by Sir H. Hesketh Bell, K.C.M.G.," being Parliamentary Colonial Report, No. 63. Uganda, from which we take the following notes:—

The disease appears to have come from the Congo basin. At Kampala in 1901 eight cases of a mysterious disease were first noted.

The total mortality in the Uganda Protectorate from the scourge up to end of 1906 considerably exceeded 200,000. A number of investigators were sent out by the Royal Society. Koch, who arrived in 1906, devoted himself to curative methods, using Atoxyl in particular in large and repeated doses. The method seemed hopeful, but in view of the protracted duration of the disease, and variety of the phases, some years would have to elapse before any cure could be considered permanent. The disease so far appears to be *incurable*. The best recommendation seems to have been to remove the entire population to fly-free areas. Citronella plantations are in a flourishing condition, and probably drive away several kinds of noxious insects, but they have been disappointing, *c.f.* p. 702. The segregation camps justified existence in several particulars. Drugs have prolonged lives, but not a single undoubted cure among thousands of cases that have passed through the camps.

In February, 1909, Kleine stated that the trypanosome must pass through a cycle in the fly of at least 17 days, and until this had happened it was unable to transmit the disease. He proved flies capable of conveying infection up to the 75th day. Bruce later found *Glossina palpalis* capable of retaining infectivity for two years.

Deaths during current year (1909) only 459, as against 5,000 in 1907. *Vide* also Na. May 5, 1910, p. 280, for a recent *résumé*.

Excessive liability of European women in Africa to trypanosomiasis, owing to skirt form of dress.—B.M.J. i./10,72.

See Sodium Arsanilate, Arsacetin and other Organic Arsenics also Antimonial Compounds (Antimonii et Sodii Tartras, Injectio Antimonii Oxidi, Cinnamica, etc., for recent treatment and refs.

DOURINE OR MALADIE DE COIT.—Trypanosoma Equiperdum found in, in Canada.—L. i./07,1315.

Tuberculosis.

The deaths from tuberculosis amount to 60,000 in England and Wales alone in a single year.

Only 4% of married persons take consumption one from the other.—B.M.J.E. ii./05,9.

Contrary to public opinion regarding cow's milk as the source of infection, *absence of air and light* from the home and school seems to be the chief etiological factor. Tuberculosis flourishes in not a few countries where feeding with milk from cows or other animals appears unknown.—L. ii./09,284.

The only way for the Local Govt. Board—not local authorities—to effect a complete change in present conditions of supply of milk would be to appoint competent Veterinary Surgeons to examine all dairy farms and to insist that all tuberculous cows be slaughtered, recompensing the farmer—this to come out of National funds, not out of local rates.—Williams, London Pure Milk Association.

Milk and Dairies Bill for Scotland, see P.J. Supp. i./09, 391, B.M.J. i./09,1451.

In all forms of tuberculosis there is bacteriæmia—is the opinion of a worker. The sweeping conclusion that the tubercle bacillus is always present in the blood in tuberculosis cannot be accepted without confirmation.—L. ii./09,1884.

The sheep and horse are resistant to tuberculosis. Their blood plasma may prove a suitable remedy.—Paton.

Tuberculin, Old, Tuberculinum Kochii, P.G. iv.

That of P. Belg. is similar.

This is an amber coloured liquid—an old glycerin broth culture of the tubercle bacillus (*typus humanus*) boiled and concentrated, from which the bacilli have been removed by filtering. It is supplied in 1 Cc. bottles. This is now used (a) as a *diagnostic* both in man and beast, and (b)—(*German method*) as an injection for the cure of disease due to growth of the tubercle bacillus.

(a) *To diagnose tuberculosis in man.* The patient's temperature must not exceed 98.6°F. at the time of injection. *Dose.*—One-thousandth of a cubic centimetre (0.001 Cc.) diluted to 1 Cc. (termed a 'No. 3 Dilution'), or if patient is weakly, or a child, use $\frac{1}{10000}$ Cc. (0.0001 Cc.) in 1 Cc. Fluid (called a 'No. 4 Dilution').

If there is no rise in temperature after the first injection, inject a double dose on the next day but one following. If the first injection causes even $\frac{1}{2}^{\circ}$ F. rise, wait until the normal temperature is reinstated, and inject the same dose again. If the reaction is now more violent than after the first injection tuberculosis is undoubtedly present. If no reaction appears after the first small doses, the dose may be increased to 5 Cc. of Tuberculin No. 3 (above mentioned) and finally to 1 Cc. of Tuberculin Dilution No. 2, i.e., $\frac{1}{100}$ Cc. of the strong liquor. If there is no reaction on twice repeating the latter dose one may conclude that no recent or progressive tuberculosis exists.

As a diagnostic of tuberculosis in cattle its injection into healthy animals produces no reaction, while in tubercular beasts there is a constant rise of $1\frac{1}{2}$ to 6° F. after injection. The diagnostic dose of the Lister Institute Veterinary product for animals is 16 minims.

It is important to note that after a dose of Tuberculin in cattle, a further dose during six months may fail to again produce a rise in temperature.

'Sterules' of this and other tuberculins are supplied (freshly prepared) ready for use in man, and may be conveniently arranged so as to have a dose in 1 Cc., or in 20 minims as desired, according to the graduation of the syringe employed.

Effects of Injection.

The tuberculin seems to act upon the tuberculous lesions, and even partly destroys them—it is not definitely destructive to the tubercle bacilli—or their surroundings, and subsequently there is a risk of further symptoms from blood poisoning dependent on this. In many instances the tuberculin has appeared to cause a very serious fall in blood pressure, leading even to a fatal issue; in others the mischief has seemed to be due to a coagulating influence on the blood corpuscles, tending to blood stasis, congestion and hæmorrhage, especially in unhealthy areas adjacent to tubercular deposits; and again tuberculin does at times show an irritant effect on the leucocytes, causing inflammatory swellings.

For diagnosis (? tuberculous kidney) there is little danger of an undue reaction if care be taken in selecting dose and patient. Temporary localised tenderness in the loin, and alteration in character of the urine (presence of pus cells and Tubercle Bacilli) often indicate both the site and nature of the suspected trouble.—B.M.J. ii./08,997.

The reaction (rise of 2 to 3° in temperature) lasts for a few hours only, and is accompanied by slight malaise.—B.M.J. ii./08,126.

Treatment with Old Tuberculin (as Remedial agent).

Some favourable results have been noticed in cases of commencing phthisis pulmonalis, and in skin affections, especially in lupus of the face, but it is not suitable where phthisis is far advanced.

The behaviour of the patient during the diagnostic test will have afforded indication of the degree of sensitiveness towards old tuberculin. It is impossible to draft a scheme applicable to all cases.

Dose.—The quantity of Tuberculin which affords an undoubted reaction in the diagnostic test is regarded as the initial dose.

No new injection may be made until the temperature has returned to normal and the patient's general condition is satisfactory. As a general rule the dose is doubled at each injection.

For example, if the patient has in the diagnostic tests reacted in typical manner to an injection of 1 Cc. Tuberculin (Old) Dilution No. 3, he receives after the subsidence of the symptoms (and in any case not before the second day) an injection of 2 Cc. Tuberculin Dilution No. 3 (*to inject the same dose would be useless, and a smaller dose absolutely wrong*); if the reaction is not very considerable the dose at the next injection is increased to 5 Cc., of the same Dilution, and then one proceeds to use Tuberculin Dilution No. 2, (*i.e.*, diluted 100 times), passing from 1 to 2 and to 5 Cc., and so on. For sensitive patients, who exhibit a violent reaction, and particularly if the general condition is unfavourably affected, the increase of dosage must be made more gradually; for instance 2 Cc. Tuberculin Dilution No. 3 is increased to 3 Cc. instead of 5 Cc., then to 4 Cc., and in like manner the progress from 5 Cc. Tuberculin Dilution No. 3 to 1 Cc. Tuberculin Dilution No. 2 is made with intervening stages.

Generally speaking the Tuberculin Treatment may be regarded as finished when the dose of 5 Cc. of Tuberculin Dilution No. 1 has been reached, but higher doses and even undiluted Tuberculin may be tolerated after the fundamental immunity has been established by the foregoing treatment.

After a pause of three or four months the cure may be recommenced if necessary. This secondary period of treatment should also be preceded by a diagnostic test.

Site of Injection. The injection is made subcutaneously where large folds of the skin and underlying tissues can be raised, avoiding, however, such parts as the patient is in the habit of lying upon.

Bovine Tuberculin (Old) 'Perlsucht Tuberculin' is exactly analogous in strength and use to the Tuberculin Old, but is prepared from a *typus borinus* of *B. tuberculosis*.

Tuberculin O. (This is *not* Old Tuberculin).

Consists of the '*obere*' or upper layer of solution of bacilli cultivated on glycerin serum which are desiccated and treated with water. Tuberculin R. is the solution of the residuum. This latter is Tuberculin "New" introduced in 1897. It is, in reality, a solution or emulsion of the bacilli in distilled water and centrifugalised: it is not boiled.

Tuberculin TR. New Tuberculin. (Koch). (That supplied commercially is of the *human type*.) It is an opalescent liquid containing 2 milligrammes of solid substances in each Cc., and not 10 milligrammes as stated in the past. It keeps well. *This is used for treatment only*, and not for diagnosis.

Dose.—0.0002 Cc. (*German procedure* as distinct from the *English dosage*, vide p. 797).

To render results published prior to 1908 correct, or rather comparable with the new figures, if practitioners continue to employ a 'solid substance' basis, it will be necessary, *owing to an error of Koch's, to divide by 5 former figures used in dosage*, but we advise a change over to the decimal part of a Cc.—that above indicated is an *initial dose* [equivalent to 0.002 ($\frac{2}{1000}$) Mgr. solid substance, *as was thought*, but actually 0.0004 ($\frac{4}{10000}$) Mgr.].

With a view to getting over the difficulty above referred to, the Manufacturers indicate the dosage by decimal parts of a Cc., without reference to the 'solid substance.'

(Prof. Ruppel, however, says there was no error—confusion having arisen from want of knowledge of method of manufacture of T.R.—the strength remains the same. — B. M. J., 1, 1908, 463.)

Injections according to the *German procedure* are made in any part of the body, as mentioned, p. 794.

They should, as a rule, be made every second day with a moderate increase of dose, so that a rise of temperature greater than 0.9° F. is avoided. If more violent reactions occur, before the next injection is made a complete subsidence of any febrile symptoms must be awaited. When a dose of 0.5 Cc. of the original preparation has been reached, not more than two injections weekly should be given, and for even larger doses (1 to 2 Cc.) only one injection in each week is recommended.

If an injection of 2 Cc. of the original fluid is tolerated without any reaction the treatment is discontinued or injections are only made at longer intervals.

For the *initial dose* a sufficiently small quantity of the preparation is selected that no reaction may be expected. If contrary to expectation a rise of temperature occurs, the subsidence of the reaction should be awaited, and then about 3 or 4 days later the same dose again injected.

In the majority of cases a quantity of 0.0002 Cc. of the original liquid, as already stated, has proved satisfactory as an initial dose. This is diluted for use with 20% Glycerin Solution to 3 minims (0.2 Cc. or two divisions of the Koch or Pravaz syringe *q.v.*) for injection. *Personally we should re-*

commend the volume to be made 10 to 15 minims as being more convenient with the ordinary syringe.

The large doses advised by Koch preferred to the homœopathic methods of Wright.—B.M.J. ii./o8,1500.

German dosage preferred, giving at short intervals increasing up to 1 to 2 Cc. of the original solution. May be given *per os* equally well as subcutaneously, etc.—B.M.J. i./o9,902.

In Germany the aim is to reach the maximum dose—L. ii./o9,1147.

Relationship between Human and other forms of Tuberculosis.

The late R. Koch denied that bovine is identical with human tuberculosis, and believed that cow's milk and meat cannot give rise to human tuberculosis.—*c. f.* B.M.J. ii./o1,190; L. ii./o1,187; L. ii./o3,333.

V. Behring demonstrated a very close relationship between them.—B.M.J. i./o3,806. Koch's work and theory disproved: the organism is the same in both—Römer, Marburg.—L. i./o5,658.

The bacilli in man and cattle may be different varieties of the same species. Discussion.—L. ii./o3,333,352,399,473,560,744,788. Human tuberculosis is more generally the result of man to man infection.—L. ii./o3,850.

SECOND INTERIM REPORT OF ROYAL COMMISSION ON HUMAN AND ANIMAL TUBERCULOSIS. The matter can only be settled by prolonged investigation and systematic record.—L. ii./o7,714; B.M.J. i./o7,323.

The injection of various strains of bacilli of human origin into animals produced two groups (1) virulent and (2) slightly virulent types of the bacillus.—P.J. ii./o7,569.

Raw takes a middle view, namely, that the two are varieties of one common species. He claims that cases of infection with the *typus bovinus* do best with human tuberculin, and presumably by contra that those due to the *typus humanus* will do best with Tuberculin of bovine origin. The appropriate strain is probably essential for correct treatment. It is probably best to commence with ordinary T.R., and if no improvement proceed with T.R. of bovine strain.

A letter agreeing with Raw's views.—B.M.J. i./o9,928.

THIRD INTERIM REPORT OF ROYAL COMMISSION. Experiments with regard to infectivity of faeces of tuberculous cows showed that faecal matter of cows obviously suffering from extensive tuberculosis of the lungs or alimentary tract must be regarded as much more dangerous than matter from the mouth and nostrils (*e.g.*, in coughing). The faeces of such contain large numbers of virulent tubercle bacilli. These experiments were suggested by the fact that milk as supplied to the consumer is almost constantly infected with dirt of various kinds from cows and cow sheds.—L. i./o9,492.

Human and Avian Tubercle Bacilli compared. The former is pathogenic to the pigeon to a very limited extent only. The bacilli are not identical and the human bacillus is not convertible into the avian by inoculation into the bird. Negative evidence however with Opsonic Index Test.—L. ii./o7,1443.

The avian bacillus as tested from various kinds of birds is pathogenic to the guinea pig in very limited degree. Further experiments to ascertain whether repeated transmission of the avian bacillus through the guinea pig, or whether repeated transmission of the human through the pigeon would increase virulence. In both cases negative result—the avian does not become any more 'human' or virulent, and the 'human' passed through pigeons continues to set up no more than a purely local lesion. White rats injected with a pure culture of 'avian,' also with the tuberculous spleen and liver of a pheasant dying from typical tuberculosis, tended to show that the white rat is immune to the 'avian,' whether experimentally injected or whether it is introduced in large quantities by the mouth.—L. ii./o9,1739.

Avian form of tubercle bacilli is a modified form which has become adapted to the species from an origin common to it and mammalian forms.—Koch, B.M.J. ii./o8,1499.

INTERNATIONAL CONGRESS AT WASHINGTON.—Bacilli of the bovine type have been found in the cervical lymph glands of man, and in relation to the human intestinal tract, but with few exceptions these bacilli are but slightly virulent for man and remain localised. The crusade must be against the 'human' type.—Koch. Koch had lost his battle. He stood alone in the field.—B.M.J. ii. 08,1190,1201.

Necessity of stamping out tuberculosis in childhood.—B.M.J. i./09,387.

Pulmonary tuberculosis is in immense majority of cases probably not contracted by inhalation but the germs enter through the intestinal tract. Future research will explain how in China, where the consumption of the milk of bovines is practically nil, tuberculosis is everywhere prevalent amongst the natives.—Whitla. B.M.J. ii./08,63.

Results of tuberculin test on cattle compared with a number of cases of tuberculosis in people employed on the farm in question. Conclusion was that tuberculosis in man and that in cattle have a certain relation to each other. Reaction in cattle on farms where human tuberculosis has been traceable occurs nearly three times as frequently as on farms where this disease was not found.—L. ii./08,362.

Good review of difference between Human and Bovine.—Bonney.—*Vide* B.M.J. i./09,669; *vide* also B.M.J.E. 1./09,12,100.

English Dosage in conjunction with Opsonic Index Determinations.—The English School start with a small initial dose, *viz.*, 0·00001 Cc. or 0·00002 Cc. of T.R. (**human type or bovine type** or the two **combined**), and do not look for any marked rises in temperature.

Tuberculin, T.R. (Human Type).—This preparation may be employed in tubercular infections wherever situated, but especially in cases of early apical pulmonary phthisis. In all other varieties, such as tubercular glands, joints, bladders and kidneys, and in lupus, treatment may be begun with this preparation. If no improvement result after three injections, substitution of T.R. of bovine type, or of the mixed human and bovine types is advisable. Dosage and time for administration should, if possible, be controlled by determinations of the opsonic index.

The Index is taken daily after the injection to observe when the negative phase passes off—in 80% of the cases in 8 days. If no response the dose is increased until it is reached. Maintain this dose for 2 or 3 injections and then increase until further injection ceases to give marked alteration of Index. Then diminish doses at increased intervals.

By the use of small doses, especially if the progression be gradual from low dose (0·00001 Cc.) to higher doses (up to 0·001 Cc.) no ill effect can result and much good may accrue in most tuberculous infections. The intervals may vary from 8 to 14 days, and are to be controlled by pulse rate, temperature and other clinical signs and symptoms.

Before treatment arrest auto-inoculation by rest—physical and mental.

Site of injection:—where the skin or flesh can be raised in large folds.

Steriles, Hypodermic are prepared containing from 0·00001 Cc. to 0·0001 Cc. of 'T.R.'

Tuberculin by the Mouth.—

D'Arcy Power at St. Bartholomew's Hospital administered 'T.R.' by the mouth to ascertain curative value:—

Rise of temperature accompanied smallest doses, even 1/100,000 mgr., which is an initial dose. If the temperature fell and remained uniform at or below normal, the dose was given every other morning before breakfast, but if it rose or became irregular the dose was increased by doubling the quantity without increasing the frequency. It is useful in the slighter cases of

surgical tuberculosis. Also in cases of sinuses after operation difficult to heal. Valuable in enlarged cervical glands not extensively caseated or suppurated.—B.M.J. ii./09,766. c.f. also pp. 765, 799, 800.

Tuberculin P.T.R. (Perlsucht Tuberculin Residuum). *Syn* N&W BOVINE TUBERCULIN or Tuberculin T.R. Bovine.

Sterules, Hypodermic are prepared containing this 'Bovine T.R.' from 0·00001 up to 0·0001 Cc. *The Germans begin as before with 0·0002 Cc.*

This corresponds with 'T.R.' in every way excepting that the *typus bovinus* is used.

It is recommended in such cases as have failed to show improvement under gradually increasing doses of T.R. (human type) and above all in lupus, adenitis and joint disease. Treatment of tuberculosis of the intestine and abdominal and cervical glands in children should (R. W. Allen) be carried out with this preparation—dosage, &c. as for tuberculin of the human type. (See the conclusion of Raw, *ante*, p. 796).

N.B.—The problems as to the relationship existing between the human and bovine 'types' of Tuberculin are still sub judice, and require further lengthy consideration of pathologists.—B.M.J. i./08, 815.; vide also B.M.J. i./09,408.

Tuberculin T.R. (Mixed Human and Bovine Types in equal amounts) is used in pulmonary phthisis in children, or secondary to tubercle elsewhere. In view of the doubtful type of the infection in most tubercular lesions, some authorities advise a preliminary trial of this preparation in all cases except those of well-defined apical phthisis. Total dosage as for T.R. (human) at similar intervals.

Sterules, Hypodermic are prepared containing 0·00001 up to 0·0001 Cc.

General References to Tuberculin and Treatment.

Living tubercle bacilli have been found in Koch's Tuberculin. It is a good precaution to heat to 60° C. for one hour to kill same, and to add 0·2% Trikresol. This does not harm the Tuberculin.—Wright and Douglas.

Good effects in nine cases of tuberculous disease, phthisis, and for lupus.—B.M.J. ii./08 77; B.M.J. ii./97,207; L. i./98,168; B.M.J. ii/98,80.

Tuberculosis of knee. Sinus closed under repeated doses of $\frac{1}{800}$ milligramme.—B.M.J. i./06,204.

Good results with Wright's method, *v. infra*.—L. i./06,1070.

Some experiments on monkeys with bovine and human tuberculous material; those fed with the bovine material gave no evidence of tuberculous ulcers in the intestine, while every animal fed with the human had intestinal lesions.—L.ii./03,745.

Gibbons' monkeys equally susceptible to both kinds of bacilli—hence by analogy mankind also.—B.M.J. ii./06,720.

Tuberculous interstitial keratitis treated by sub-conjunctival injection.—L. ii./03,403.

Bovine tuberculosis when present in man occurs almost exclusively in children under to years or age.—B.M.J. i./06,701.

Tuberculosis treated by the toxin of bovine tuberculosis as an immunising agent.—B.M.J.E. ii./04 47.

Review of Koch's old and new tuberculins as curative agents.—B.M.J. i./05,292.

Tubercular cystitis marked improvement under treatment with Tuberculin T.R., commencing with $\frac{1}{20}$ mgr., and increasing to 1 mgr. daily.—B.M.J. i./05,1089.

Good results in tuberculosis of the urinary system.—L. ii./05,1766.

In diagnosis of ocular tuberculosis the violent local reaction sometimes following the injection of Tuberculin may be reduced by injecting beneath the conjunctiva 1 Cc. of 1% Guaiacol Solution.—Oph. Apl. 1907,231.

Leishman's method of determining Opsonic Index simpler and more rapid than Wright's Modification of.—B.M.J. ii./07,948.

In tuberculosis of the urinary tract of undoubted service (T.R.)—B.M.J. i/07,858.

Sprengler's Inoculation Treatment.—L. i./08,892.

The Vaccines (including Tuberculin) have come to stay; failure to use Tuberculin in localised tuberculosis may be open to serious indictment.—B.M.J. i/07,859.

Advocating the general use of Tuberculin both within and without Sanatoria.—"Tuberculosis of the lung in the first stage can be cured with certainty by Tuberculin,"—Koch said.—B.M.J. i./07,1298.

Royal Commission. Comparative Histological and Bacteriological Investigations.—B.M.J. i./07,697.

Koch's statements on the position of combat against tuberculosis.—L. i./06,1449.

Lupus treated with Tuberculin vaccinations (T.R.)—L. i./08,923 1000.

In genital tuberculosis T.R. better than heroic operations. In urinary tuberculosis improvement under T.R. but never a cure. In genito-urinary tuberculosis amelioration of symptoms. Frequent micturition diminished. In tuberculosis of the genital or urinary systems with tuberculous disease elsewhere not so good.—Pr. May, /08,723.

Tuberculous meningitis may possibly be deprived of its terrors by timely inoculation with Tuberculin. Successful in lupus and tuberculous peritonitis.—B.M.J. ii./08,1085.

Forty-seven patients treated with Tuberculin (Koch New) Dose of $\frac{1}{1000}$ to $\frac{1}{100}$ mgr. hypodermically—one with Bovine Tuberculin. Three of the patients received Tuberculin *per os* $\frac{1}{1000}$ mgr. in 12 divided doses—one dose thrice daily. Results good throughout.—B.M.J. i./09 138.

Tuberculosis (of joints) well treated by Denys' Tuberculin, which is prepared like T.R., excepting that it is not reduced in volume at the finish. It is presumed to contain therapeutic material in addition to toxic. The therapeutic is thought to be killed by Koch's method.—L. i./c8,1152.

Clinically there is no difference between effects of Old Tuberculin, Koch's Bacillary Emulsion and Denys' Tuberculin.—B.M.J.E. ii./08,71.

The preparation is termed Bouillon filtré (B.F.). It is prepared in several solutions for use:—

B.F. III is undiluted B.F.

B.F. II is B.F. diluted to $\frac{1}{10}$ its strength.

B.F. I is B.F. diluted to $\frac{1}{100}$ its strength.

B.F. O is B.F. diluted to $\frac{1}{1000}$ its strength.

and so on down to

B.F.O. at $\frac{1}{1000000}$ in B.F. diluted to $\frac{1}{100000000}$ its strength,

0.1 Cc. B.F. III is equivalent to 100 mgr. of B.F. undiluted.

and so on down to

0.1 Cc. of B.F.O diluted to $\frac{1}{1000000}$ is equivalent to $\frac{1}{1000000}$ mgr. undiluted B.F.

A work by Denys, *Le Bouillon filtré du bacille de la tuberculose dans le traitement de la tuberculose humaine*, is stated to be indispensable if one wishes to effect a cure with the preparation.

Assuming that immunity against certain diseases is frequently due to the absorption of the products of dead micro-organisms from the alimentary canal, the administration of various vaccines by the mouth, notably Tuberculin, T.R., has been tried, with result that it has been clearly demonstrated that satisfactory immunisation can be so produced. In tuberculosis and other diseases of bacterial origin in which fever was present there was a definite relation between the curve of the Opsonic Index and the temperature. **Horse Serum** in certain cases has an effect on the opsonic content of the blood.—L. i./08,934; B.M.J. i/08,769, *c.f.* also p. 818.

The statement that it is possible to produce immunising response in the blood by giving these and other vaccines by the mouth on an empty stomach was amply confirmed. A dose by the mouth is equivalent to about $\frac{1}{2}$ the same dose under the skin. L. ii./c8,1280.

With regard to **Normal Horse Serum**, it is stated that a dose of tuberculin

in 10 Cc. of same is less likely to cause rise of temperature than the same dose in 10 Cc. of Saline. The *German method* of increasing doses is *not advised*—it is only satisfactory in a limited number of cases. *Tuberculin is a dangerous drug.*—L. ii./08, 1280.

Horse Serum (*vide* also p. 818). Investigation of the value of this gave negative results. The opsonic value of normal horse serum is much lower than that of human serum or than that of patients suffering from chronic pulmonary tuberculosis. The addition of normal horse serum to normal human serum *in vitro* tends to lower the opsonic value of the human serum.—L. ii./08, 440.

Treatment of Chronic Gastric and Duodenal Ulcer with Antilytic Serum (*i.e.* fresh normal horse serum). The serum is given by the mouth 3 or 4 times daily directly after food in $\frac{1}{2}$ ounce of water. 60 or 80 Cc. may be given in 24 hours. The serum must be fresh or serum deprived of its globulins thus rendering its antilytic value artificially increased. A fair idea of the potency of the Serum can be gained by observing its action on an old long-standing wound—if it does not produce a good reaction in 24 to 36 hours it is useless for the purpose.—Hort. B. M. J. ii./08, 1081.

Normal Horse Serum injections with small dry meals, mainly meat, in acute cases of duodenal ulcer.—B. M. J. i./10, 28, 76.

Ulcers, superficial, do well with a dressing of sterile gauze soaked in sterile Normal Serum.—B. M. J. i./10, 77. See also B. M. J. i./10, 360.

Rabbit's Serum, fresh in 30 Cc. injections subcutaneously 24 hours before operation. Stated to be valuable to prevent hæmorrhage.—B. M. J. ii./09, 939.

Hæmophilia treated by horse serum.—L. i./09, 149.

Consumptive treatment (Review). Large doses of tuberculin (up to 1 Gm. or higher) with good result.—L. i./09, 768.

Surgical tuberculosis. 162 cases treated with T.R. (human) with good result.—L. ii./08, 1082.

Lupus treated by Tuberculin Ointment (3 to 5% in vasenol). B. M. J. ii./08, 502.

Serum by the mouth with Vaccine has shown that the Vaccine can be given in much larger doses. There is evidence of a person with high antitryptic index being unable to respond in the same degree to an inoculation as one with a low index.—L. i./09, 970; also p. 980.

Three years experience with Tuberculin. German dosage with rapid increase to 1 to 2 Cc. of the original solution.—L. i./09, 984.

Hip joint disease—10 cases. Six improved very considerably. A valuable remedy, especially in joint disease of old standing. Separate Vaccines desirable.—L. ii./08, 828.

In lupus remove crust and encourage lymph flow by local use of dilute Salt and Sodium Citrate Solution. Streptococci and Staphylococci may be present—these must also be attacked by appropriate Vaccine.—Sir A. E. Wright, L. ii./08, 731.

Early tuberculous infection in children.—T.R. preferable all round to P.T.R. It was given both hypodermically and by the mouth. For treatment by mouth $\frac{1}{1000}$ to $\frac{1}{300}$ mgr. results disappointing. Hypodermically $\frac{1}{10000}$ for initial dose to an infant 9 months old to $\frac{1}{30000}$ mgr. for a child 12 years old. Repeated weekly and fortnightly, increased very slightly and at long intervals. Diminished vitality during the few days following injection was taken as sign to either diminish dose or increase intervals between doses. It was aimed to produce after each dose steady improvement.—L. ii./09, 1745.

Tuberculin is a remedy of first importance in the treatment of tuberculosis. By its administration an agent is provided closely related to the infecting organism in the hope that nature's own effort at immunisation may thereby be reinforced.—R. W. Philip, address in Medicine, B. M. A. Meeting.—L. ii./09, 281; B. M. J. ii./09, 256.

There is still much to learn as to the actual relationship between the Opsonic Index and the production of immunisation. Everything points to the early and final disappearance of the disease.—*Ibid.*

In tuberculosis of the eye the Opsonic Index is extremely variable. It may be as low as 0.4 or 0.5, or as high as 2.2. It is usually well above the normal. As there is often complication of tuberculosis elsewhere tending to lower the index Calmette's Test is not of much assistance as it indicates tuberculosis in other parts of the body. To secure the best results in eye infections, doses considerably in excess of those, which would be used in similar localised infections elsewhere, must be employed and increased, if necessary, with bold-

ness. The area of infection is small, the blood and lymph flow limited, the resultant amount of toxæmia and of opsonin brought to the part correspondingly small, large doses of vaccine may, therefore, be safely employed, without fear of increasing the toxæmia, to elevate the opsonic index to such a height that adequate opsonin may be brought to these parts.—R. W. Allen. Pr. May '08, 737.

Tuberculous invasion of the lung as contrasted with pneumococcic infection. The whole effort of the tuberculous lesion is to cut off the circulation and starve itself into a necrotic condition.

The pneumococcic congestion is very different. These points alone emphasise the difficulty in treating phthisis by any particular specific means, and the ease with which pneumonia yields to bacterial inoculation. There is, however, in phthisis an inherent power of the individual to respond to inoculations, whether artificial or self-induced. It is noted that young people infected with a rapid form of phthisis, respond very feebly to Koch's tuberculin in minimal doses; but with older patients, whose history shows attempts at self-immunisation, results are very encouraging; but here we are often confronted with cavities—potential abscess cavities—which we cannot drain.—Pr. '09, 654.

Tuberculous glands in children well treated with $\frac{1}{1000}$ to $\frac{1}{1000}$ mgr. (T.R.) Pr. '09, 657.

St. Mary's Hospital results of inoculation treatment of tuberculosis. Tuberculous lymphatic glands 79 cases—27 cured, 22 much better, 18 better, 8 are unchanged, and 4 are worse. Best results to be anticipated in young children and young adults between 15-25. Ulcer sinus and abscess 50 cases treated. 10 cures, 20 much better, 9 better, 8 unchanged and rest doubtful. Average dose here was $\frac{1}{1000}$ mgr. minimum, and $\frac{1}{1000}$ mgr. maximum for children. $\frac{1}{1000}$ mgr. min. to $\frac{1}{1000}$ max. for adults. Details also given in results with genito-urinary cases and lupus. In the latter Max. doses vary between $\frac{1}{1000}$ mgr and $\frac{1}{1000}$ mgr. Treatment averaged 2 years in the successful cases.—B.M.J. ii. '09 532.

Graduated Labour Treatment.—Address in Medicine on Vaccine Therapy. Consideration of spontaneous auto-inoculation. Spontaneous auto-inoculation is believed to be the cause of the irregular fluctuations in the Opsonic Index of a patient suffering from advancing pulmonary tuberculosis. When graduated labour was introduced as an adjunct to sanatorium treatment it was not realised that in addition to the benefit from the increased functional activity of the organs and tissues of the body, patients were at the same time treating themselves with doses of tuberculin of their own manufacture.—B.M.J. ii. '08, 248. Curative effects are produced in quite early pulmonary tuberculosis by means of these artificial auto-inoculations by allowing the patient to take *sufficient* exercise. "In theory, the ideal treatment should consist of reduction of auto-inoculation, and then artificial immunisation with tuberculin. But clinically, these cases want more than this: the loss of weight, and poor general condition of body and mind, have to be corrected, if the patient is to be returned in the shortest possible time. To effect this, we must look beyond the injections of Tuberculin, and must take the patient to pure invigorating air and healthy surroundings, and put him through a course of physical exercise carefully graduated for his individual needs and constitution." Rest is essential in febrile cases of consumption, and in these cases injections of Tuberculin, using as a guide the Opsonic Index, is the treatment indicated.—Pr. May, '08, 665.

Auto-inoculation in graduated labour treatment. There is no attendant rise in temperature, and there is decrease of sputum. Irregular pyrexia indicates activity of the disease, i.e., auto-inoculation of toxin. Every step is taken to prevent exertion in these cases. Sanatorium treatment com-

prises (1) Ideal hygienic conditions; (2) artificial inoculations of tuberculin added to the former; (3) prevention of excessive auto-inoculation; (4) graduated exercises to induce auto-inoculation.—B.M.J. ii./09,1055.

Opsonins are non-dialysable proteid substances contained in the serum or plasma of the blood—they are probably formed in the muscle tissue. They possess the power of influencing bacteria in such a way as to render them more easily attacked by phagocytes.

In addition there are said to be bodies variously named agglutinins, precipitins, lysins, and stimulins. To the last named Metchnikoff in particular attributes the power of stimulating the phagocytes to destroy invading organisms. This worker assigns to 'Opsonins' a secondary rôle.

The demonstration of the presence of some such body or bodies by cultivation of (a) Bacterial Emulsion and washed corpuscles compared with (b) Bacterial Emulsion and corpuscles *previously acted upon by Blood Serum* is a comparatively simple and conclusive experiment proving its or their presence.

Opsonins are by some workers thought to be allied to the 'complement' in Ehrlich's Serum Side Chain Theory *q.v.* On the other hand there seems ground for viewing Opsonins in the nature of a ferment—their action is, to a certain extent, independent of quantity, and they are decomposed by heating Serum at 60° C.; on the other hand, in the dried condition they will withstand 120° C. Experiments show that there exists a **Preopsonin** which, when necessity arises, yields the appropriate Opsonin for a given bacterium.

It is obviously necessary at the outset to determine the nature of the disease to be treated by the examination of the blood or pus.

The **Opsonic Index** for a given organism, *e.g.*, *B. Tuberculosis*, is the ratio of the opsonic power of the serum of a patient as compared with that of the normal being.

Method of Collecting Blood for Determination of the Opsonic Index.

Cleanse the index finger or thumb of the hand with a little spirit and water or warm soap and water without using antiseptic. The patient must then swing the arm round from the shoulder a few times so as to concentrate the blood into the hand as much as possible; a bandage or handkerchief is then wound tightly round the second joint of the finger or root of the thumb respectively, and the joint firmly flexed. Should swinging the arm be considered inexpedient, the limb should be held pendant for a few minutes instead. A puncture should then be made near the base of the nail with a lancet, or a flat needle. The finger may then be turned over and the blood allowed to run (the first drops being rejected) into the short end of a **Wright's Tube** or modification of it, which is afterwards sealed at both ends, particular care being taken not to heat the blood. If the finger is not suitable owing to thickened epidermis, puncture the lobe of the ear instead.

Capillary tubes are filled with equal quantities of (i.) **washed blood corpuscles**. For collection of the Blood Cells a suitable pipette is necessary, *e.g.*, made of $\frac{1}{4}$ inch glass tubing with strong teat attached, and the point drawn out in a fine even capillary tube. A little *Sodium Citrate Solution* 2% to prevent coagulation is first drawn up followed by the blood—the ultimate dilution being about 1 in 6. The corpuscles are then centrifuged in

a centrifuge with hæmatocrite attachment,—(the red corpuscles being heavier are deposited below the white and are rejected), and washed with 0·8% Sodium Chloride once or twice. (ii.) **Suspension of tubercle bacilli.** This in the case of T.B. may be preserved, if killed by heat at 70° C. in a sealed tube, and must be free from clumps, otherwise should be an 18 hours' culture. Ready stained organisms have been suggested for the purpose.—B.M.J. i./07,866. The strength to be such that 150 to 250 Bacteria appear in the 100 normal cells counted. (iii.) **Serum to be tested.** Equal volumes (Wright) of these are mixed in the capillary pipette and incubated 15 minutes at 37° C. The average number of bacilli ingested per corpuscle is then determined by spreading films by the slide method and staining same with Carbol-Fuchsin, or by Leishman's method for organisms other than tubercle bacilli, the number of bacilli taken up by at least 100 phagocyte cells being counted. *In like manner a determination is made with an equal quantity of a normal serum or of a mixed average serum; the ratio is then indicated.* **The Tuberculo-Opsonic Index** in particular has been the subject of considerable investigation. *A lowered index to any organism, whether antecedent or the result of infection, always accompanies the disease in question, and the converse is also true.*

The Normal Tuberculo-Opsonic Index has been found to average 0·95. Bulloch found 0·96, Lawson 1·0 and Fleming (*vide infra*) finds normal limits 0·9 to 1·1.

An index below 0·8 or above 1·2 is said to be suggestive of tubercnlosis. The index is above 1 in slight early cases, variable in acute cases, below 1 in chronic cases.

Wright explains these by dividing infection into two classes—

- (1) *Local*—the opsonic power being permanently low and does not vary.
- (2) *Systemic*—great fluctuations and frequently above the normal. On injecting a vaccine there is generally first a diminution in protective substances, i.e., a fall in opsonic power. This is the "negative phase." Then follows a rise in opsonic power constituting the "positive" phase. By observation it has been proved that an injection should not be given during the negative phase, as that would increase this phase.

The subsequent gradual return to the normal opsonic content may be called the phase of 'maintained high level.'—Pr. May/08,661.

It should be noted that a female infected by any organism shows a marked lowering of the index to that organism at the menstrual period.

The factor in improvement is generally assumed to be a 'rising' index.

The duration of the negative phase in phthisis may be a week or more. It seems safest to wait over long rather than inject too soon—the psychological moment has, if possible, to be found by repeated determination of the 'Index' to inject before the fall subsequent to the positive phase which sets in and to make these positive phases accumulate.

Each phase should be allowed to work out its full advantageous effect, generally three weeks or so before the next injection is made.

Speaking generally, gradually increased dosage is to be employed.

The following is a table of possible results and conclusions to be drawn as to dosage in any case under treatment:—

Index 24 hours after injection.	Index 7 or 10 days later.	Deduction.
Slight fall.	Further fall.	Dose too large, or case unsuitable.
„ rise.	But little altered.	„ too small.
„ fall.	Marked rise.	„ correct.

If there be no alteration at 24 hours or later the dose has been too small. If this be the result a further dose should be given and effect observed.

The fluid portion of pus, and many serous exudations may be almost free from opsonins; in such cases it is necessary to remove fluids lacking in anti-bacterial power, and to provide lymph rich in such substances. This is done either by opening abscesses, as by tapping an empyema, or by injecting with 0·5% solution of Sodium Citrate with 5·0% of Sodium Chloride to decalcify lymph and induce osmosis.

An abnormally low index will assist in discriminating such conditions as:—

- Tuberculous kidney from malignant kidney or renal calculus.
- Addison's disease from pernicious anæmia.
- Tubercular peritonitis from malignant peritonitis,
- Tubercular laryngitis from malignant laryngitis.
- Tubercular pleurisy from malignant and other forms of pleurisy.
- Tubercular joints from syphilitic and gonorrhœal joints.
- Tubercular adenitis from Hodgkin's disease.
- Tubercular endocarditis from fungating and other forms of endocarditis.
- Tubercular keratitis and iritis from syphilitic and rheumatic.
- Tubercular epididymorchitis from syphilitic, adenomatous or malignant forms.
- Tubercular cystitis from that due to calculi, tumors, enlarged prostate, &c.
- Tubercular salpingitis from gonorrhœal,
- Tubercular ovary from malignant or cystic.
- Tubercular endometritis from malignant, &c.
- Lupus from syphilis or rodent ulcer.—R. W. Allen.

Fleming points out that the serum of the average ordinary healthy individual to be used as control in Opsonic Index estimations is practically speaking non-variable. Normal serum is therefore a good standard for comparison of infected persons from day to day.

He examined 44 healthy people with 635 estimations: 0·8% being under 0·9, 10·1% between 0·9 and 0·95, 76·7% between 0·95 and 1·05, 10·7% between 1·05 and 1·1 and 1·7% being 1·1. Thus the normal limits are 0·9 to 1·1.

He provides rules for counting the bacteria ingested by the leucocytes— which should be referred to, and summarises his results as follows:—With a diminution of the number of washed corpuscles in the opsonic mixture there is an increase in the amount of phagocytosis. Agglutination of the washed red corpuscles increases the amount of phagocytosis. The tuberculo-opsonic index is the same whether washed corpuscles are used from a healthy or tuberculous individual. If red corpuscles are taken up with serum the amount of phagocytosis is reduced. Serum sealed up in a capsule at room temperature retains its full power, in the case of healthy blood, for at least a week, and, in the case of pathological blood, for a day or two less. Blood capsules left widely open for several hours give very untrustworthy readings. Two practised observers can count the same slides, and obtain results in almost all cases within 10%. Duplicate estimations of the tuberculo-opsonic index of tuberculous patients can be performed, the results differing from each other by less than 20%, except in rare instances (2 in 52).—Pr. May '08, p. 607.

The experimental error in the investigation ranges from 4 to 13% in the case of a novice as operator.—Pr. May, '08, 639.

When to operate:—

If time will permit *before operating*, particularly in the case of tubercle, raise the *Opsonic Index* to obtain rapid healing. Wright estimates the

index to *B. Coli* in certain cases of appendicitis where this infection is suspected, so as to lessen risk of subsequent infection in operating.

If index is low inoculation should be given, and operation postponed, if possible, until resisting power is shown to be high.—Pr. May, '08, 712.

The following is, however, the other view:—

Unless a low index signifies a serious negative phase—and one can usually guess this by the condition of the patient—it seems to be the better period, since an operation has much the same effect as a large inoculation.—Stansfield Collier. Pr. May, '08, 696.

Preparation of the Vaccine:—

The **Vaccine** is best prepared from the organism isolated from the patient, but in case of *B. Tuberculosis* this is not essential, and there are many obstacles in the way in other diseases, e.g., in the case of *Gonococcus* it may be hopeless to secure a pure culture, and the loss of time may be of immense importance. In the case of tubercle it is suggested to employ a stock Tuberculin while a special one is being prepared from the case. *Staphylococcus Albus* and *Aureus* are usually in (i) a state of purity, though in limited numbers, or are (ii) mixed as in periostitis and osteo-myelitis. *Streptococci* are isolated from pus or blood (for the latter 5 Cc. at least are necessary). Dilutions of $\frac{1}{2}$, 1 and 2 Cc. with 10% of Sodium Citrate (*vide* above) are made with 10 Cc. of broth incubated at 37° C. The colonies develop in the clot which forms, and the organism is further isolated in the usual manner.

For *Gonococcus*, Blood Agar or Nutrose Ascitic Agar is used; for *Pneumococcus* employ Human Blood Agar. For *B. Coli*, McConkey's Medium (2% Agar containing 2% Lactose coloured by Neutral Red (*c.f.* 922) is used. *Friedländer's Bacillus* is isolated with ease by cultivation in broth—it inhibits all other organisms. *B. Septus* or *B. Coryzae Segmentosus* is easily plated from nasal or pharyngeal mucus. *M. Catarrhalis* from same source by aid of Blood Serum, or Blood Agar plates. *Morax-Azenfeld B.* or *B. Lacunatus* on Blood Serum Tubes from the serous secretion near the caruncle in chronic conjunctivitis. The *Meningococcus* from the cerebro-spinal fluid by lumbar puncture, and culture on blood serum.

The Vaccine is then standardised to a content of 125, 250, 500 and 1,000 million Bacilli per Cc., by mixing with an equal volume of normal blood together with 4 or 5 volumes of Sodium Citrate Solution, and counting the red corpuscles 'R' and the bacilli 'B' in a given area—knowing that a cubic mm. of blood contains 5,500,000 Red Corpuscles we have

$$\text{Number of Organisms per Cmm.} = \frac{5,500,000 \times B}{R}.$$

The next step is to devitalise the organisms by a temperature of 56° F., and introduce the Vaccines into $\frac{1}{2}$ and 1 Cc. tubes with another sterilisation.

When the body is lowered by disease it still retains a certain amount of reserve resistance, which small doses of devitalised organisms are able to call out. In the preparation of vaccine by devitalising them by heat insufficient to destroy them, objectors have asked how this could be done. Sir A. L. Wright (L. ii./08, 730) gave an illustration as answer. The body

throws into the blood antibodies or substances which resist anything introduced into it; *e.g.* if white of egg be introduced, the blood at once throws off substances to act as antidotes to neutralise it. If the egg-white were heated to a certain temperature it would be devitalised; no chicken could be produced from it, but if introduced into the blood it would still lead to production of antibodies. Estimation of opsonic power forms an incomplete valuation of the protective power but the only possible one to obtain at the present time. Protective power also depends on agglutinating power, phagocytic power of the leucocytes, bactericidal and bacteriolytic power of the blood and other factors. Objection has been raised to the opsonic index as being only partial in truth. Sir A. E. Wright says thousands of estimations have shown that there is a definite correlation between low index and low resistance to disease, as also between high index and curative processes. It had been said that the index was of no value because patients had died while the index was high—this probably was explained by the fact that the focus of the disease was inaccessible to the blood circulation—“*the protective substances must be brought into effective operation at the site of infection.*”

For a complete account of Vaccine Therapy and Stock Vaccines as made and used at St. Mary's Hospital—*vide* L. ii./08,925.

Opsonin References.

Edmund Owen criticises Wright's opsonin-treatment calling it a “Bacillary relish.”—L. i./06,1665.

The tuberculo-opsonic power of infant's blood is very much less than that of the mother, and it would be interesting to know whether any absorption can take place from the mother's milk.—B.M.J. i./07,865.

It is about the same in each case to the *Staphylococcus p. aureus*. The practical point is whether or not mother's milk is essential in remedying this deficiency.—B.M.J. ii./06,1785.

Tuberculo-Opsonic Index found low after antidiptheritic inoculation, but this has nothing to do with the specific antitoxin.—Bradshaw, L. i./06,1387.

Technique of the “qualitative” estimation of Opsonic Index.—L. ii./07,1841. Considerable experience on the use of Tuberculin.—L. i./07,279.

The insane, as a class, are particularly liable to tuberculosis. The average tuberculo-opsonic index of the non-tubercular insane is below that of the healthy sane. The Opsonic Index can be used as a measure of liability to infection. A low Opsonic Index precedes infection. Large doses Tuberculin can be injected into healthy persons without harm. The quantity of T.R. injected may therefore be of importance in diagnosis, as a small dose effects a reaction in infected cases.—L. i./07,1287.

Successes (at Toronto) with appropriate doses of New Tuberculin and estimations of Opsonic Index.—B.M.J. ii./06,1452.

A review of the whole matter with a clear statement on Opsonic Index determination. Wright and Douglas assert that Opsonins are thermo-labile, *i.e.*, destroyed by heat, and are therefore distinct from immune body, but Dean's work tends to disprove, and Bunch draws no distinction between them as they have not been shown to be different.—Bunch, L. i./07,144, 803.

Some excellent results with Tuberculin. Opsonic Indices estimated.—
L. ii./06, 1130.

On the combining properties of Opsonins of Normal Serum. Muir and Martin tested the three chief varieties of Amboceptors, namely, those obtained by injection of (a) red corpuscles, (b) serum and (c) bacteria respectively, and found in each case the combination of receptor and immune body removed the opsonin of normal serum as tested by an emulsion of *Staphylococcus pyogenes aureus*. A bacterium treated with immune body takes up more of the normal opsonin than the same bacterium untreated.—
B. M. J. ii./06, 1784.

Vaccine treatment combined with estimations will not work miracles, but the method is of real benefit to many patients—tuberculin injections valuable as adjuvants, e.g., to Light Treatment in lupus, to Hexamethylentetramine in bladder cases, and so on. It is handy to have the appropriate doses in little glass bulbs.—B. M. J. i./07, 256.

Emery's Work on Opsonic Index Determination. Under the guidance of Metchnikoff, leucocytes are now recognised as the prime factor in immunity—the antibodies and the other substances present in the body fluids play only a secondary rôle. The Germans, on the other hand, claim that immunity can be explained by the action of Antitoxins and bacteriolysins—though not denying the action of phagocytes. The English School, under Wright, view the phagocyte as the most important agent—but that it only acts, or acts best, in the presence of the special antibody termed 'Opsonin.' True Opsonins exist apart from amboceptor—by some thought probably identical.—
B. M. J. i./07, 496.

Whether the day of the opsonist passes or not (some other less laborious method of determining dosage may perhaps be found), the therapeutic position of Vaccines (including Tuberculin) is now assured. Details of a number of cases.—B. M. J. i./07, 859.

Tuberculosis at the very earliest age can be diagnosed. On injection of $\frac{1}{500}$ mgr. Tuberculin R. into non-tuberculous subjects, Opsonic Index rose, but when given to a tuberculous patient it fell. Tuberculosis might be diagnosed if a negative phase appears after inoculation of any person. Absence of negative phase indicates absence of tuberculosis.—B. M. J. i./07, 627; L. i./07, 808.

Effects on the Opsonic Index with T. R.—L. ii./07, 158.

Vaccine principles. Antiseptics (internal) are one and all pulled to pieces; the knife (in 'radical operations') is placed *hors de combat*, as it is viewed that the bacteria by blood and lymph stream have been carried beyond its reach; hot fomentations, evacuation and drainage of abscess cavities, massage and radio-therapy have occasionally met with disaster; it is doubted whether there is any assured basis for the treatment of bacterial infections by serum therapy, and finally the expectant treatment is looked upon as virtually 'chance' (10 to 20% of typhoid cases in which rest, care and nursing treatment are employed are fatal).—Sir A. E. Wright, L. ii./07, 423.

Agglutinating, opsonic, bactericidal and bacteriolytic effects can all be obtained independently, i.e., bactericidins, bacteriolysins, agglutinins and opsonins all exist in the blood fluids: of the four, the opsonins are the most important and they can be accurately measured. Living vaccines

are better than killed. In treatment with vaccine the changes which are associated with acquirement of immunity are changes in the blood fluids and not in the white corpuscles. Auto-inoculations, and the comparative methods of treatment by artificially induced auto-inoculations and treatment by inoculation of bacterial vaccines, and the question as to whether these latter may be undertaken in bacterial infections, which are associated with spontaneous auto-inoculations, are discussed, together with a review of results which have been achieved by vaccine therapy.—Sir A. E. Wright, L. ii./07,423,493.

Another account.—Pres., May, 1907,166.

Tuberculo-opsonic Index of the Urine and Sweat in health and tuberculous disease. These excretions contain anti-bacterial and bacteriotropic substances.—L. i./08,1000.

Opsonic Index, Clinical Significance of.—B.M.J. i./08,947.

Statistics of the question—caution necessary in drawing conclusions.—L. i./08,1106.

Desires the bacilli measured, and a report showing the length (sum total of same ingested by the leucocytes), as this must be more accurate than simply stating the number; they vary in length from 1.5 to 4.5 μ .—L. i./08,1106.

Vaccine therapy of very great value in bacterial diseases of the eye. Diagnosis of tubercular infection aided by Calmette's test, which, however, must be employed with caution. Whether ocular Tuberculosis be due to *Typus Humanus* or *Typus Bovinus* is unknown, hence if one variety produces unsatisfactory result, give the other a trial, or use both together. Conjunctivitis, both acute and chronic, is benefited in the most striking manner by use of the appropriate vaccines, which must be employed with boldness. Vaccine therapy extremely valuable in the various causes of corneal ulceration, especially in the case of *Pneumococcus* and *Gonococcus*. Acuteness of infection no contra indication whatever to this mode of treatment, which has proved most successful in infections due to the *Streptococcus*, *Staphylococcus*, *Gonococcus*, *Pneumococcus*, *B. Coli Communis*, *B. Friedlander*, *B. Morax* *Arenfeld* and other organisms.—R. W. Allen, Pr. May 1908.

Vaccine therapy applicable not only by means of bacterial vaccines but also by means of judiciously caused auto-inoculations brought about by massage and movements. Satisfactory results not to be obtained by the guidance of clinical symptoms only; difficulty of estimating approximate initial dose, and deductions to be drawn from clinical symptoms apt to prove fallacious. Past experience but an imperfect guide and only applicable to a small class of cases—some other guide therefore necessary, and this role is filled at present, even if imperfectly, by the Opsonic Index. The great importance of utilising every other possible means of increasing resisting power of patient and of bringing the immunising forces to the proper point of attack is emphasised—relief of serous effusions, removal of substances such as fibrinous exudate which prevent transudation of lymph laden with protective substances, voiding of abscess cavities, removal of scabs and securing adequate supply of lymph by raising the hydrostatic pressure in the capillaries, and diminishing the viscosity of the blood.—Sir A. E. Wright, Pr. May, 1908.

The Opsonic Index as a Diagnostic method.

Stansfield Collier relates that he predicted in the early days that of two individuals—a man and a boy—brought into hospital with gangrene of the appendix—the boy would live and the man would die—the prophecy was incorrect. Bacteriological examination showed the serum of the man to give a

marked phagocytosis to mixtures of Coli Bacilli, while in the apparently weaker individual phagocytes were almost inert to the same organism—other similar cases showing diagnostic power of the index.—Pr. May, 08,693.

Strictly *localised infections*, e.g. acne, syphilis, and lupus, may be treated *without estimation* of the opsonic index. Opsonin and complement probably identical.—B.M.J. ii./08,877.

Observations on the Index. Notes on errors in counting. Two or more normal persons used as controls. Various 'types' of tuberculosis, according to Opsonic Index Charts.—L. ii./08,148.

Bushnell on Estimation Technique. The individual's serum and leucocytes are both examined. The tedious collection of washed leucocytes is obviated. L. ii./08,185. See also Dodds. L. ii./08,330.

Various cases, tuberculous, staphylococcal, pneumococcal infection with favorable opinion.—L. ii./08,931.

An improvement on Wright's method of Estimation.—B.M.J.E. ii./08,27.

Opsonic Index Determinations supported the view that Koch's theory was erroneous.—L. ii./08,713.

Estimation of the index in a number of infants under 1 year old (mostly artificially fed) gave the following:—

(a) A low opsonic index is not diagnostic in children under one year old.

(b) In infants a low opsonic index is not inconsistent with health, and the child may be thriving well with a declining index.

While in healthy children a low index may have no significance, it would appear to be of the gravest prognostic importance in infected adults. In two cases of septicæmia, indices as low as, and even lower than, those in a Table provided (*q.v.*), were found immediately before death. In one case the index to staphylococcus, with which the patient was infected, declined from 0.83 to zero, and in the other a tetrægenus infection, the resistance was phenomenally low to tubercle, staphylococcus, and gonococcus.

(c) Where the opsonic index is low this will rise in response to the stimulus of an inoculation with a bacterial vaccine.

(d) Inspection of the results embodied in a Table (giving the indices at each month from birth to one year) would appear to show that the healthy breast-fed infant possesses no advantages over the healthy artificially-fed child.

(e) The anti-bacterial defence in children cannot depend upon the opsonic content of the serum.—Pr. May, 08,635.

Jurgens criticises Wright's statements—says clumping of the bacteria renders counting difficult. Subjective factor also of import, but concludes that the careful use of the method may be of diagnostic and therapeutic value.—B.M.J. ii./08,48.

Extraordinary variations in results of estimation of the index by different workers (all experts with years of practise). Hort is not able to endorse the view that the index is a safe guide to diagnosis and treatment even when estimated by such acknowledged experts. Standardisation of emulsions, cultural difficulties, agglutination questions, and so forth assumedly cause the marked differences.—Hort, B.M.J. i./09, 400. See also L. i./09,614.

Statistics of Opsonins (leader on Greenwood and White's Investigation).—B.M.J. i./09,1562.

Opsonic power of serous exudates. The paper should be consulted by those requiring the information. The writer of the paper holds that opsonins are not specific bodies.—B.M.J.E. ii./09,16.

Notwithstanding the severe criticisms of the Berlin Pathological Society in 1908, Wright's main conclusions thought to be correct. Many instances

are recorded where dose of vaccine was sufficient simultaneously to raise the opsonic index and lower the temperature—recovery following. Detailed directions as to method of estimating the index. For staining the organisms and phagocytes it is thought that the hot solutions of carbol-fuchsin may injure the phagocytes.—L.ii./09,6.

The fall in the tuberculo-opsonic index. (the negative phase of greater or lesser degree, according to the dose) produced by a dose of tuberculin occurs either in a healthy or tuberculous individual. In a patient with tubercle constant auto-inoculations are taking place, and each of these is followed by similar fluctuations of the opsonic index. It is clear that in a tuberculous patient observations of the opsonic index to tubercle may show the index to be above or below the normal. Many examinations have to be made before negative diagnosis can be justified.—B.M.J.ii./09,1046.

In addition to the foregoing preparations of Koch the following (N.B. all *German procedure*) have been placed on the market by the Manufacturers of Koch's Tuberculins:—

'T.O.A.' i.e., Tuberculin-Original-Alt. (Alt, German = old.) A Germ-free Tubercle-Bacilli-Bouillon resulting from filtering fully grown nutrient bouillon cultures of bacilli (*typus humanus*.) In 1 and 5 Cc. bottles.

T.O.A. recommended to be freed from fat by ether and chloroform, then dilute with 20% glycerin in normal saline with 0.5% Phenol. Dose, $\frac{1}{100000}$ Cc. given at prolonged intervals. One must not give in the negative phase.—B.M.J.E.ii./08, 68.

'P.T.O.' i.e., Perl sucht-Tuberculin-Original. (Perl sucht German = Pearl Disease, i.e., tuberculosis of serous membrane of cattle, producing pearly nodules, or tumours often peniculous), is exactly like the above excepting that it is prepared from Tubercle Bacilli of cattle (*Typus Bovinus*).

Vacuum-Tuberculin is obtained by reducing 'T.O.A.' at a low temperature and in partial vacuum to one-tenth of its volume. It differs from the Old Tuberculin in that Old Tuberculin is strongly heated. It consists of toxins produced by the bacilli during their cultivation. Old tuberculin, on the other hand, contains in addition to toxins endotoxins extracted from the bacilli at higher temperatures. In 1 and 5 Cc. bottles.

Bovine-Vacuum-Tuberculin corresponds to Vacuum-Tuberculin last mentioned excepting that *Bacilli Typus Bovinus* are used. In 1 and 5 Cc. bottles.

These 'Vacuum' preparations are introduced on account of their better keeping qualities.

Directions for use of 'T.O.A.', Vacuum Tuberculin and Bovine Vacuum Tuberculin. (N.B.—*German procedure and dosage*.)

These are exclusively for treatment of patients exhibiting a very violent reaction to Old Tuberculin or other similar preparation, as well as for treatment of those with a permanent or intermittent febrile temperature, *not* for diagnosis.

Dilute 1 Cc. of any one of the above with 9 Cc. 0.5% Phenol. The manufacturers then term this 10 Cc. of Vacuum-Tuberculin or Bovine-Vacuum-Tuberculin Dilution, 'Tuberculin Dilution 1'; and the 10 Cc. of 'T.O.A.' or 'P.T.O.' Dilution, 'Tuberculin Dilution 2.'

They then show that if 1 Cc. of 'Tuberculin Dilution 1' made from Vacuum Tuberculin or Bovine-Vacuum-Tuberculin be further diluted with 9 Cc. 0.5% Phenol solution, the 'Tuberculin Dilution 2' is obtained, and by dilution of the 'Tuberculin Dilution 2' from 'T.O.A.' or 'P.T.O.', 'Tuberculin Dilution 3' is obtained, &c.

The different dilutions compare as follows:—

Each 1 Cc. 'T.O.A.' or 'P.T.O.' corresponds to 1 Cc. 'Tuberculin Dilution 1' (because Vacuum and Bovine-Vacuum-Tuberculin are concentrated 10 times strength of 'T.O.A.' and 'P.T.O.').

It is intended that the physician should by trial injections select for each case the preparation most suited. **Dose (German).**—Commence with 1 Cc. of a 'Tuberculin Dilution 5,' i.e., with 0.0001 Cc. 'T.O.A.' or 'P.T.O.', or 0.0001 Cc. Vacuum or Bovine-Vacuum-Tuberculin. If no marked reaction appears continue with this preparation as with Old-Tuberculin (*q.v.*).

If reaction violent even from this small dose, after a few days' interval the trial is repeated with one of the other preparations. In the course of the treatment as a rule no change is made in the preparation employed, but frequently patients with great sensitiveness lose it in the course of treatment and it is then advantageous to continue the treatment with the more active preparations, Old-Tuberculin, Bovine-Tuberculin, or with Tuberculin 'T.R.' or with Bacilli Emulsion (*q.v.*).

New Bovine Tuberculin (Perlsucht Tuberkulin P.T.R.) is equivalent to T.R. excepting that *Bacilli Typus Bovinus* are used (already described *v. p.* 798).

Lupus in all stages seemed to respond rapidly to injection of Bovine-Tuberculin.—*L.i./o8, 433.*

New-Tuberculin Koch—Bacilli Emulsion 'B.E.' is a suspension of pulverised Tubercle Bacilli in water with an addition of an equal volume of Glycerin. 1 Cc. contains 0.005 Gm. of powdered Tubercle Bacilli. **Dose.**— $\frac{1}{3000}$ Cc. (=0.0000025 Gm. of bacillary substance) as a rule to begin with. Dilutions are made with 0.8% Sodium Chloride Solution, or if the dilutions are to be kept several days with 0.8% Sodium Chloride and 0.5% Phenol.

With this small dose it is very exceptional for any reaction to appear. At one or two days' intervals the dose is rapidly increased from twice to five times the dose at each injection, until definite reaction appears with a rise of $2\frac{1}{2}$ to 5° F. in temperature. As soon as such violent reaction develops much longer pauses, 6–8 days, must be made. If, however, it is desired to carry out the treatment without violent reactions, the dose must be increased at a rate which only causes little or no rise in temperature, and between each injection 5 to 7 days' intervals should be allowed. Otherwise the same procedure is followed.

The subcutaneous injections are increased until the dose reaches 20 milligrammes. Larger quantities are badly absorbed. If absorption takes place too slowly, it is advisable to inject the dose at two or more points. The larger doses of 10 to 20 milligrammes are only injected at intervals of 2 to 4 weeks.

Bovine Tubercle Bacilli Emulsion (Perlsuchtbazillen Emulsion) corresponds in every respect to New-Tuberculin Koch—Bacilli-Emulsion above except that for this, tubercle bacilli of the bovine type are used. Its method of application is like the last mentioned.

Tuberculol Merck (Laudmann).

Tubercle toxin in concentrated form for treatment. Tuberculol A contains toxins and bacilli.

Solution No. I. = 1 lethal dose for a 250 Gm. guinea pig.

"	II. = 0.1	ditto	"	"
"	III. = 0.01	"	"	"
"	IV. = 0.001	"	"	"
"	V. = 0.0001	"	"	"

Keep in good condition (in the cold) for months.

Tuberculol B. contains extractives only of the bacillary bodies.

Tuberculol C. contains bacillary secreta only.

Behring's *Tulase.—A clear liquid of honey consistence, said to contain all the constituents of the Koch bacillus. Used subcutaneously, intravenously, or *per os, c.f.*—*B.M.J. i./o7, 715; Am. Jl. Ph., March/o7, 134.*

The nature of this new cure is complicated and it is not yet procurable.—*B.M.J. ii./o5, 964; L. ii./o5, 1115, 1126, 1900.*

Tulase-Lactin is *Tulase with milk intended to immunise infants. Behring himself warns against too much reliance on the curative properties of.—*Am. Jl. Ph., March/o7, 134.*

I.K. (Immune Körper) Tuberculin.—*B.M.J.E. ii./o8, 83.*

Lannelongue's Serum is derived from horses submitted to the action of a toxin extracted from the tubercle bacillus by warming with water at 120° C., precipitating with acetic acid, and redissolving in sodium carbonate. Has been tried in the Paris hospitals for a year, the patients receiving doses of 5 to 10 Cc.; in one case 20 Cc. was administered. Results stated to be satisfactory.—*C.D. ii./o8, 608.*

Jacob's Tuberculin contains the toxins present in the bacilli themselves and possesses the most active immunising properties.—**Marechal's Tuberculin**, *vide* L. ii./c8,1558.

Beraneck's Tuberculin (Dr. Béranek, Neuchâtel) is stated not to be a serum as it contains no antibodies—it is further stated to contain exotoxins and endotoxins and acts like a vaccine, strengthening the bacteriolytic power of the protective cells; it also exercises a bactericidal or attenuating effect on the Tubercle bacillus.—*Pres.* 1910,17.

***Tuberal.**—A proprietary article. Described as containing "all the therapeutic agent of tubercle bacilli." Dose from 1 to 40 drops in $\frac{1}{2}$ tablespoonful of water in the morning on an empty stomach.

OPHTHALMIC REACTION TO TUBERCULIN (Calmette).

Calmette in June, 1907, advocated the employment of a simple method of diagnosing tuberculosis by dropping a small quantity of Tuberculin Solution into the eye (in preference towards the inner angle), the lids being kept apart a moment. A 0.5% (originally 1%) Tuberculin (precipitated by Alcohol 95%) in sterile distilled water is used, or a 1% Solution or stronger may be employed if this $\frac{1}{2}$ % does not produce desired effect. On dropping this Solution into the eye of a healthy subject, no reaction follows. Tubercular sufferers, on the other hand, present a definite local reaction. Thus, in a tuberculous patient, after three to five (in rare cases as long as 48) hours after the liquid has been placed in the eye, there is congestion of the palpebral conjunctiva, which assumes a red colour and the seat of more or less intense œdema designated in France a 'Tuberculin conjunctivitis.' It is accompanied by lachrymation. At the end of six hours, filaments of fibrinous secretion may be seen in the conjunctival cul-de-sac. The reaction attains its maximum in from six to thirteen hours. There is no elevation of temperature. It disappears after 18 hours in the child and after from 24 to 36 hours in the adult. There is no attendant pain and but trifling discomfort. The eye assumes its normal condition after two or three days (or it may be eight or ten days in rare cases).

In the *Hopital des Enfants Ma'ades* at Paris three distinct intensities of reaction could be defined—(i.) so mild as to almost escape notice—compare the untreated eye carefully. (ii.) *Moderate*—lachrymation and fibrinous purulent matter observed—may last seven days. (iii.) *Intense*—general infection of the conjunctiva, secretion, unpleasant sensations, swelling of lids—may last as long as fifteen days.

Newly-born children are exempt or almost exempt from tuberculosis, and the reaction may fail with infants up to one month in age, or it may exceed what is expected or desired, and may take the form of an episcleritis. Children who appeared perfectly healthy have responded to the test, thus proving them to be suffering from an absolutely latent form of tuberculosis. Tubercular meningitis in all its stages also responds. The ophthalmo-reaction can be obtained in all forms of tuberculosis unless the patient is moribund or almost so. It enables the practitioner to diagnose with comparative certainty even obscure tuberculous lesions even at the very outset. It further enables him to certify a cure when accomplished. It places in his hands an easy, harmless and efficacious means of detecting the infected amongst a number of non-tuberculous persons. It is, therefore, of great utility, both in Institution and private practice, and should be looked upon as simple, trustworthy and harmless.

Commercially the test is supplied in two forms,—

Liquid Form.—0.5% strength. A sealed 'eye-dropper' with rubber cap, containing several drops of the sterile solution (sufficient for two or

three trials on one occasion). In this form will keep indefinitely and is always ready for use.

Dry Form.—Precipitated Tuberculin Powder (0.005 Gm.) to be dissolved in 20 drops of distilled water by the physician to produce 0.5% or in 10 drops to make 1%—the latter strength is suitable in the event of reaction not occurring with the 0.5% solution—sufficient for 10 trials. Drops thus prepared are inserted into the eye in similar manner to the above.

Koch's Old Tuberculin (glycerinated) is not suitable, on the contrary it is liable to prove intensely irritating.

Points to be noted in applying the Test.

Precautions as to cleanliness in applying the test are obviously necessary. It is not applicable unless both eyes of the patient are perfectly sound—no previous lesion of the eye or of the lid. The observer must not confuse his results with pre-existing ophthalmia. A negative conclusion must not be drawn until 48 hours after inserting the drops.

The patient's head must be thrown back and the lids kept apart a few seconds to spread the Solution evenly over the surface of the eye ball; he must not rub the eye—if necessary apply a bandage. Special care is necessary in the case of persons suffering from acute or chronic gonorrhœa.

References to Calmette's Reaction.

A precipitated Tuberculin.—B.M.J. ii./07,1038.

The Ophthalmic-Reaction will be of use to show when Tuberculin injections in treatment may be safely stopped. The Eye Drops cause movement of the Tuberculo-Opsoneic Index similar to those following a subcutaneous injection. The permeability of the conjunctiva varies with different individuals. The negative phase is usually well marked and sometimes lengthy.—L. ii./07,1754.

A large number of cases tested and reported on. The 1 in 200 solution may be used in children as preliminary test. The test is not only diagnostic, but may possibly be of therapeutic value to the local condition. Is free from the disadvantages of the hypodermic test. The theory of the reaction discussed. Von Pirquet thinks due to the presence of an antibody in the tuberculous.

The test is the best method of diagnosis so far. An analogous reaction has been obtained in enteric with a solution of typhoid toxin.—B.M.J. ii./07,1642,1647.

Lancet leader on the test; innocuousness requires further proof.—L. ii./07,1629.

The B.M.J. tried the test in twenty cases with good results.—B.M.J. ii./07,1528.

Calmette's reaction is sometimes bilateral.—B.M.J. ii./07,1826. S. Stephenson reports fifty cases favourably examined.—L. ii./07,1462. And describes a series of Eye Cases several of which did not respond satisfactorily to the hypodermic injection method of diagnosis.—B.M.J. ii./07,1038.

Tuberculous tumour of the pons verified.—L. ii./07,1465.

The diagnosis by the T.O. method is now thought to be of a somewhat untrustworthy description—hence this new diagnostic may be of value.—Oph./07,305.

The reaction is most valuable but the inflammation may be prolonged.—L. April 18th, 1908,1163.

If there is fever a tuberculin injection cannot be employed—try the Calmette Reaction if the eye be healthy, if the eye prohibits this use the Von Pirquet test.—L. i./08,1013.

A test of this kind should be of great service in asylum practice.—L. i./08,1032.

Used as a routine procedure in all doubtful cases of choroiditis or iritis as a help in diagnosis. Probably as useful an indicator as Widal's Reaction in typhoid.—B.M.J. i./08,923.

On the whole the test is reliable. Sequeira.—L. ii./08,391.

The eye reaction gives results more in accordance with clinical experience, but not absolutely certain.—B.M.J.E. ii./08,53.

More in favour of the eye than the skin test, but not much better than the skin method.—B.M.J.E. ii./08,5.

Forty-five children age 3 months up to 14 years tested with only 3 inaccuracies and these of the negative order. Solution of the powder used.—L. ii./08,1845.

Results quite satisfactory, the test is reliable as a means of diagnosing cutaneous tuberculosis.—B.M.J. ii./08,1178.

In tuberculous meningitis of considerable assistance in diagnosis of doubtful cases. Reaction always pronounced as compared with other tuberculous conditions.—B.M.J. ii./08,1198.

Advice to try Calmette's test and Pirquet's reaction coincidentally so that one may neutralise mistakes of the other —B.M.J.E. ii./08,41.

Negative reaction with Calmette's considered more trustworthy than the positive. Excessive reactions frequent.—L. ii./08,1606.

Calmette's may set up recurring attacks of conjunctivitis by auto-inoculations with toxins.—L. ii./08,1223.

A patient may be tuberculous and yet give no local conjunctival reaction. Not completely free from danger.—Pr. May /08,754.

The cutaneous and ophthalmic tests are commonly less conclusive than the subcutaneous, but the former preferable.—L. ii./09,283.

Diagnosis of tubercle of joints. If radiographs insufficient employ Calmette —no trouble as regards the eye.—B.M.J. ii./09,954.

Wolff Eisner's Conjunctival Reaction and Moro's Percutaneous Reaction.—Books on.—B.M.J. ii./08,1501; ii./09,269.

Calmette's gives no information of value in prognosis.—B.M.J. i./10,115.

Von Pirquet's Cuti-Reaction, Cutaneous Tuberculin Vaccination, i.e., by making two small scarifications in the superficial layers of the skin through two drops of Koch's original Tuberculin diluted with equal volume of 5% Phenol in Glycerin and twice its volume of normal Saline Solution, has been found diagnostic by Von Pirquet. A small red papule develops in twenty-four hours if patient is tuberculous.—B.M.J. ii./07,1520; B.M.J.E. ii./07,83; L. i./08,106. May also be employed by making 2 small blisters on the back of the patient—to one applying T.R. and comparing with the other not so treated—look for a rosy red colouration.—B.M.J. i./08,743.

Cutaneous Reaction trustworthy aid to diagnosis in infants.—B.M.J.E. i./09,44.

Better where there is ocular trouble.—B.M.J. ii./08,1178.

Extremely—almost too sensitive. If used in young children earliest infection can be recognised.—B.M.J.E. ii./09,5.

Blister method advocated—i.e., making two small blisters and then applying Concentrated T.R. to one and using other as control.—B.M.J. ii./08,1179.

Employ Calmette's and this together.—L. i./09,627.

The red lumps produced on the arm may develop into pustules.—B.M.J. ii./09,952; B.M.J.E. ii./08,83.

In the case of children up to 13 years, Von Pirquet's test the more favourable. Calmette's dangerous where any degree of inflammation already present.—B.M.J. ii./09,1335.

Calmette pointed out that the cuti-reaction is not perfect; only conclusive in patients under 3 years of age. In 55% apparently healthy people it gives a positive reaction.—B.M.J. i./09,328, 528; L. ii./09,469. See also *Annus Medicus*.—L. ii./09.

Lautier's Modification: 3 drops of tuberculin solution on cotton-wool covered with gutta-percha tissue. Amount and time of reaction varies.—L. i./09,1195.

Tuberculin Ointment (E. Moro).—As diagnostic test. Old Tuberculin 1, mixed with Anhydrous Lanolin 1. On inunction on the

upper arm this produces within a day or so a temporary rash, papule or pustule.—*Cf.* L. i./10,73; v. also B.M.J.E. i./09,17.

A control of Lanolin basis should be used simultaneously on the other arm.

In the knowledge of the writers Von Pirquet's Test (from the same batch of solution) was applied simultaneously on a patient in a severe condition, and on a healthy individual. The response to the test in the first case was most marked, whilst in the healthy person reaction was nil.

A 1 to 2% dilution of Koch's Old Tuberculin preferred.—B.M.J.E. i./09,37. Or indeed the *undiluted* Old Tuberculin has been used by some physicians.

Tubercle Serum Agglutination Diagnosis practised on same lines as that for typhoid.—L. ii./08,1740.

Courmont's modification of,—is referred to.—B.M.J. i./09,400.

Marmorek's Antituberculous Serum is the sterile serum from the horse immunised against the toxic products of Koch's Bacillus. It is employed in all manifestations of tuberculosis, either local or general. Should be employed at the commencement of disease symptoms.

Dose, subcutaneously.—5 Cc. injected every second day during a period of three weeks into the abdominal region, or at the exterior of the thigh, alternately at the right and at the left. Injections are then discontinued for three or four weeks, then give ten further injections and so on, or administered daily (5 to 10 Cc.) per rectum, intermitting and repeating as before.

The skin is washed with 5% Phenol or a dilute sublimate solution. The syringe and needle should be sterilised and the point of inoculation is covered with a pad of cotton wool soaked with Collodion.

Rectal Injection. The Serum is administered, after an evaculatory enema, with the aid of a syringe to which is attached a catheter.

It contains no antiseptic, and should be clear.

References to Marmorek's Serum.

Cases treated with good results.—L. ii./05,760; B.M.J. i./06,340; B.M.J.E. i./06, 60; B.M.J.E. ii./07,51; B.M.J.E. i./08,2.

Given subcutaneously Opsonic Index greatly lowered,—this gave place to rapid rise on discontinuing. Rectal use produced fall and then rise.—B.M.J. i./07,862.

Professor Monod (Paris) reports at the Académie de Médecine the results contained in 43 publications of which 38 appertaining to 592 cases are favourable as to the value of the Serum.—Bulletin de l'Académie de Médecine, Jan. 15th, 1907.

In tubercular joints, especially with sinuses, this Serum gave good results.—B.M.J. ii./09,952.

Marmorek's theory for using young forms of *T. Bacilli*. Frey states evidence (from published cases) in favour of this Serum having a specific curative action.—B.M.J. ii./08,1884.

Typhoid Fever, Anti-Typhoid Inoculation.

(For general preventive use Anti-typhoid Tablets (*q.v.*) are suggested.)

The fact that in China enteric fever in epidemic form rarely occurs is, according to one authority, due to the fact that the Chinese drink tea (which implies boiling water) instead of water, congee instead of milk, and that uncooked food is seldom taken.

As already indicated, the toxin in the case of *B. typhosus* is an intra-

cellular one ("Endotoxic," Maefadyen); it is not conveyed in a soluble form to a nutrient medium. The dead bacteria are toxic if injected into animals.

Anti-typhoid Vaccine Inoculations have been used as a prophylactic by Wright, Haffkine, Semple and Leishmann.

Typhoid Vaccines (Wimpole Inst.).

Special methods of sterilising are employed to ensure these vaccines remaining fully potent for at least 2 years.

(1). **Anti-typhoid Vaccine** (broth culture of *B. Typhosus* for immunising).

Initial dose.—500-1000 millions, and this should be followed by rest in bed for twenty-four hours. Double this dose to be given 10 days later, when little constitutional disturbance should result. Full immunity is not secured until the lapse of 4-6 weeks.

(2.) **Anti-typhoid Vaccine** (Allen). Both culture not only of the *B. Typhosus* but also of the various Para-typhoid Bacilli.

An immunising agent like (1), and to be similarly employed.

(3). **Typhoid Vaccine.**

Agar culture of the Typhoid and Para-typhoid Bacilli for use in typhoid fever and in localised infections. Initial dose 50 millions up to 1,000 million if necessary.

Preventive inoculation is desirable before going to a country where typhoid is present, but it should not be practised upon those present in an epidemic of typhoid fever, because the inoculation produces a temporary enhanced susceptibility.—Hale White; *vide* also L. i./07,1500.

Lincoln epidemic of 1905, no anti-typhoid inoculation was tried.—W.W.W.

Inoculation with success. First dose 2 mgr. of dead phenolised agar culture increased to 10.—B.M.J. i./05,1166.

Notice of the Report of the German Commission on Anti-typhoid Inoculation is generally favourable.—L. i./05,1453.

Results with Serum.—B.M.J. i./09,1358.

TYPHOID CARRIERS cannot be said to be cured until daily examinations of the faeces demonstrate absence of the bacilli for a period extending at least from April to November.—L. ii./08,1589.

For **TYPHOID CARRIERS**, see also B.M.J. i./08, 15, 562, 584, 655, 701, 723, 889, 1129; ii./08, 834, 1173, 1175; i./09, 1451; ii./09, 100, 174, 432, 491, 1056, 1058, 1372, 1813; L. i./08, 732, 969, 1566; ii./08, 492, 1585; i./09, 311, 575, 1729, 1770, 1794, 1840, 1872; ii./09, 534, 586, 967, 1137, 1222, 1392, 1893. Consult also the Indices from which these have been taken.

Osonic Index to the organism assisted in diagnosis. The formation of antibodies in the sick person takes a long time,—the bacilli can withdraw to a place of refuge, e.g., the gall bladder. Cholera, plague, etc., also dealt with.—Jl. Trop. Med. Aug. 1. '08, p. 233.

Preparation of Vaccine at Roy. Army Med. Coll. The broth culture of the organism should not be heated over 53° C. The Antiseptic (0.25% Lysol) should not be added to the warm vaccine. Notable statistics as to infection amongst inoculated and uninoculated.—B.M.J. i./09,1857.

Meyer-Bergell's Serum for typhoid fever is supposed to have an antitoxic component. As is well known typhoid bacilli are supposed not to produce true toxins, but they do produce a poison which acts to some extent as an antigen. This Serum has slight prophylactic power.—B.M.J.E. i./09,11.

Vaccine therapy in Enteric Fever. Dose from 6,000,000 organisms. The front of the chest, about 4 inches below centre of clavicle, employed as site of injection.—B.M.J. i./09,1669.

15 to 30,000,000 organisms daily from patient's blood. Method of preparation of the vaccine. The method is devoid of risk. Well marked improvement noticed in several cases.—L. i./09,1668.

Inoculation of Vaccine containing the living typhoid organisms (heated 1 hour at 50° C.) gives a higher degree of immunity than the use of dead organisms. Antityphoid vaccination is well conducted by inoculation of $\frac{1}{2}$ Cc. of the usual dead vaccine (Wright) and one week after 1 Cc. of live vaccine. There is no danger, and both vaccinations may be with live cultures.—A. Castellani, Colombo.—L ii./09,523; see also L ii./03,1834.

Preparation and keeping properties of Antityphoid Vaccines. The sterilisation of a Vaccine may be done by heating at 60° for twenty minutes, or at 53° for 1 hour. This kills the living culture, and the addition of 0.5% Phenol, 0.25% Lysol preserves from possible subsequent contamination. The sterilisation with the Phenol is efficient,—heating is not desirable. Vaccine with the addition of Phenol 0.5% retains its power for two years.—L ii./09,436.

Heating an Antityphoid Vaccine in order to sterilise it introduces a harmful and unnecessary element which acts in two ways:—

- (1.) It diminishes its immunising properties.
- (2.) It curtails its keeping properties.

Carbolic Acid 0.5% would appear to be the best agent with which to sterilise,—it obviates any necessity for heating.—Annus Medicus. L ii./09,1884.

Vaccination, Vaccine, Glycerinated Calf-Lymph. Vaccinum.

P. Belg., as prepared at the Veterinary College of Brussels.

This Lymph has several advantages over that obtained even from healthy children. Vaccinia produced by the injection may be regarded as variola in a modified form. Vaccination at the time of infection with a small-pox may probably modify the disease, as the incubation period of vaccinia is 4 days, whereas that of variola is 12 days. Attenuation by passage of the organism through an animal of greater resistance to the disease than man is known as 'Jennerisation.' The danger of imparting infectious and other human disease is absolutely avoided, and there is but slight risk of communicating any disease peculiar to the cow. The place of insertion should be small, otherwise the reaction is too great. The amount of protection afforded seems to be greater than that afforded by humanised lymph. Glycerinated lymph is recognised as the safest lymph for vaccination, and by the VACCINATION ACTS AMENDMENT ACT, 1898, it is enacted that if a child has not been vaccinated when four months and one week old, the public vaccinator of the district shall visit the home of the child, and shall offer to vaccinate the child with Glycerinated Calf Lymph free of charge.

It is supplied in tubes each containing sufficient for 2, 3 or 8 cases, and also in vials for 30 to 40, and 60 to 80 vaccinations.

Vaccination Lancets of special form are convenient.

Vaccination Pads of Wood Wool and Vaccination Shields are made for protecting.

Vaccine Injectors of Rubber are prepared of different forms and are *sine qua non* in careful vaccination.

N.B.—Vaccine Lymph is destroyed in potency in 36 hours at 37° C. (!), and a temperature of 57° C. destroys it in 5 minutes, ice chests are arranged for the Gent. Lymph to maintain at 10° C. Even a temperature of -180 for a long period (11 weeks) maintains lymph active. Kept 1 year at -5° C. was found more active than that kept at +10° C. same time.—A. Newsholme, M.O., L.G.B.

Chloroform water has been recommended to replace Glycerin to kill off extraneous bacteria. Very much more rapid effect. Urgent demands for vaccine as in an epidemic, could be met by this method with a supply of vaccine in 14 days, instead of the month or 6 weeks necessary for glycerination.

For the storage and use of lymph it is recommended to mix lymph 50 parts, glycerin 25 parts, and water 25 parts.—Pr. ix,284.

Lanolinated Calf Vaccine is also prepared.

A treatise, historical, bacteriological, giving the method of manufacture of

calf vaccine, the glycerination of the same, the filling into tubes, and the bacteriological examination of lymph.—W.H.M., C.D. ii./01,629.

The parasite of small-pox and vaccinia, an amoeboid protozoon, can be stained with Safranin and Loeffler's Blue.—B.M.J. ii./04,1410; L. ii./04,1777.

The organisms of variola, vaccinia and varicella.—L. i./05,118.

Whooping-cough often ceases after vaccination.—M.A., 1906,369.

Hypodermic Injection advocated. Reaction less.—B.M.J.E. ii./06,52.

Debate on Vaccination Bill.—B.M.J. i./07,1318.

The virus of small pox and vaccinia. Description of theories of the contagium.—B.M.J. ii./06,1576.

Motile 'grains' in vast numbers are seen both in fresh variolous matter, and in the contents of a human vaccine vesicle. They are considered as spores by de Korté; they are immobile in glycerinated lymph.

Attempted culture of the specific organism of vaccinia, amongst other methods, within a celloidin capsule in the peritoneal cavity of the rabbit.—B.M.J. ii./06,1780.

Can be stored in large quantities for length of time.—B.M.J. ii./08,1308.

Cowpox, outbreak of.—L. ii./08,719.

Accidental vaccination of the cornea.—B.M.J. i./07,198.

Normal Horse Serum, Horse Plasma (Liquid) is supplied in 10 and 25 Cc. vials. *Dose*.—1 to 2 drachms. Is employed to increase the amount of "complement," according to Ehrlich's theory, *c.f.* also pp. 753, 800.

In typhoid has been recommended as an ideal food, also in tuberculosis; the horse is immune to this latter disease.

Sheep's plasma is equally satisfactory. For use in duodenal ulcer. *See* p. 800.

Byno-plasma contains 1 drachm Sheep's plasma in every $\frac{1}{2}$ ounce.—Paton.—B.M.J. ii./08,441.

ANIMAL ORGANOTHERAPY.

ANIMAL GLANDS AND TISSUES AND THEIR PREPARATIONS.

Of the animal extracts introduced during the last few years, those of the supra-renal capsule, the thyroid gland, and bone marrow have established a reputation in the field of therapeutics. Many others are prepared, and their use is suggested for various forms of disease.

The prefix 'Opo' meaning *juice*—is added to the names of these extracts. **Animal Membranes** in the treatment of granulating wounds:—

The employment of Goldbeater's Skin, the peritoneum of the ox (known as *Cargile Membrane* in America) has been followed by that of the gastro-intestinal mesenteric attachments of the sand-shark, *Carcharias littoralis*, one of which produces 2 or 3 square feet of gossamer-texture strong material which can be kept in alcohol. Suggested to employ dog-fish mesentery.—L. ii./04,2738.

Red Bone Marrow Extract.

The marrow of ox and veal-bones and sheep's ribs has been used as a remedy for pernicious anæmia, chlorosis, scurvy, purpura, hæmiophilia, debility, lymphadenoma and rickets.

Tablets, containing 1 grain of the dessicated marrow, equal to 20

grains of the substance in its natural state. Each weighs 3 grains.
Dose.—1 to 3.

***Marrubin.**—*Syn.* GLYCERIN EXTRACT OF RED BONE MARROW, Medullary Glyceride.

Dose.—1 to 2 drachms, increased if desired.

A thick brown liquid, containing the full activity of the ox-bone marrow, and is recommended as a nutrient substitute for cod liver oil. Being flavoured, it is palatable. It has had remarkably beneficial effects on weak children. It is easily assimilated and retained. Particularly suited for the anæmia resulting in tuberculosis, and has been found valuable in malaria.—B.M.J. i./94,1172; L. ii./94,682; M.C. Mar. 1895,431. It is valuable in treatment of leucocythæmia.

In anæmia valuable.—B.M.J. ii./07,1315. Red Bone Marrow has been used in the form of lotion to increase growth of the hair.

Marrubin in the following combinations is prepared with *dose* in each case 1 to 2 drachms—

Marrubin cum Pepsina. 1 grain Pepsin (*Off.*) in each drachm.

Marrubin cum Bismutho et Pepsina, nutritive, sedative, and digestive

Marrubin cum Bismutho et Ferrum. Nutrient and digestive.

Ⓟ Marrubin cum Bismutho et Strychnina, containing $\frac{1}{120}$ to $\frac{1}{60}$ grain Strychnine in 1 to 2 drachms respectively. Nutritive and tonic.

Marrubin cum Pepsina et Quinina. Nutritive, tonic and digestive.

Marrubin cum Cascara. Nutritive and laxative.

Marrubin cum Tinctura Laxativa. Nutritive and laxative.

Marrubin cum Podophyllino. Nutritive and laxative.

Marrubin cum Hypophosphitibus. Nutritive and tonic.

Marrubin cum Ferri Phosphate. Nutritive and tonic.

Ⓟ Marrubin cum Arsenio. Containing in each drachm $\frac{1}{100}$ grain Arsenious Acid.

Two cases of anæmia under Arsenic and antiseptic treatment markedly improved on adding Bone Marrow to the diet.—B.M.J. i./09,1349.

Composition of Bone Marrow. 'Yellow' marrow consisted of 77·95% Oleic Acid, 14·22% Stearic Acid, and 7·83% Palmitic Acid. Red marrow consisted of 47·38% Oleic Acid, 36·25% Stearic Acid, and 11·36% Palmitic Acid. In the red there was 0·2853% Cholesterolin, in the yellow 0·296%. Lecithin in the red 0·2% and in the yellow 0·184%.—P.J. ii./08,239.

***Virol.** Is claimed to be a preparation of bone marrow, with malt, egg, and lime. It is said to have nutrient properties for infants.

***Myelocene.** Is an ethereal extract of bone marrow, with a small quantity (1%) of Chloretone; it has been used by Inunction, and poured into the ear for deafness due to disease of the middle ear. Half a drachm of equal parts of warm alcohol 90% and glycerin may first be employed with massage.

Also used (previously liquefied by warming, after drying the surface skin) in eczema and psoriasis, and in rheumatism.

For lupus, the nodules are treated with Myelocene to remove the catarrhal processes, and then a caustic is used and the Myelocene treatment again resumed. Myelocene Fluid may be dropped into the ear.

***Cerebrine and Myelin.** *Syn.* Brain and Spinal Cord Extracts.

These, separately or mixed together, may be tried for the relief of locomotor ataxy, chorea, epilepsy, and melancholia. Cerebrin Tablets, 5 grains.

Brain Extract.

Dose.—5 to 10 minims *per os*, or hypodermically.

One minim equals three grains of sheep's brains.

Spinal Cord Extract.

Dose.—5 to 20 minims thrice daily by the mouth.

1 minim is equivalent to 1 grain of fresh spinal cord. May also be administered hypodermically.

The last two may also be employed mixed in equal volumes. They are prepared with glycerin and 0.5% Phenol. **Spinal Cord Tablets**, $2\frac{1}{2}$ grains.

Cerebrinum Poehl. *Syn.* OPOCEREBRIN. A special preparation in powder and tablets. Given to calm epileptics and check the attacks, but sodium bromide is given simultaneously, 30 to 50 grains a day.

Chorea, recovery under cerebrin.—*L. ii./93,819.*

Neurasthenia and locomotor ataxy have been much improved by Cerebrin.

Duodenal Membrane. In view of the fact that an extract of the mucous membrane of the duodenum of the pig has given good results in the treatment of diabetes by stimulating the secretion of the pancreas—with resulting increase in the oxidation process going on in the body—a

Liquid Extract of the Duodenal Membrane. *Syn.* SECRETIN EXTRACT (glycerinated) has been prepared. Strength, 1 minim=1 grain of the fresh substance. *Dose.*—5 to 20 minims. **Tablets** representing 5 grains are also manufactured.

Experiment at University College showed that an acid extractive of the intestinal lining of a dog injected into the veins caused, when reaching the pancreas, an immediate increase in the flow of the pancreatic juice. *c.f. p. 823.*

Elixir Duodenalis.

Dose.— $\frac{1}{4}$ ounce once or twice daily after a meal.

A Secretin product similarly prepared to the above for use in diabetes.

In diabetes mellitus disappointing.—*L. i./08,14.*

Duodenal Membrane Desiccated. Clean the upper portion of the duodenum of the pig. Scrape off the mucous membrane and scale on glass by drying between 70 and 80° C. Mix three of this with 1 of Calcium Phosphate and pass through No. 60 sieve. The temperature does not destroy activity of the "Secretin."—*P.J. i./06,166; C.D. i./06,255.*

Further on Secretin.—*Starling, B.M.J. ii./06,781.*

Duodenal Extract Tablets.—Each equivalent to 5 grains of fresh substance are prepared. *Dose.*—1 to 3 tablets.

Eye.—A Retinal Extract *Syn.* ★Opticine has been tried in cases of atrophy of the retina and tobacco amaurosis.—*B.M.J. ii./03,190.* Is prepared of strength 1 ounce=4 retinae. *Dose.*—2 drachms.

Kidney Extract. In granular kidney the administration of Renal Extract has given striking instances of improvement. It must be freshly made. The kidney apparently has an internal secretion, and it is to the failure of this that the renal cachexia is due. The most remarkable case treated was one of long standing and apparently hopeless—chronic parenchymatous nephritis.—*L. ii./09,1122.*

Nephritis of malarial origin has been treated by kidney (from pig), pulped and macerated in normal saline.—*L. i./09,62,68.*

Liver.

Early cases of cirrhosis have been well treated with glycerinated liver extract. *Dose.*—20 Cc. daily.—*B.M.J.E. ii./08,52.*

Functions of liver and metabolism of fats. The liver is, *inter alia*, evidently the seat of the synthesis of fatty acids. Arachidic Acid has been found to the extent of 10 $\frac{2}{5}$ in pig's liver. This acid may be a product of the synthetic activity in question. A point brought out is that the more fat there is in the liver the more nearly it approaches in composition the fat of adipose tissue.—L. i./09,593.

Mucin. *Dose.*—5 to 10 grains (0.32 to 0.65 Gm.).

This is the essential constituent of the secretions of mucous membranes, buccal, nasal, pharyngeal, &c. It is precipitated from these by alcohol and by acetic acid. The saliva produced by the submaxillary and sublingual glands contains it, but not the parotid. It may be procured from areolar or connective tissue, and from bile.

Taken internally, relieves painful digestion, gastritis and gastric ulcer. In the form of a spray containing Mucin 5 grains, Sodium Bicarbonate 5 grains, Menthol 1 grain, Lime Water $\frac{1}{2}$ ounce, Distilled Water $\frac{1}{2}$ ounce, has been found of value in dry catarrhs, rhinitis, &c., pharyngitis, and where incrustations on the laryngeal lining.—L.ii./00,730; i./02,961; i./03,374.

Elixoid Mucin. *Dose*—1 to 2 drachms. As much as 3 ounces a day were given and were found soothing and moistening to the tongue and throat. As an adjuvant to thyroidectomy in the treatment of cancer. (Mucin is deficient in the carcinomatous subject.) Several cases cited showing improvement in malignant growth after thyroidectomy or partial removal of the thyroid glands.—L.ii./09,1138.

Neatsfoot Oil, OLEUM PEDUM TAURI. If normal has saponification No. 193.1 to 194.7, Iodine No. 70 to 72.—Southall Lab. Rep., 1907. Difficult to obtain pure.—U.S.D. We give 66 as Iodine No. elsewhere.

Ptyalin. *Dose.*—5 to 30 grains. This active constituent of saliva is given to assist conversion of starch in dyspepsia. It liquefies gelatin—a proteolytic ferment in the saliva has not been shown before.—L.ii./07,1641.

Ovaries.

Following the example of Spermin obtained from the testes, some experiments have been made with the ovaries. An extract has failed in the treatment of osteomalacia, but has proved of value in the cure of dysmenorrhœa and menorrhagia, and for climacteric ailments. **Tablets**, 5 grains.

The name ★ 'Varium' is given to a trade brand of Ovarian Extract.

Chlorosis, mental disease and hæmophilia have been treated.

Hæmophilia treated by Ovarian Extract and vegetarian diet; striking result. B.M.J.ii./08,1182.

Pituitary Gland.

It appears that there are certain resemblances in the action of the Pituitary Extract to that of Suprarenal Extract, but they are certainly not identical since the vascular contraction and cardiac inhibition obtained with Pituitary Extract are much more prolonged than those with Suprarenal Extract. The most striking difference is, however, in relation to their effects on the kidney; for while Suprarenal Extract produces a marked constriction of the renal vessels and cessation of the flow of urine, Pituitary Extract produces dilation of the vessels of the kidney and an increase in urine.

It is also interesting to note that "the effect upon the kidney is not proportional to the amount given; indeed, within certain limits the kidneys seem

to respond more readily to a small than to a large dose of the Extract, a fact which the writers suggest is in consonance with the view that the pituitary body produces a secretion which is discharged into the blood and subserves a diuretic function. The diuretic activity of this substance is far greater than that of any substance in the Pharmacopœia." These researches are of great practical importance and deserve careful consideration, for it will be of interest to know whether diabetes—and especially diabetes insipidus—is associated with hypertrophy of the pituitary body. The substance may further prove to have a field of therapeutic usefulness.—L. i./07,304.

Pituitary Extract. (*Infundibular*—i.e. from the posterior part of the lobe) Dose— $\frac{1}{2}$ to 1 Cc. of 20% Extract representing 0.1 to 0.2 Gm. of Fresh Infundibulum.

Intramuscularly to avoid superficial sloughing from local vaso-constriction. May be repeated at 1 hour intervals.

Causes uterine contraction, has a special action on uterine muscle.

It keeps blood pressure raised for hours; but the drug must in no way supersede or take the place of Saline infusions. It is useful in shock.

In 2 cases of Cæsarean section a single injection took immediate effect.

It is stated to quieten and strengthen heart beat and to increase flow of urine to a marked degree; acts similarly to Digitalis and Strophanthus.

When a second or subsequent dose is necessary it is to be noted that the fresh dose will not produce more than a small fraction of its effect unless some time has elapsed.—B.M.J. ii./09,783,1609,1805. Pr. Nov.'09,742.

Adrenalin injected subsequently to Pituitary Extract increases arterial pressure apparently for longer than without a previous injection of it.—B.M.J. ii./08,789.

Pituitrin is a solution containing the active principles of the Infundibular portion of the pituitary body.

Uses.—Though at the time of writing there is little recorded in therapeutics, it is suggested that such preparations may, by action upon the circulatory system, be of value in endocarditis, cardiac dilatation, arteriosclerosis, cerebral anæmia and shock, may favour compensation and lessen tachycardia. Exophthalmic goitre has benefitted. Effect on the kidneys points to use in suppression of urine. May control hæmorrhage, e.g., in typhoid fever. Its effect upon metabolism has led to its use in acromegaly and skin affections.

The anterior lobe of the Pituitary (one of the most obscure organs of the body) body is of glandular structure—the posterior of nervous organisation. Histological observations indicate that the *anterior* portion is the active part, the posterior being merely a *vestigial* structure, but physiological experiments demonstrate the opposite—an extract of the whole gland is advised in preference. Pituitary Extracts promote excretion of Nitrogen, Calcium, and Phosphorus, but further information is necessary, as dried extracts appear to operate differently to fresh preparations.

Removal of the pituitary body produces prostration, apathy, increasing muscular weakness, etc.

Pituitary Extract should be tried where it is desired to raise blood pressure, lessen pulse rate, etc., as above, and improve appetite and capacity for sleep.

Daily dose should not exceed the equivalent of $\frac{1}{2}$ a fresh gland of the ox. Arterial pressure to be observed, and taken as guide to modify dose if necessary. Should not be given when pressure is high nor combined with Suprarenal Extract.—L. i./10,381; see also B.M.J. i./10,350.

Likely to be the drug of the future in cases of anæsthesia shock.—B.M.J. i./09,722; L. i./09,913.

Acromegaly is better treated by pituitary body extract than by thyroid. Some good appears to come from its use in fair proportion of cases.—Guthrie Rankin, L. i./09,28.

For further details on Pituitary Gland see N.N.F.

Hormones.

Pro-Secretin, the remarkable body found by Bayliss and Starling in the columnar epithelia of the small intestine, is an instance of internal secretion by a tissue, the main function of which is of a different nature. This substance when acted on by dilute acid yields **Secretin**, which after passing into and circulating with the blood provokes the secretion of the gastric juice and to a less extent that of the liver, it (Pro-secretin) exemplifies the class of hormones, bodies which give the character to internal secretions, and which, on absorption into the blood, influence tissues and organs other than those from which they have been obtained.

The testes and ovary, the intestinal epithelium, the pancreas, thyroid, the suprarenals and the pituitary body appear to yield specific hormones of physiological importance.

If a small quantity of Pituitary Extract boiled and filtered is injected into the blood vessel of an animal there is a rise in blood pressure due to constriction of the vessels (as with Suprarenal Extract) but with the difference that the Pituitary Extract decreases the rapidity of the pulse, although it may beat more strongly than before, and the action is more prolonged than with Suprarenal.

It is of especial interest, as pointed out by Howell, to note that a second injection of the pituitary substance does not repeat the effects, indeed there may be a tendency to a temporary fall instead of rise of blood pressure, and there is no diminution in rate or increase in force of the heart beat. Immunity of a kind is caused by the first dose. This does not occur with Suprarenal—the pituitary hormone is, therefore, distinct from that of the Suprarenal. But Pituitary Extract contains another hormone; this body has a specific action on the kidneys and promotes a free flow of urine. The increased flow is due to the glandular cells of the organ being stimulated to activity by the agency of a specific hormone,—Pituitary Gland Extractive as above.—B.C.D. ii./07,415; see also P.J. i./09,361; ii./09,726.

Spermin. *Syn.* ORCHIDIN, TESTICULIN.

Said to be allied to Diethylenediamine (Piperazin.)

The use of an extract from the testicles of animals was asserted to re-animate sexual power.

Liquor Testicularis, Orchitic Fluid.

Dose.—15 to 30 minims hypodermically, or by mouth.

Prepared from the testes of animals (preferably guinea-pigs), by maceration with glycerin and subsequent filtration under pressure in contact with carbonic acid, by d'Arsonval's process.

Has been tried for anemia with irregular menses—injections made between periods, preferably into muscular substance.

Tablets of Didymin (Testicular substance), 5 grains.

*Sperminum (Poehl) is sold in 2% solution in capsules containing about 1 Cc. for *hypodermic injection*.

Spermin Essence (Poehl) for internal use.

Dose.—20 to 30 drops twice daily.

Orchitin is given in doses of 0.5, 0.8, 1.0, or 3.0 Gm. *per os* during 24 hours.

These preparations have been tried for the relief of anæmia, debility, diabetes, impotence, tabes dorsalis, and neurasthenia with varying results.

Ⓟ "**Lymphoid Compound Capsules.**"—Testicular Lymphatic Glands, with Brain and Spinal Cord Extracts 2 grains, Iron Glycerophosphate $\frac{1}{2}$ grain, Sodium and Calcium Glycerophosphates 2 grains, *Strychnine Nitrate $\frac{1}{80}$ grain, *Aloin 1/20 grain—in each capsule.

Dose.—One capsule thrice daily or less $\frac{1}{2}$ hour before meals.

This preparation has been used in neurasthenia and general debility, melancholia, malnutrition, neuritis, impotence, insomnia, neuralgia, rheumatic affections, diabetes mellitus, epilepsy, and kidney diseases.

"**Lymph Serum.**" (For Hypodermic use only.)

Dose.—10 minims (0.6 Cc.) daily in the gluteal region.

Contains Orchitic fluids, Extracts from Lymphatic Glands, Spinal Cord and Brain, together with Gold Chloride and Sodium Chloride (1/50 grain to 10 minims) as preservative. Microscopically it is stated to show spermatozoa, leucocytes, crystals of lecithin, Nucleinic Acid and Spermin.

Uses.—The same as the Capsules, but it is intended for the more severe cases and in those of long standing.

Parry has reported on the analysis of these preparations.

Placentine, prepared by extracting minced fresh normal placenta with Absolute Alcohol, evaporating to dryness and taking up the residue with normal Saline Solution. Injection of this preparation causes a striking rise in blood pressure following a preliminary fall on injection—chiefly due to constriction of peripheral arterioles. General effect on the circulation similar to that by Adrenalin, but differed in three ways.—(1) Less rapid rise of blood pressure, (2) more prolonged rise, (3) less marked cardiac effect. Should prove a valuable agent administered prior to anæsthetisation in serious abdominal operations,—the more so in view of frequent use of the Scopolamine-Morphine-Chloroform method.—L. ii./07,1158; P.J. ii./07,737.

This chemical substance developing simultaneously with the growth of the placenta probably provides stimulus for the production of labour, as it stimulates the uterus to contract. It should be possible to produce the substance synthetically.

Placentine Solution from sheep, as prepared by the writer, contains 1% of the extractive in Normal Saline.

(In our opinion, and for various obvious reasons it would be very much better to use placenta from animals, not subject to tuberculosis and venereal diseases).

Placental opotherapy.—B.M.J.E. ii./04,3. Chorionin from sheep's placenta.—L. ii./03,1179.

Suprarenal Capsules.

Development, structure and functions of the Suprarenal Capsules.—L. i./05,178.

The fresh gland was first given to relieve Addison's disease, then dried preparations were used, also liquid extracts, and lastly an active principle, Adrenalin, which, in the form of its Chloride, is now used both internally and externally for many purposes.

These preparations are notable for causing contraction of small blood vessels when applied locally, blanching the skin or mucous membrane, and for a general tonic effect on the arteries when given internally, they strengthen the heart's action, slow and regulate the pulse. Locally there is an astringent action, and capillary bleeding, epistaxis and menorrhagia are checked; useful for bleeding after tooth extraction, and of the greatest value applied to the

nostrils for hay fever and coryza. It is applied by the surgeon locally to check bleeding and blanch the parts for operations on the eye, ear, nose, throat and larynx.

Use.—Internally the action resembles digitalis and acts as a cardiac stimulant in mitral regurgitation and in cases with a weak, irregular pulse, and may be given in any form of hæmorrhage; but it is really only efficient when it can reach the actual bleeding surface—hence will stop hæmatemesis, but not hæmoptysis; it may also be given to relieve syncope from chloroform. Its use has been suggested in Graves' disease and Addison's disease.

The maximum effect is produced by intravenous injection of $\frac{1}{120}$ grain (0.0005 Gm.) of the dry extract per $2\frac{1}{2}$ pounds (1 kilogramme) of body weight; $\frac{1}{800}$ grain (0.000075 Gm.) has a distinct action on the heart and arteries of an adult.—B.M.J. ii/02, 170.

Problems in connection with the suprarenal capsules. Adrenalin given by the mouth in pneumonia in adults and in broncho-pneumonia in children with good results. Appears to prevent cardiac failure. The question as to whether it is a valuable circulatory tonic requires further trial.—L. ii./07, 875.

Tablets, Compressed, of fresh Gland Substance, each equivalent to 5 grains are prepared. In Addison's disease, with considerable benefit. L. ii./05, 523.

Suprarenal Extract, Dry.

Dose.— $\frac{1}{2}$ to 3 grains, three times a day.

This is prepared of such strength that 1 grain represents 8 grains of fresh sheep's suprarenal gland substance.

Glandulæ Suprarenales Siccæ, U.S. *Average dose.*—4 grains

Suprarenal glands of sheep, freed from fat, cleaned, dried and powdered. Ash limit, 7%.

Suprarenal Snuff contains—

Dry Suprarenal Extract 1, Menthol 2, Ammonium Chloride 6, Boric Acid 4, Lycopodium 4, and is for use in hay fever. ***Rhinodyne** contains this extract.

Tabellæ, Chocolate, contain $\frac{1}{2}$ grain of dry extract equivalent to 4 grains of fresh gland, and are agreeable for internal administration.

Nebula Extracti Suprarenalis, C.L.T.E.

Suprarenal Extract 48 grains, Sodium Sulphate 10 grains, Distilled Water to 1 ounce.

Liquid Extract of Suprarenal Glands.

Dose.—10 to 15 minims (0.6 to 0.9 Cc.).

A light brown liquid prepared with glycerin, strength 1 = 1 of fresh gland. It was with this preparation that all the early valuable results were obtained. For local application rarely used stronger than 10%.

Suppositories contain 3 minims of Liquid Extract in 15 grains of Gelatin basis; to check bleeding piles.

Suppositories, Suprarenal with Morphine.—These contain $\frac{1}{4}$ grain of Morphine Hydrochloride in addition. Useful for painful piles.

Suprarenal Uterine Injection.—1 part in 10 used.

Suprarenal Ointment.—Liquid Extract of Suprarenal Gland 50 minims. Liquid Paraffin 2 drachms, Hydrous Wool Fat to 1 ounce. It may be scented with Otto of Rose.

Spray for the Nose and Throat.—For use in hay fever and coryza, contains 5% of Liquid Extract.

Hypodermic Injection. *Dose.*—1 to 5 minims.

Liquid Extract of the Suprarenal Gland is employed as such or diluted with Normal Saline Solution.

Surgical shock after chloroform anaesthesia should be treated by weak solution (1 of Suprarenal Extract in 50,000 to 1 in 160,000) used as continuous rectal irrigation at the rate of a pint an hour. The limit of fluid thus to be used is 8 pints, when employed intravenously not more than 3 pints is recommended.—Blumfield, Pr. Feb. '09, 242.

Exophthalmic goitre treated beneficially by Suprarenal Extract.—B.M.J. ii./05, 1249.

Adrenalin*. P: BELG. FR. CX. (Tests are given which should be consulted if required.)

The empirical formula usually given is $C_8H_{13}NO_3 = 181.77$. (183.114 I. Wts.), i.e. $(OH)_2.C_6H_3.CH(OH).CH_2.NH.CH_3$. c.f. P.J. i./09, 361.

It is an active principle of the Suprarenal gland (first prepared by Takamine) in grey crystals. It appears to maintain a proper degree of contraction of the arteries, and hence to correct blood pressure.

Soluble in Hydrochloric Acid, and Boric Acid Solution forming corresponding salts, also soluble in alkalis, but if latter in excess decomposition will occur.

Aqueous solutions of its salts are laevorotatory.

Insoluble in alcohol, ether, chloroform, and petroleum ether. It is stated to be soluble in oleic acid, but we do not find this a good solvent. Not precipitated by ordinary alkaloidal reagents. It is chemically a very powerful reducing agent.

Viewed under the microscope is of crystalline form. On heating above its melting point ($263^\circ C.$) it decomposes with an odour resembling opium smoke.—FR. CX.

TEST OF IDENTITY.—A peculiar odour like phosphoretted hydrogen is developed on treating a small quantity of the salt or solution with a few drops of sodium hydrate solution.—P.J. i./07, 718, 774, 797. See also Organic Analysis Chart.

*Hemisine, *Renaglandin, Suprarenin, *Adnephrein, Paranephrein, *Renostyptin, and *Vaso-Constrictine are supplied in commerce.

Epinephrin is different from suprarenin. Maben's Paper on the introduction and priority of Adrenalin.—P.J. i./07, 388; see also P.J. i./07, 447.

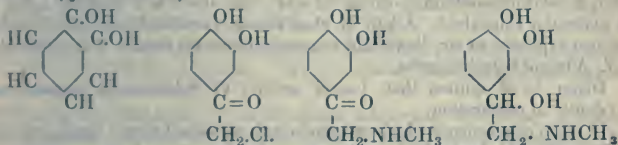
J.J. Abel isolated Epinephrin. This is capable of producing a prolonged rise in blood pressure when introduced into the circulation. The effect on respiration is at first excitant, but later paralysing through its action on nerve centres, while the heart is only paralysed with difficulty and after repeated doses.—M.P. Oct. 20/09, 413.

Abel showed that Adrenalin of Takamine is not chemically pure. Aldrich, Abel's former associate, has obtained an extremely pure form of the body and retained Takamine's name, but its production by Aldrich's method is not commercially possible. This Adrenalin and Abel's later product, Epinephrin, are probably identical.—Am.Jl.Ph., July /08, 323.

In the preparation of Adrenalin the suprarenal capsules are reduced to

pulp and macerated, excluding oxygen as much as possible, in warm (50° to 80° C.) water or very dilute acid for 5 hours, the mixture being then heated at 90° to 95° C. to coagulate albuminoids. This aqueous extractive is evaporated and extracted with alcohol. Precipitation from this liquid of impure Adrenalin follows by means of ammonia. It is purified by ether-alcohol, and re-precipitation with ammonia or fixed alkali.

Synthetically, a body with chemical and physiological properties very similar to those of Adrenalin has been made by starting from Pyrocatechin (*syn.* Catechol):—



converting this into Chlor-acetyl-pyrocatechin; thence with Methylamine into the Ketone; finally reducing to the body Dihydroxyphenylmethylaminomethyl-Carbinol of the fourth formula above strongly resembling Adrenalin. The Ketone is not much more powerful than the Chlor-acetyl body. They are, however, both physiologically very active, but not nearly so powerful as the ultimate body.—Dakin, *Jl. Physiol.*, Vol. XXXII.; L. ii./05,341. See also Jowett, *P.J.* i./05,909.

Suprarenin.—Dihydroxyphenylmethylaminomethyl-carbinol is a synthetic substance made on above lines. It is optically inactive, consisting of equal parts of dextro-and levo-suprarenin, but the latter termed **L-Suprarenin** is supplied commercially and is understood for 'Suprarenin.' Its action is identical with that of Adrenalin.

L-Suprarenin Hydrochloride Solution 1 in 1,000 is also prepared.

Dose and Uses as for Adrenalin Solution, *vide infra*.

Incompatible with alkalis and solutions of Ferric Chloride.

On several other synthetic bodies of like nature.—M.A. 1908,4.

Substances possessing an Adrenalin-like action have also been found in putrefying meat, *vide Hydroxyphenylethylamine*.

Uses of Adrenalin.—*vide* Adrenalin Chloride Solution below, in which form it is principally used.

Adrenalin Chloride Solution.

Dose.—5 to 30 minims (0.3 to 1.8 Cc.), by the mouth.

A solution of 1 of Adrenalin Chloride in 1,000 of Normal Saline Solution, with 0.5% of Chloretone. It may be diluted with Normal Saline Solution 10 times (or less) for use as hypodermic injection.

Uses and References.

Internally.—In hæmorrhage (*e.g.* in typhoid fever), hæmoptysis, and postpartum hæmorrhage.

It has also been suggested for *intravenous* use. It controls the heart's action (like digitalis): 5 minims produce marked effect in cardiac failure.

A few drops *locally* applied render the area blanched and bloodless. It has been injected with Cocaine and Eucaine *q.v.* to produce anæsthesia and restrain bleeding during surgical operations. Both these combinations have been applied to epitheliomatous growths and ulcers (*c.f.* also Suprarenal Capsules, *antea*).

Braun considers that Adrenalin should be injected in very dilute solution, the maximum *dose* being 0·5 mgr., *i.e.*, 0·5 Cc. of the 1 in 1,000 Solution diluted with 50 to 200 Cc. of a Cocaine Solution.

Decoloration of Solutions.—Adrenalin dissolved in water with one molecular equivalent of Hydrochloric Acid is stated to become pink quicker than a solution containing excess of acid; use about half as much again as 1 molecular equivalent. Alkali of glass vessels favours formation of color, as also exposure to air, light, and contamination with iron.—P.J. i./o8,513. *c.f.* Adrenol Solution *infra*.

Dixon is of opinion that loss of activity of Solutions is proportional to depth of colouration.

In some experiments which we conducted we found that a small quantity of formalin added retards the colouration of Adrenalin solution.

Solution of (Synthetic) Suprarenin Borate (*v. supra*) 1 in 1,000 is also made.

Adrenol Solution. A stable and efficacious solution of the Adrenal active principle in oily solution. Suitable for spray with an oil atomiser on to the mucous membrane in throat and nose cases. Dissolve Adrenalin 1 in a mortar with Alcohol 7 and Hydrochloric Acid *q.s.* (0·2 of Actual HCl = 0·6 of P.B. Acid approximates theory: we find in practice a little more may be necessary), then add Absolute Alcohol *q.s.*, to 12·5 and make up to 1,000 with Castor Oil. Eucalyptol 5 may be incorporated if desired. This preparation is based on Gunn and Harrison's method in P.J. ii./o7,310.

Oleic Acid may contain a trace of iron, and this, if brought into contact with Adrenalin will produce a purple tinge.—P.J. ii./o7,181.

Adrenalin Inhalant.

A special preparation 1 in 1000 Adrenalin Chloride made with aromatised Hydrocarbon Oil. Is soothing and astringent in inflammatory affections.

For use as spray the Adrenalin Chloride Solution in Normal Saline diluted to 1 in 2,500, or even 1 in 5,000 parts, is effective in the nostrils or within the uterus. Schäfer considers it acts more strongly on uterine muscle than any other drug.

⑩ *Codrenine.

Dose.—For dental use 8½ minims (0·5 Cc.), two or three minutes before extraction. A solution 1 Cc. of which contains Cocaine Hydrochloride 0·02 Gm. ($\frac{1}{50}$ grain) and Adrenalin 0·00006 Gm. ($\frac{1}{10000}$ grain). A local anæsthetic and hæmostatic. For local anæsthesia over large area dilute 1 volume with 9 volumes of Normal Saline.

⑩ Conephrin.

Dose.—15 minims, one half to be injected in front and the other behind the tooth, as near the periosteum as possible. Is a special preparation successful in dental work for painless extraction, containing the same ingredients in the same strengths as the last mentioned.

⑩ Conephrin Sterules, Hypodermic 15 minims for dentists' use.

⑩ Tablets of Adrenalin ($\frac{1}{3000}$ grain), with Cocaine Hydrochloride ($\frac{1}{6}$ grain) are prepared for dental use. They will fit into cavities where pulp

has to be extirpated, or may be dissolved in 15 to 30 minims of water forming a solution suitable for ordinary cases.

Ⓔ ***Easemine.** A solution of 5 of Adrenalin Chloride Solution 1 in 1,000, Cocaine Hydrochloride 0.75 in Normal Saline Solution 100.

Adrenalin in solution is easily oxidisable: the solution turns pink on exposure, bottles should be opened as little as possible.—Barker.

Sterules, Hypodermic of Adrenalin Chloride Solution (contain, 10 and 15 minims) with elongated ends, which may be snapped off; these are a great convenience, particularly in dental work to check hæmorrhage after tooth extraction.—B.M.J. i./03,849.

The 15 minim size are for use with the β -Eucaine Powders in Infiltration Analgesia (v. p. 269).

Adrovaine Sterules contain Adrenalin 0.00025 Gm. ($\frac{1}{2000}$ grain). with Stovaine 0.02 Gm. ($\frac{1}{50}$ grain). **Hypodermic Tablets of Adrovaine** are also made same strength.

Sterules, Ophthalmic of Adrenalin Chloride Solution are also prepared. In these the activity of the solution persists for months, in all probability for years, owing to their being hermetically sealed.

Styptic Gelatin.

Gelatin $1\frac{1}{2}$ grains, Adrenalin Solution 15 minims, Water 45 minims—this quantity for a dose; contains Salicylic Acid 1 grain to ounce to preserve. Suggested for internal hæmorrhage.

Suppositories, Hollow, of Cacao Butter are prepared, containing 10 minims of the solution (15 and 30 grain size). As also 1 in 1,000 of the Adrenalin Chloride in the Theobroma mass. For hæmorrhoids.

Ⓕ **Suppositories of Adrenalin, Cocaine, Hamamelis and Formidin** contain Cocaine Hydrochloride $\frac{1}{4}$ grain, Hamamelis Extract 3 grains, and Formidin 3 grains. Germicidal, analgesic and tonic astringent.—L. ii./09,302. They may be made 15 grain size with 1 of Adrenalin in 1,000 of the basis.

Adrenalin $\frac{1}{2}$ grain in a 30 grain cacao butter suppository was found to prevent it from melting freely at body temperature.—P.J. ii./09,391.

Unguentum Adrenalin. Adrenalin base 1, Lanolin Ointment 5,000. scented with Geranium Oil. Useful in the nostril in acute coryza and inflamed mucous surfaces,

In neuralgia, neuritis and reflex or referred pain,—small quantities rubbed in with advantage.—M.A. 1908,2.

Ⓖ **Adrenalin Catheter Lubricant.**—Adrenalin (base) 1, Cocaine 10. Atropine 10. Dissolve the Adrenalin in Hydrochloric Acid (*Off.*) *q.s.* (0.6 is usually sufficient) diluted with Absolute Alcohol 30. Dissolve the alkaloidal bases in Oleic Acid 20 and mix this and the Adrenalin Solution with sufficient Castor Oil and Absolute Alcohol in proportion of 4 to 1 to make 1,000 of the lubricant.—B.M.J. ii./07,859.

Adrenalin Gauze.—Gauze impregnated with Adrenalin Solution, at the time of use, for local application.

References to Adrenalin.

A hæmostatic and cardiac stimulant.—L. ii./01,1752.

For intestinal and typhoid bleeding.—B.M.J.E. i./05,48; B.M.J. ii./04,1452.

Eye practice, control of congestion and bleeding.—B.M.J. i./02,707,1142.

- Stops nasal bleeding.—B.M.J. ii./02,170,976; Epistaxis cured by packing nostrils with gauze dipped in Adrenalin Solution 1, Saline Solution 2.—B.M.J. i./04,489.
- Controls vesical bleeding.—B.M.J.E. ii./02,56; i./03,421.
- Coryza aborted by Adrenalin and Cocaine Spray Solution.—B.M.J.E. ii./02,3.
- For mouth bleeding.—B.M.J. i./04,1247.
- Hay fever cured by spray of 1 in 10,000.—L. ii./01,488.
- In bubonic plague when unaccompanied with lung and intestinal trouble, Adrenalin Solution in 1 to 3 drop doses every hour reduces temperature and maintains the pulse. Also in the mæna of typhoid and malarial spleen.—Jl. Trop. Med. 1904,40.
- Purpura well treated by solution in 10 minim doses.—M.A. 1904,605.
- Fails for hæmoptysis, but valuable in hæmatemesis.—B.M.J. i./04,603,1246; ii./04,965,1636; i./05,68. L. ii./04,1446.
- Tuberculous pleural effusion, 4 to 8 Cc. of the 1 in 1,000 solution injected.—B.M.J. ii./04,1003.
- Laryngeal papillomata 1 in 5,000 solution injected daily.—B.M.J. ii./04,1224.
- Inflammation of nose and throat. Spray 1 in 1,000 in Hydrocarbon Oil.—L. ii./04 1160. Or as ointment.—P.J. ii./04,967.
- Post-partum bleeding checked at once by swabbing uterus with a 1 in 5,000 solution. B.M.J. i./04,1254.
- Intraseous injections of 10 minims in pleuritic effusion. Good results.—B.M.J. i./06,973.
- Pleurisy treated by tapping and injection of 4 Cc. of Adrenalin Solution 1: 1,000 diluted 2 or 3 times its volume with normal Saline Solution. Uniformly good results.—B.M.J. ii./07,1292.
- In plague 20 minim doses internally, on the heart beneficial, or better subcutaneously every 2 hours same dose.—M.A., 1903,2.
- It would appear that the pancreas has the power of inhibiting the sensitive ness to Adrenalin in certain organs supplied by the sympathetic nerve—i.e., normally Adrenalin does not dilate the pupil, but this does occur in certain cases, e.g., extirpation of the pancreas, pancreatic insufficiency, in diabetes, and in some cases of Basedow's disease. This susceptibility is probably due to hyperthyroidism.—J.C.S.A. ii./08,712.
- Effect produced on tracings in counteracting Epinephrin action with Nitroglycerin.—Martin, C.D. ii./09,213.
- In cardiac dropsy with chronic polyserositis repeated tapplings of abdomen or pleuræ may be necessary and at the end of the paracentesis Adrenalin may be injected into the serous cavity.—B.M.J. ii./09,537.
- Osteomalacia treated with $\frac{1}{2}$ to 2 Cc. doses.—B.M.J. ii./08,797.
- Rickety children improved in appetite and general nutrition by $\frac{1}{10}$ to 1 Cc. doses of the 1 in 1,000 solution.—B.M.J.E. ii./09,20.
- Nose operations, submucous injection of 10 minims of 1 in 10,000 solution with 5 minims of 1% Cocaine Hydrochloride to lessen blood flow. Pr. Oct.'07,525.
- Lime content of cardiovascular tissues increased by Adrenalin.—M.P. Sept. 28,'09,312.
- For cardiac failure in acute pneumonia injected.—West. Pr. Apl.'08,435.
- In acute asthma used as a spray with an equal quantity of water gives relief.—B.M.J. ii./09,1323.
- Isoamylamine and para-hydroxyphenylethylamine (*q.v.*) are pressor substances like Adrenalin found in putrid meat and Ergot. Unlike Ergot the pressor action is produced when taken by the mouth. The action though less marked is more prolonged than of Adrenalin.—B.M.J. ii./09,540.
- A death under Chloroform, Ether and Adrenalin Solution in an operation on the nose.—M.P. Oct. 20,'09,413.
- Vomiting of pregnancy well treated with Adrenalin. Adrenalin in doses of 10 drops of 1 in 1,000 solution twice daily in the case of a woman in an exhausted condition at her third month. Abortion, previously decided on, rendered unnecessary.—Pres. 1910, p. 9.

Thymus Gland. Desiccated.

Dose.—3 to 10 grains (0·2 to 0·65 Gm.).

One grain of this powder represents 8 grains of the fresh gland of the calf. Has been given to improve defective nutrition in childhood, for anæmia, Graves' disease, hæmophilia, chlorosis and leucoeythæmia. It does not appear to cause pyrexia, or any form of constitutional disturbance.

Tablets, 3 and 5 grains: of value in rickets.—B.M.J.E. i./02,40.

Relieves urticaria and checks bleeding.—L. i./96,153.

In tachycardia is useful.—L. i./02,1093.

Useful to increase the coagulability of the blood.—L. ii./06,436.

Metabolic osteo-arthritis has been treated with good result with two 5 grain tablets thrice daily, increasing to three tablets in a fortnight, and after a few months three tablets four times daily, keeping patient at rest. Passive motion of the affected joints then commenced. Acts as a stimulant to the nutritive processes.—B.M.J.E. ii./09,41.

Liquid Extract of Thymus Gland. 1=1.

Dose.— $\frac{1}{2}$ to 2 drachms (1·8 to 7·0 Cc.).

Exophthalmic goitre benefitted by.—B.M.J. ii./05,1249; L. ii./07,1495.

In cancer an aqueous extract of the gland (method of preparation given) in drachm doses *per os* and hypodermically with benefit.—M.A. 1908,36.

Acidum Thymenicum. *Syn.* *Soluroil. Nucleotin-phosphoric acid.

Dose.—5 to 10 grains (0·32 to 0·65 Gm.) after meals.

Approximate composition:— $C_{20}H_{33}N_3O_{16}P_2$ (Kossel)=630·7 (635·31 I. Wts.). Minkowski has $C_{30}H_{43}N_4O_{15}2P_2O_5$ =979·26 (986·408 I. Wts.). A product of the metabolism of the nucleins present in food containing nucleo proteids, *e.g.*, thymus gland, pancreas, spleen, etc. It possesses affinity for, and solvent action on, Uric Acid. Uric Acid formed in the body without its equivalent of Thymenic Acid is stated to be precipitated. It is, therefore, employed in the treatment of gouty affections; 1 of the acid will dissolve 1·3 of Uric Acid at 100° F. *in vitro*.

No especial incompatibilities when in solution.

Febly acid, but as far as uric acid is concerned it probably acts as a base. It is thought to be non-toxic and non-depressant.

Has been given in 2 grain doses by intra-muscular injection in severe gouty affections, especially neuritis.

Soluble with ease 1 in 5, stronger solutions may be prepared, but it is mostly prescribed as **Thymenic Acid Tablets**, 4 grains.

A number of cases of gout treated with.—L. ii./08,1804.

Thyroid Gland.

This gland, and preparations made from it, have been employed for relieving myxœdema, cretinism, lupus, psoriasis and chronic eczema. The methods applied have been (1) by feeding with the glands; (2) by grafting; (3) by the exhibition of the official **Thyroid Solution** by the mouth or hypodermically; (4) by **Dry Thyroid**, in powders, cachets or tablets. Success has been most notable in cases of myxœdema and goitre; obese and insane persons and weak-minded children have also improved under its use.

The opinion is held by some that the secretion from the thyroid gland has an antitoxic action, neutralizing the toxins produced by bacteria. The

action on administration of thyroid gland preparations is in any case (1) a stimulating one—metabolism is increased by a process of katalysis (*c.f.* Spermin); and (2) the production, by means of the parathyroid tissue present when sheep's gland is used, of a substance which has the effect of neutralising the toxic results of this metabolism.

It should be noted that the Thyroid preparations on the market (mostly made from sheep's thyroids) consist really of an extract both of thyroid as well as parathyroid tissues; deficiencies, therefore, in both these glands in man are met by feeding with these preparations. Signs of thyroidism must be carefully watched for during administration of Thyroid preparations.

In exophthalmic goitre Thyroid Extract is totally unsuited—it aggravates the condition, *c.f.* Potassium Iodide.—B.M.J. ii./05,1249; i./09,384.

Myxœdema on the other hand is speedily improved by Thyroid Extract and a more or less complete cure is established. 'The results,' says Osler, are unparalleled by anything in the whole range of curative measures. Within a few weeks a poor feeble-minded toad-like caricature of humanity may be restored to mental and bodily health.'

Murray first employed Thyroid gland, a glycerin extract being used subcutaneously. V. Horsley had previously practised transplantation of sheep's thyroid gland into the tissues of a myxœdematous patient. Later McKenzie showed internal use of Thyroid preparations equally good.

The treatment consists in supplying a necessary element for proper metabolism which is withheld by the absence of disorganisation of the thyroid gland. The patient must continue to take the preparation more or less all his life. In rare cases in which thyroid treatment upsets the patient p'locarpine hypodermically in $\frac{1}{8}$ to $\frac{1}{4}$ grain doses should be tried.—Guthrie Rankin, Pr. Feb./09,211.

Over-doses of Thyroid preparations may cause rapid pulse, feverishness, headache, pruritus, and even delirium. Chronic thyroid poisoning has also been observed—the symptoms being emaciation, muscular weakness, loss of hair, dilated pupils, and general debility.

Bromine, Iodine (first found by Baumann in 1896), and Arsenic have been found in sheep's thyroid glands. Thomson, however, does not agree with Gautier as to the normal existence of Arsenic in thyroid, liver, spleen, etc.—L. ii./04,1229.

For enlarged thyroids good.—B.M.J. ii./06,693.

Myxœdema, mild cases, should be treated with 5-10 minim doses of Liquor Thyroidei each night. The latter dose is thought to be the amount corresponding to the daily output of thyroid secretion from an average normal gland, *i.e.*, in a case in which there was believed to be no further active portion of the gland remaining, this dose taken 6 nights in the week kept the patient free from myxœdema for 17 years.—B.M.J. i./09,382.

Incontinence of urine treated with phenomenal success by the Extract. Details of 25 cases, many of them of severe enuresis, in 24 of which the treatment was immediate and complete.—L. i./09,1247

Liquor Thyroidei, THYROID SOLUTION (*Off.*).

Dose.—5 to 15 minims (0.3 to 0.9 Cc.), freshly prepared. 100 minims represent one entire gland.

It is better to add glycerin 15 to 20 of the sliced and bruised tissue, macerate 24 hours, press, and make up to the required volume with glycerin and water *partes æquales*.—P.J. ii./02,140. Mixtures containing Liquor Thyroidei should be prescribed with Chloroform Water.

Flavoring.—Glyl or Syl Aurantii Floris, Glyl or Syl Amygdalæ Amaræ; Syrupus Limonis.

Thyroideum Siccum, DRY THYROID (*Off.*).

Dose.—3 to 10 grains (0.2 to 0.65 Gm.), in cachets.

Should not exceed fifteen grains daily.—W.W.W.

Prepared from healthy fresh glands of sheep; the surrounding fat, etc., is first removed; the glands are finely powdered after drying at not exceeding 40° C.; and finally the substance is freed from fat by Ether percolation.

Glandulæ Thyroidæ Siccæ, U.S. are similar. *Average dose.*—4 grains (0.25 Gm.). Ash limit 6%.

Tablets, 1½ and 5 grains (0.1 and 0.32 Gm.).

Thyroidea, P. Belg., contains 0.03% Iodine.

Iodothyrene. *Syn.* THYRO-IODIN.

A brown amorphous substance insoluble in water, soluble readily in weak alkalis. Contains phosphorus and Iodine.—B.M.J. i./09,385.

Prepared by extraction of pancreatised gland by means of petroleum ether, solution in soda, and precipitation by sulphuric acid, adjusted in strength to contain 0.3% of iodine. It is doubtful whether the therapeutic value of the gland is due to Iodine.

Iodothyrene Tablets, 5 grains (0.32 Gm.) each, about equivalent to 5 grains of the fresh gland.

These tablets are used for goitre, obesity, myxœdema, psoriasis, eczema, menorrhagia, and for rickets.

Unguentum Iodothyrene.

Iodothyrene 1, Ether 6, Lanolin 48.

***Thyroglandin.** A dry thyroid extract prepared for the treatment of obesity and myxœdema. *Dose.*—3 to 5 grains (0.2 to 0.32 Gm.).

Pills 1 grain and tablets 2 grains are prepared.

Thyrocol.—*Dose.*—5 grains (0.32 Gm.)

A tasteless powder made from the colloid material of the gland, and stated to contain all its active principles. Used in cancer, alopecia, cretinism, psoriasis, insanity, ichthyosis, &c.

Employed in connection with some Calcium Estimation experiments.—B.M.J. i./09,520.

References to Thyroid Treatment.

It is worthy of note that arsenic and iodine were used in the treatment of myxœdema long before these were found in the thyroid gland.

Victor Horsley on grafting the thyroid gland.—B.M.J. i.90,287; ii./90,201.

Numberless reports of the relief of myxœdema and cretinism have been recorded. Opinion varies as to its value in obesity.

Summary of results of use in the insane, satisfactory.—L. ii./94,846; B.M.J. ii.00,815. Twelve cases out of 22 recovered.—M.P. 1905,131.

Has been used successfully in lupus, psoriasis, in pityriasis rubra, ichthyosis, and alopecia.

Acromegaly improved.—B.M.J.E. i./96,51; L. ii./96,614.

Tends to assist the development of backward children.—B.M.J. i./98,618.

Apathy may follow the use of thyroid.—B.M.J. ii./00,582.

Hæmophilia controlled by the liquor. B.M.J. ii./00,1375.

In auto-intoxication of pregnancy and impending eclampsia. Full doses.—L. i.03,397.

In the delayed union of fractured bones beneficial consolidation occurred. Thyroidectomy in the rabbit delays healing of fractured bones.—Batty Shaw.

Osteomalacia, rickets, rheumatoid arthritis, infantilism, acromegaly and gigantism, results in. Also arrhythmia and tachycardia.—Batty Shaw, 88,100.

In arterio-sclerosis thyroid preparations are very useful.—B.M.J. i./06,121.

Eclampsia, vomiting, and coma in pregnancy must be combated by some substance that will overcome the vaso-constriction of the renal and other vessels; thyroid preparations do this effectually.—Batty Shaw, 91.

Hay fever, 1 to 3 tablets daily will benefit.—M.A. 1908, 37.

In chorea of pregnancy no definite result.—B.M.J. ii./06, 1131.

Cretinism, 'nervous' markedly improved by giving fresh and dried extracts of sheep's thyroid.—L. ii./08, 1275.

DERCUM'S DISEASE treated by 5 grain doses thrice daily. After two weeks reduced pain and alleviated numbness and tingling and reduced size of swelling.—B.M.J. ii./09, 516.

In amenorrhœa a valuable drug. The function of the thyroid is (just before onset of menstruation and early in pregnancy) to stimulate calcium excretion which may take place from the uterus, or failing that from kidney or bowel.—B.M.J. i./09, 597.

Rheumatoid arthritis treated by Thyroid Extract.—L.i./10, 643.

Enuresis in a case had been thought to be due to adenoids—these were removed but without effecting any good. Thyroid gland in small dose, however, night and morning caused immediate cessation of the trouble.—Pr., Nov./09, 719. Dose—*e.g.*, 1 to 3 grains night and morning and more frequently. Adjustment of dose is of utmost importance.—L.i./09, 1245.

Para-thyroid Preparations. Some experimental work has been done with administration of para-thyroid compounds. Exophthalmic goitre is said to have been improved under dosage 10 to 12 glands daily. Opinions, however, differ as to their efficacy.

Tetany treated successfully by Thyroid. It has been shown that on removing the parathyroids from dogs, tetanus results.—B.M.J.i./06, 262. An animal thus operated upon may be prevented from tetany by grafting parathyroids.

Parathyroid glands are vitally essential to the organism. Parathyroidectomy causes death in a few days; thyroidectomy produces only a chronic ill-health, dragging on it may be for years.—B.M.J.ii/07, 1508.

The glands in question are functionally the same.

Parathyroid glands are not responsible for exophthalmic goitre. Surgical treatment is not to be directed against them, but to perverted condition in the thyroid.—B.M.J.ii/06, 1286.

Anti-Thyroid Serum. *Syn.* *ANTITHYREOIDIN MOEBIUS.

Dose.—*Internally* 8 minims thrice daily, increasing 5 minims every other day up to 30 minims per dose and decreasing by similar stages. After giving 50 Cc. pause for eight days, then administer for a short period 10-20 minims thrice daily, or 8 minims 3 times daily, increasing 8 minims per day up to 60 minims per day, or 15 minims twice daily, later 30 minims in wine, lime juice, &c., or similar doses per rectum.

Hypodermically 15 minims at first daily, then every other day.

The symptoms of Graves' disease and goitre are said to be due to excessive thyroid secretion; to neutralise this the serum of thyroidectomised animals is given, supposing this to contain in excess the harmful principles which should be neutralised by the thyroid secretion. The milk of thyroidectomised animals has also been given with good results.

The serum of rams, from which the thyroid glands have been removed six weeks prior to bleeding, is preserved by adding 0.5% phenol. It is said to keep indefinitely and to reduce the size of goitre rapidly.

Large doses must be given carefully as a condition suggesting myxœdema may result.—Münch. Med. Woch, 1905, No. 29.

In the knowledge of the writers a case of exophthalmic goitre has been treated with considerable quantities of this preparation spread over more than six months with 'encouraging result.'

Tachycardia, precordial distress, tremor relieved.—M.A. 1908,5.

Rats fed on (1) bread and milk; (2) fresh milk. (3) same milk pasteurised; (4) same milk boiled 30 minutes. No distinct differences in the thyroids of same in 80% of cases, while in the remaining 20% the structure of gland varied. The gland of the rat is exceedingly susceptible to variations in diet.—B.M.J. i./07,620.

Thyroidectin. *Dose.*—5 grains in capsules. The dried blood of thyroidectomised animals has been given in exophthalmic goitre.—L. ii./05,1383.

*Rodagen.

Dose.—5 to 10 grammes daily. A white powder and tablets consisting of the dried milk of thyroidectomised goats with 50% Milk Sugar to improve the keeping qualities. In exophthalmic goitre (Basedow's or Graves' disease), this preparation causes a reduction of the swelling, diminution of pulse rate and increase of body weight. In exceedingly chronic cases the treatment must be prolonged over an extended period. Effects on the tremor, palpitation, insomnia, etc., are noticeable after two or three weeks' use, i.e., after taking 100-200 Gm. of Rodagen.—B.M.J. ii./05,1251. Six cases of exophthalmic goitre in females greatly improved.—B.M.J. i./06,326. In cases of severe cardiac trouble the dose must be increased very gradually. In some cases 15 to 30 Gm. Rodagen *pro die* are given.

Graves' disease treated with milk from thyroidless goats—all living. It would appear better to administer the dried serum and corpuscles of the thyroidless animal.—L. i./09,1041.

Exophthalmic goitre improved by large dose, and prolonged treatment with Rodagen and thyroidectin—the latter appeared to be better than the former.—L. ii./08,708.

Other Organic Principles.

The following preparations of animal glands and tissues are also obtainable but have not come into general use by physicians: Corpora lutea, Mammary Gland Substance, Prostate Gland Substance, and Spleen.

Glandalen, from the bronchial glands of sheep in 4 grain tablets; failed to benefit cases of phthisis.

Hirudines, (*Sanguisuga Medicinalis*, *S. officinalis* and *H. quinque-striata*—the latter I.C. Add.), Leeches. An active principle from, called Hirudin has been made by macerating the chopped-up heads in Normal Saline at 40°C.

To remove leeches lodged in the throat, e.g. from drinking water containing *Limnatis Nilotica*. Paint the leech with strong cocaine solution (15 or 20%) and remove with forceps or let it be coughed up, patient lying with head hanging. Menthol in Paroleine also suggested.—B.M.J. ii./08,525.

GAUBIUS' TABLE

Of Proportion of Dose according to Age.			
For an adult, suppose the dose to be			
Under 1 year will require	"	1	or 60 grains
" 2 "	"	1 1/2	" 5 "
" 3 "	"	2	" 8 "
" 4 "	"	2 1/2	" 10 "
" 7 "	"	3	" 15 "
" 14 "	"	4	" 20 "
" 20 "	"	5	" 30 "
" 20 "	"	6	" 40 "
21 to 60, the full dose, or	"	1	" 60 "

Above this age, an inverse gradation must be observed.

Another rule is, for children under 12, add 12 to the age, and divide the age by the amount thus obtained; thus for 8 years $\frac{8}{8 + 12} = \frac{2}{5}$ of adult dose.—Young's Formula.

The doses for two individuals are proportional to their body surfaces, *i.e.*, $\frac{2}{3}$ powers of their weights. Thus a rat of 140 Gm. can tolerate 0.02 Gm. Atoxyl, and for man about 1 Gm. is a maximum,—this is practically to the $\frac{2}{3}$ powers of the ratio of the weights (1:500)—P.J. ii./09,342, Biochem Jl. IV. through "Nature."

MINERAL WATERS.

The following information regarding mineral waters has been obtained by applying in most instances direct at the sources.

The arrangement of the paragraphs is as follows:—

The name of the water and locality is given, then follow in order the names of spring or springs, the nature of the water, the chief chemical constituents, the medicinal uses, the season, if any, at the health resort, and an indication as to whether the water is imported in the bottled condition. The accounts of some are, however, condensed. 'Sulphurous' is to convey Sulphuretted Hydrogen with (usually Sodium) Sulphates and Sulphides.

See also "Selection of Patients for Spa Treatment."—A recent treatise on the subject.—N. Wood.—L. ii./09,1276.

① We have adhered to the letter of the law viewing mineral waters containing arsenic as 'Medicinal Preparations of Arsenic,' but obviously we are concerned here *de minimis* in some instances—in others again the amount is very considerable.

Adelheidsquelle (BAVARIA).—Saline Tonic. Sodium Chloride and Carbonate, Carbonic Acid. Skin affections, rheumatism, gout, women's diseases. May to Sept. Imported.

Aedipsos (GRECIAN).—Saline thermal. **Aegina (GRECIAN).**—Alkaline Imported.—Ph. Notes.

***Aesculap (HUNGARY).**—Aperient. Magnesium and Sod. Sulphates, Sodium Chloride and Calcium Sulphate. Occasional and habitual constipation, bowel and liver disorders. Imported.

Aix-la-Chapelle (AACHEN, PRUSSIA).—Saline, Sulphurous. Both drunk and for baths. Sodium Chloride, Sodium Bicarbonate, Sodium and Potassium Sulphates, some Sulphuretted Hydrogen, Carbonic Acid. Rheumatism, gout, stiff joints, skin diseases, syphilis. 15th May to 30th September, also winter season 15th September to 31st March, and imported.

Aix-les-Bains (SAVOY).—Anti-rheumatic. Sulphur and a curious organic matter called Baregine, which renders it easy of digestion, oily and suitable for massage. Rheumatism, gout and throat diseases. 1st April to end of October.

Alet (AUDE, FRANCE).—Source des Bains and Source Nouvelle.—Alkaline carbonated. Debility, dyspepsia, anæmia. Imported.

Alexanderbad (BAVARIA).—Chalybeate. Anæmia, chlorosis, incipient phthisis. May to October.

Alexisbad (GERMANY). 3 springs: Alexisbrunnen, Schönheitsquelle, Stahlbrunnen or Grotte.—Chalybeate, Iron, Manganese, Potassium Chloride, Free Carbonic Acid. Anæmia, diabetes, nervous diseases and women's diseases. May 20th to September 20th.

Allevard (ISÈRE, FRANCE).—Sulphurous carbonated. Calcium and Magnesium Bicarbonates, Sodium Chloride, Calcium, Sodium and Magnesium Sulphates, free Sulphuretted Hydrogen, Carbonic Acid and Nitrogen. Chest affections of all kinds, skin diseases, women's diseases, rheumatic complaints, June 1st to September 30th, and imported.

Alvanen-Bad (Near Engadine).—Sulphurous. Alpine Climate.

Andros (GRECIAN).—Chalybeate. Imported.—Ph. Notes.

***Apenta** (near BUDAPEST).—Aperient. Magnes. Sodium and Calcium Sulphates, Sodium Chloride with small quantities of Lithium and Potassium Sulphates. Habitual constipation, hepatic torpor, congestion, hæmorrhoids, gall stones, gout, uric acid diathesis. Imported.

***Apollinaris** (NEUENAU, GERMANY).—Acidulated alkali table water. Sodium Chloride, Calcium and Magnesium Bicarbonates, with large excess of Carbonic Acid. Catarrhal affections of the respiratory organs and mucous membrane acute and chronic laryngitis, bronchitis, dyspepsia, gout and gravel. Imported.

Arabella (HUNGARY).—Saline aperient. Magnesium, Sodium Sulphates, similar to Apenta. Obesity, gout, rheumatism, liver and kidney disorders. A mild purge.—L ii./03,322. Imported.

Arnstadt (GERMANY).—Saline, Sodium Chloride. Scrofula and skin affections. April to September.

① **Baden-Baden** (GERMANY).—Arsenical, Lithiated. Anæmia chlorosis, gout, dyspepsia paralysis. Summer and imported.

Baden (near VIENNA).—Sulphurous. Calcium and Sodium Sulphates; rises warm and contains free Carbonic Acid. Rheumatism, gout, diseases of bones and joints, metallic poisoning, scrofula and syphilis. Throughout the year.

Bagnères-de-Luchon (HAUTE GARONNE) and **Bagnères-de-Bigorre** (HAUTES PYRÉNÉES, FRANCE) Labassère.—Sulphurous. Skin, lung and rheumatic affections. Imported.

Barèges (HAUTES-PYRÉNÉES, FRANCE).—Sulphurous, warm. Sodium-Sulphhydrate and Sulphate, Sodium Chloride, Silica. Chronic rheumatism, skin and bone diseases. Imported.

Barium (LLANGANMARCH WELLS, WALES).—Saline. A tumbler full three or four times daily. Sodium, Calcium, Magnesium and Barium Chlorides. Good organically. Only 0.0056 grs. per gallon of Albuminoid Ammonia. Contains no sulphates owing to presence of Barium. Heart affection, glandular swellings, skin affections, rheumatism. Bottled, both aerated and still.

Bath. The only thermal spring in England, and one of the oldest in Europe. Recent improvements and accommodation.—B.M.J. ii./09,157. (See also SELIS, i.e., Bath water, aerated and bottled).

Bellthal (MOSEL SPRUDEL bei COBERN a.d. MOSEL, GERMANY).—Table water. Free from organic impurity. Summer.

Ben Rhydding. See **Ilkley**.

Berka (WEIMAR).—Chalybeate and Sulphurous. In anæmia and rheumatism. 'Moor' and sand baths. May to October.

***Bethesda** (WISCONSIN, U.S.A.).—Alkaline, Calc. and Magnesium Bicarbonates. Kidney diseases, Bright's disease, diabetes, torpid liver, dyspepsia, insomnia. Imported.

Bilin (BOHEMIA).—Alkaline acidulated table water, Sodium Carbonate, Sodium Chloride, Sodium Sulphate, Lithium Carbonate, Free Carbonic Acid. Catarrh of the stomach and of the respiratory organs, rheumatism and for Bright's disease. Summer and imported. Pastilles are also prepared.

Birmenstorf (SWITZERLAND).—Saline aperient. Constipation, jaundice, hæmorrhoids, uric acid. Imported.

***Birresborn** (VULKAN, Eifel, GERMANY).—Alkaline, slightly chalybeate table water. Sodium, Magnesium, and Calcium Bicarbonates, Sodium Chloride, Carbonic Acid. Dietetic. Imported.

Bocklet (near KISSINGEN, GERMANY).—Chalybeate. Anæmia and nervous and women's diseases. Imported.

Bonifacius (at SALZSCHLIEF, HESSE-NASSAU).—Saline Lithiated. Gout, gall stones, stimulates intestines and urinary organs. May to Oct. Imported.

Bonnes (see EAUX BONNES).

② **Bourboule**. La (PUY DE DÔME, FRANCE) Choussy-Perrière Spring.—Arsenated. 1 litre=0.028 Gm. Crystallised Sodium Arsenate (19 grs. per gallon), Sodium Chloride and Bicarbonate. Dose, a large tumblerful. Debility, anæmia, chest affections, arthritis. For diabetes.—B.M.J.E. i./06,60. Imported.

Brides-les-Bains (FRANCE).—Alkaline saline. Obesity, uric acid, constipation. Imported.

Bruckenaue (GERMANY).—Ferruginous. For women's diseases, anæmia. Imported.

Brucourt (CALVADOS, FRANCE). "Star" Spring.—Chalybeate. Tonic in anæmia. Imported.

Buda-Pesth *St. Lucasbad (HUNGARY). (v. Kristaly).—Warm Sulphurous, Potassium, Sodium and Calcium Sulphates, Sulphuretted Hydrogen. For bathing, sulphur mud baths, in chronic rheumatism, sciatica, gout, skin affections. Internally, the hot sulphurous springs for intestinal diseases, constipation, hæmorrhoids. Frequented all the year round.

Buffalo Lithia (MECKLENBURG CO., VA., U.S.A.).—(No. 2 the chief spring) Alkaline Lithiated table water. Albuminuria, uric acid diathesis, and other affections needing alkaline treatment. June 15 to October 1, and imported.

Bulgarian Waters.—43 on the South side of the Balkans.—B.M.J. ii./07, 536.

⑥ Bussang (VOSGES, FRANCE).—Ferruginous tonic and digestive. Free Carbonic Acid, Sodium, Calcium, Magnesium Bicarbonates with Manganese, Iron and Arsenic. Anæmia, chlorosis, jaundice, gout, rheumatism, diseases of women. 15th June to 15th September, and imported.

Buxton (DERBYSHIRE).—Slightly Saline. Sodium Chloride, Magnesium Carbonate, Calcium Carbonate, Free Nitrogen and Carbonic Acid. Stomach, bladder, liver, and kidney disorders, skin affections, gout, rheumatism, sciatica. All the year round and bottled.

***Cachat (see EVIAN, Source Cachat).**

***Cambrunnen (TAUNUS, GERMANY).—**Alkaline. Dyspepsia, rheumatic affections, skin diseases. Imported.

Capvern (HAUTES PYRÉNÉES, FRANCE).—2 springs; Houn-Çaoude (drinking) and Bouridé (baths). Alkaline. Catarrh of bladder, gravel, gall stones, women's diseases. May to October. Imported.

Carabana (SPAIN).—Purgative, Sodium Sulphate. Intestinal and hepatic affections and dyspepsia. Imported.

***Carlsbad (BOHEMIA).—**Several similar springs, that known as ***SPRUDEL** is the most favored. Alkaline, Lithiated. Obesity, constipation, stomach, intestinal, liver, kidney, and bladder disorders, gout, and diabetes. July mainly. Imported. ***Carlsbad Sprudel salts** (powder and crystals) are also supplied.

Cauterets (PYRÉNÉES).—Sulphurous. Sulphuretted Hydrogen, Iodine. Skin and lung diseases, glandular swellings. Summer and imported.

Cerigo (GRECIAN).—Chalybeate. Imported.—Ph. Notes.

Challes (SAVOY).—Sulphurous. Chronic catarrh, skin affections and intestinal diseases. May to October. Imported.

Charlottenbrunnen (SILESIA).—Chalybeate.

Chateldon (PUY DE DOME, FRANCE).—Alkaline Acidulated. Stomach and urinary disorders, anæmia and as a table water. Imported.

Chatel Guyon (AUVERGNE FRANCE).—Source Gubler.—Alkaline. Dyspepsia, jaundice, anæmia, constipation, uric acid. May to October. Imported.

***Cheltenham.—**Pittville Waters: No. 1 Cheltenham Alkaline, Sodium Chloride, Sulphate and Bicarbonate; No. 2 less Sodium Chloride more Sulphate; No. 3 more Sodium Sulphate but less than No. 2; No. 4 Cheltenham 'Magnesia' (Magnes. Sulphate 117 grains per gallon) and Sodium Sulphate. No. 5 is No. 4 concentrated. No. 6 is Cheltenham Soda Sulphate Saline, Soda Sulphate in predominance.

Claudia (SORGENTE DI ANGUILLARA, SABAZIA, near ROME).—Alkaline. Carbonic Acid with small quantities of Alkaline Bicarbonates. Gastric dyspepsia. Imported.

Condal (RUBINAT, LÉRIDA, SPAIN).—Aperient, Sodium, Magnesium, Calcium and Potassium Sulphates, Sodium Chloride. As a purgative for habitual constipation, plethora, &c. Imported.

Condillac (FRANCE).—Alkaline acidulated table water. Imported.

Contrexeville (VOSGES, FRANCE).—Pavillon Spring.—Alkaline, Antirheumatic. Gouty affections, dyspepsia, eczema, catarrh of the bladder and liver. 20th of May to 20th of September, and imported. Contrexéville Source Mignon is also supplied.

Dax (called locally La Néhe).—Thermal—has temperature 61° C. Owing to evolution of Nitrogen appears to be boiling. Contains Sulphates and Chlorides of Calcium and Sodium. The mud contains a large proportion of living algae—the *Oscillaria calida*. Is distinctly radio-active. In rheumatism.—B. & C.D. i./06, 67.

Desaynes (Eau de César) (ARDÈCHE, FRANCE).—Alkaline, Acidulated. Table water. Imported.

Dolecoed. See Llanwrtyd.

***D'Orezza (CORSICA).** Chalybeate table water. Anæmia, dyspepsia; useful after prolonged illness, or for weakness. 1st July to 1st September. Imported.

Driburg (WESTPHALIA).—Chalybeate, Tonic, Aperient. Sodium Sulphate, Magnesium Sulphate, Bicarbonate of Calcium, and Magnesium, some Iron and Manganese, Carbonic Acid. Stone in the kidney and kidney diseases generally, neurasthenia, nervous diseases, women's diseases, anæmia. May 1st to October 10th, and imported.

Droitwich. See ***Wychia.**

Eaux Bonnes (BASSES PYRÉNÉES, FRANCE).—Mild Sulphurous. Helium is given off by the water—due in all probability to radium-containing mineral at the source. Similar to Barèges and Cauterets. Bronchial catarrh, phthisis, neurasthenia, asthma. June 1st to October 1st and imported.

Has reputation of curing sterility in women. *c.f.* Franzensbad.

Eilsen (SCHAUMBURG-LIPPE, GERMANY).—Sulphurous, Calcium Sulphate, Sulphuretted Hydrogen, Carbonic Acid. Asthmatic affections, neurasthenia, cardiac asthma, bronchial affections, chlorosis. 15th May to 31st August.

Ems, Bad- (GERMANY).—Several springs: Kranchen, Kessel-brunnen, Kaiser-brunnen, Victoria, Fuersten-brunnen, Alkaline Saline; rises warm. Sodium, Calcium and Magnesium Bicarbonates, Sodium Chloride, free Carbonic Acid. Indigestion, asthma, emphysema, gout, useful in coughs with expectoration, and pulmonary catarrh. May 1st to September 30th, and imported.

Enghien-les-Bains (near PARIS).—Sulphurous. Lung and skin affections, uterine disorders, nervous diseases, nose and ear affections. May 1 to Oct. 15. Imported.

Evidaurus (GRECIAN).—Imported.—Ph. Notes.

***Esvach.**—Aperient. Magnes. Sodium and Potassium Sulphates and Bicarbonates, free Carbonic Acid. Habitual constipation, indigestion, biliousness, gout. Bottled.

Evian-les-Bains (HAUTE SAVOY) Sources "Cachat" and La Croix.—Alkaline table water. Calcium and Magnesium Bicarbonates, free Carbonic Acid. Liver and intestinal disorders. For washing out bladder in uric acid troubles; calculi, cystitis. May to October.

Fachingen (NASSAU, GERMANY).—Alkaline Acidulated. Bicarbonates of Alkalies and Alkaline earth metals. Said to be bacteriologically pure, and to be useful in infectious diseases, *e.g.*, typhoid, cholera, also for use in the tropics in malaria, and for intestinal diseases, gastric catarrh, heartburn, uric acid, rheumatism, diabetes, nephritis. Imported.

Fango Mud Springs (ITALY).—Installation at Matlock. For the treatment of rheumatism.

Fiuggi (ITALY).—Saline. Sodium Chloride, Potassium Nitrate, Calcium Carbonate, Carbonic Acid, Ozone, and Oxygen, (possibly due to action of radium emanations contained), Nitrogen. Gastric complaints. Imported. Full report on.—L. ii./07,915.

Flitwick (near AMPHILL, BEDFORDSHIRE).—Ferruginous, Ferric Persulphate and Sodium Sulphate. Anæmia, chlorosis, dyspepsia, general debility and neuralgia. Bottled.

***Fontalis.**—A pure table water. Alkaline. Chlorides and Carbonates, free from Lime and Magnesium Salts. Bottled at Harrogate.

Forges (NORMANDY).—Chalybeate. Ferrous Bicarbonate. Chlorosis, dyspepsia. June 1st to October 1st. Imported.

Franzensbad (BOHEMIA).—Aperient, Alkaline, Ferruginous. Intestinal catarrh, enlarged liver and spleen, Bright's disease, gout, scrofula, anæmia, general debility, diabetes. Also mud baths. May to September. Imported.

Has been recommended in heart affections. Has powerful effect on the blood, mucous membranes, and nervous system.—M.P. Sept. 23,/08,333.

Enjoys a reputation of cure of sterility in women. Thyroid secretion is thought to be evoked.—B.M.J. ii./09,1265.

***Franz Joseph (BUDA-PESTH, HUNGARY).**—Aper. Magnesium and Sodium Sulphates, Carbonic Acid. Habitual constipation, diseases of the liver, for piles, biliousness, headache, catarrh of the stomach and intestines. Imported.

***Friedrichshall (SAXE-MEININGEN, GERMANY).** Aperient Magnesium and Sodium Sulphates, Sodium Chloride, Magnesium Chloride. Constipation, intestinal complaints, biliary disorders, gallstones, gravel, gout, scrofula; an active diuretic and for hæmorrhoids. Imported.

Gastein, Bad- (AUSTRIA).—Very slight mineral contents. Suitable for weak digestion, nervous disorders, paralysis, uterine affections. Imported.

Geilnau (GERMANY).—Alkaline table water. Imported.

***Gerolstein (PRUSSIA).** Alkaline. Antacid. Imported.

Giesshubler (bei KARLSBAD, BOHEMIA.)—Alkaline acidulated table water. Sodium, Potassium, Magnesium and Lithium Bicarbonates, free Carbonic Acid. Intestinal catarrhs, dyspepsia, heartburn, hæmorrhoids and gout Imported only.

Gilgit (KASHMIR, INDIA).—Goitre does not occur among the coolies who drink the pure water of the Gilgit river. Total solids 7 grs. per gall., Total Hardness 4, Calcium about 6, free ammonia and organic matter nil.—L. ii./06,1570.

Godesberger (GERMANY).—Table water. Alkaline, Saline, Chalybeate. Imported.

Grassion (FRANCE). Bituminous. Throat and chest affections, gastric and vesical catarrh. Imported.

Griesbach (GERMANY). Tonic ferruginous table water. Iron Carbonate, Sodium Sulphate, Calcium Bicarbonate. Imported.

③Guber (SREBRENICA, BOSNIA).—Chalybeate. Contains Arsenious Acid. Anæmia, skin and nerve affections. Imported.

Gytje.—A kind of mud from the Norway fjords used in the "Gytje" treatment in balneology for gout and rheumatism.—Ph. Notes.

Halle (BAVARIA).—Saline Bromo-iodised. Goitre, scrofulous swellings. Imported.

Harrogate (YORKSHIRE).—Sulphurous. Skin and rheumatic affections, anæmia, dyspepsia. Aperient and diuretic. Summer and winter, and bottled. the Sulphur and Alkaline Carbonates compose half the solid ingredients. the Beckwith Spring contains large proportion of Magnesia. Helium has been traced in the gases rising, hence presence of Radium is assumed.—P.J ii./05,903.

"Harrogate Salts."—Potassium Tartrate 360 grains, Magnesium Sulphate 1 pound, Sulphurated Potash 1 ounce.—P.J. i./07,548.

Hathorn (see SARATOGA).

Homburg von der Höhe (GERMANY).—Elizabeth-brunnen, Kaiser-brunnen and Stahl-brunnen. Saline chalybeate, acidulated. Sodium and Magnesium Chloride, Ferrous, Calcium and Magnesium Bicarbonates, Carbonic Acid. Chronic catarrhs of stomach and bowels, habitual constipation, gout, scrofula, chlorosis, inaction of the liver, diabetes and general tonic. May 1st to October 1st, and imported.

***Hunyadi Janos (BUDA-PESTH)**—Aperient. Large percentage of Magnesium and Sodium Sulphates, Sodium Chloride, and Sodium and Calcium Bicarbonates. Constipation and biliousness. Imported only.

Hypate (GRECIAN).—Sulphurous. Imported.—Ph. Notes.

Igmandi (KOMÁROM, HUNGARY) Water. Radio-active. Saline aperient. Magnesium Sulphate 29.3, Sodium Sulphate 9.5, Calcium Sulphate 0.7, Sodium Chloride 0.8%. Total solids 40.8 per 1,000 Gm. Radio-activity inherent in the Calcium Sulphate.—L: ii./05,777. Corpulency, constipation, hæmorrhoids, rheumatism.

Iodbad Lippik. See Lippik.

Ilkley and Ben Rhydding (ILKLEY in WHARFDALE.) Chalybeate and Antacid. (i.) Chalybeate Spring. Ferrous Carbonate, Calcium Sulphate, and Alkaline Chloride. (ii.) "Hygela" Spring. Calcium, Sodium and Magnesium Carbonates, Sodium Sulphate. (iii.) "Ilkley Wells" Carbonated. Free Carbonic Acid, Calcium Carbonate, Sodium Sulphate, Gout and rheumatism. *See also Health Resorts.*

Johannis (HESSE-NASSAU).—Saline acidulated tonic table water. Calcium, Magnesium and Sodium Bicarbonates, and Sodium Chloride. Imported.

Kaiser Brunnen (AIX-LA-CHAPELLE).—Table water. Sodium Chloride, Bicarbonates. Gout, rheumatism and dyspepsia.

Kissingen (BAVARIA, GERMANY). RAKOCZY and PANDUR.—Saline, Chalybeate. Sodium and Potassium Chlorides, Iron and Calcium Bicarbonates. Anæmia, general debility, mental exhaustion, heart, liver, and kidney diseases, gout, obesity, and congestions. Imported.

Kissingen (BAVARIA) BITTER WATER.—Aperient, Magnesium and Sodium Sulphates, Carbonic Acid.

Koenigsdorf (OBERSCHLESIE, GERMANY).—Alkaline Iodised. Sodium Chloride, Calcium Chloride, Magnesium Iodide and Magnesium Bromide. To improve blood condition, for nerve and uterine diseases, glandular swellings and skin affections. May 15th to the end of September.

Krankenheil (BAVARIA).—Sulphurous, Iodised. Sodium Chloride, Iodide and Bromide, Sulphuretted Hydrogen. Goitre and similar swellings, skin affections. Imported.

Kreuznach (PRUSSIA).—Iodised Saline. Sodium, Calcium, and Magnesium Chlorides, with small quantity of Bromides, Iodides. In syphilis, tabes phthisis, obesity, anemia, skin and nervous disorders, goitre, and similar swellings. All the year round. Imported. Kreuznach mother lye contains 3,100 grains of Salts in 20 ounces.—P.J. ii/o4,136.

Radio-active substances obtained from residues of these springs. Used in rheumatism, neuralgia and sciatica—L. i./o9 1233.

Has a reputation of curing sterility in women c.f. Franzensbad.

***Kristaly (at St. LUCASBAD, BUDA-PESTH).**—Table water. Magnesium and Calcium Bicarbonates, Carbonic Acid. In intestinal disorders. Imported.

Krondorf (bei CARLSBAD).—Alkaline, table water. Chronic catarrh of respiratory tract, also jaundice, gout, and allied disorders. Imported.

***Kronen-Quelle (OBER-SALZBRUNN, SILESIA).**—Alk., Saline Lithiated. Sodium Sulphate, Potassium Sulphate, Bicarbonates of Sodium, Magnesium, Calcium, and Lithium. Uric acid diathesis. Imported.

***Kronthal (NASSAU).**—Saline, table water. Sodium Chloride, Calcium Carbonate. BLUE LABEL.—Plain table water and for dyspepsia. RED LABEL.

—Pick-me-up, rheumatism, gout. GREEN LABEL.—Anemia and tonic.

Kyllini (GRECIAN).—Sulphurous. Imported.—Ph. Notes.

Kytnos (GRECIAN).—Saline, Thermal. Imported.—Ph. Notes.

Labassere (HAUTE PYRÉNÉES).—See Bagnères de Bigorre.

Landeck, Bad Landeck (PRUSSIAN SILESIA).—Sulphurous. Nervous, skin and rheumatic diseases. Moorbaths. Summer and all the year round.

Langenbrücken (BADEN).—Alkaline, saline. Sulphurous. Chronic skin diseases, syphilis, rheumatism, gout, bronchial catarrh. May 20 to October 1.

Latraki (GRECIAN).—Alkaline.—Ph. Notes.

Leamington.—Saline. Sodium, Magnesium and Calcium Sulphates, Sodium, Calcium and Magnesium Chlorides, Ferrous Carbonate. Dyspepsia, gout, women's diseases, sciatica, glandular swellings and skin diseases. Bottled.

⊙**Levico (AUSTRIAN TYROL).**—Two springs (strong and mild); Arsenical chalybeate. STRONG: Arsenious Acid; 0.09 part per 10,000—1-12th of a grain per pint; the MILD is 1-10th of this. Further constituents: Ferrous Sulphate, and Ferric Persulphate. Anemia, skin eruptions, neuralgia and amenorrhoea. 1st April to the end of October (Vetriolo has season June 1st to the end of September), and imported.

Lippik (SLAVONIA, HUNGARY).—Iodised water and acidulated. Potassium and Sodium Sulphates, Sodium Chloride, Sodium Iodide, Sodium Bicarbonate. Stomach diseases, scrofulosis, rheumatism, gout, glandular swellings. May 1st to September 30th.

Lippspringe (WESTPHALIA).—Alkaline, acidulated. Chronic lung affections, metastases and bone diseases. May to September. Imported.

Llandrindod (WALES).—"Strong Sulphur," "Roman Spring," "Magnesium Spring." The first is radio-active. In skin affections, dyspepsia, glandular enlargements, gout, rheumatism. All the year round.

The Sulphuretted Hydrogen waters are of several strengths. One contains a small amount of thallium chloride and a considerable quantity of lithia—latter higher than Royat.—B.M.J. i./o9, 1245.

Llangammarch.—See Barium.

Llanwrtyd, Dolcoed Spa (WALES).—Sulphuretted Hydrogen, the strongest in Great Britain.

Louche (Leuk or Loeche les Bains) (VALAIS, SWITZERLAND).—Warm, almost exclusively for baths. Calcium Sulphate, Magnesium Sulphate, similar to bat of Bath in England. Rheumatism, gout, women's diseases, skin affections, May to 15th October.

Luhatschowitz (AUSTRIA).—Saline, with small quantities of Bromides and Iodides. Catarrhal affections, gouty exudations. Imported.

***Lullus, St. (HERSFELD, HESSE), Germany.**—Glauber's Salt principal constituent. Stomach, liver, bowel complaints.

Magnaris.—A table water prepared at Llandrindod.

Malvern (WORCESTERSHIRE).—Practically free from saline matter, and contains no organic matter. Bladder and kidney diseases and skin affections. Bottled.

★**Malvern Selzer.**—Slightly saline table water.

Marcols (ARDÈCHE, FRANCE), Source du Lion.—Alkaline table water. Stomach, liver and kidney diseases, rheumatism. Imported.

Marienbad (BOHEMIA).—Several springs, Kreuz-brunnen and Ferdinand brunnen principal, Alkaline, Saline, Chalybeate, Acidulated. Gout, gravel, hæmorrhoids. Also supplied in powder and crystals. Brain and nervous diseases, melancholia and chronic gastric catarrh, dyspepsia, gall stones, obesity. Summer, and imported. Tablets are also made. See Marienbad Salt.

Martigny (Vosges). Lithiated. Gravel, diabetes, liver and kidney complaints.

Mergentheim (WURTEMBERG), Karlsquelle.—Aperient Water. Magnesium and Sodium Sulphates, Sodium Chloride, free Carbonic Acid. Gout, neuralgia, gall stones, dyspepsia, obesity, rheumatism, diabetes. 1st May to 1st October.

Meritchleri (Bulgaria).—Water resembles Carlsbad. A 'coming' resort.—B.M.J. ii./07, 536.

Methana (GRECIAN).—Sulphurous.—Ph. Notes. So powerful as to render the place objectionable; the sea into which the water falls is milky, owing to the decomposition of the sulphuretted hydrogen. The bacterium *Beggiatou nivea* is found in the sediment, and in the protoplasm of this organism particles of sulphur are distinctly visible under the microscope. Imported.

Metternich (BOHEMIA).—Alkaline table water.

Miers (Lot, FRANCE).—Saline, laxative. Sodium Sulphate, Calcium Sulphate, Magnesium Chloride. Dyspepsia, calculi, migraine, obesity, albuminuria. Imported.

Missisquoi (VERMONT, U.S.A.).—Sulphurous. Scrofula and other skin affections, diseases of respiratory organs. Imported.

Mondorf (LUXEMBOURG).—Saline. Calcium Chloride, Bicarbonates, with small quantity of Magnesium Bromide. Constipation, neurasthenia, anæmia, skin affections, jaundice, rheumatism. May 15th to October 15th. Imported.

③ **Mont Dore (PUY DE DÔME, FRANCE).**—Alkaline, Saline. Bicarbonates, Ferrous Carbonate, Arsenic, and Silica. Intestinal disorders, rheumatism, asthma, bronchitis and laryngitis. June 1st to September 20th. Imported.

Montreux (SWITZERLAND).—Alkaline table water. Slightly mineralised. Stomach, liver, kidney and bladder affections. Imported.

Nauheim (GERMANY).—Sodium, Calcium and Lithium Chlorides. Skin and rheumatic affections, heart diseases.

Nenndorf (WESTPHALIA).—With mud baths. Sulphurous, Calcium Sulphate, Magnesium Sulphate, Carbonic Acid, Sulphuretted Hydrogen. Claimed to be the strongest sulphurous water in Europe. Rheumatism, neuralgia, skin and bronchial affections, hæmorrhoids, neurosis, &c. May 1st to September 30th.

Neuenahr (PRUSSIA).—Acidulated, alkaline table water. Laryngitis, bronchial catarrh, asthma, tuberculosis, liver diseases, diabetes, heart disease, diuretic summer, commencing May 1st. Imported as Apollinaris.

For renal elimination but the place does not appeal greatly to English visitors.—L. ii./09, 1276.

Nieuer Selters.—See Selters. Nieder-.

Nocera Umbra (Angelica Spring, 185 kilometres from Rome).—Alkaline. Bicarbonates. Digestive, anturic, tonic refreshing. Imported.

Orezza.—See D'Orezza.

Oberbrunnen (SILESIA).—Alkaline Lithiated. Uric acid diathesis, nephritis. Imported.

★**Perrier (VREGÈSE nr. NISMES, FRANCE).**—Table water, slightly mineralised, organically pure. Small proportion of Alkaline Carbonates. Digestive. M.P. June 22/04.

③ **Plombières (VOSGES, FRANCE).**—Mild Saline. Sodium Sulphate, Arsenic, Oxygen, Nitrogen. Neurasthenia, gastralgia, dyspepsia, dilation of the stomach and chronic diarrhoea, rheumatism, skin affections. May to September. Imported. Mucous colitis treated by washing out the colon with the alkaline sulphur water and further Bath treatment.—B.M.J. ii./08, 78. Radioactive.—Chem. News, Mar., 1/08, p. 132.

Pougues (FRANCE). St. Leger Spring.—Alkaline. Dyspepsia, anæmia, scrofula, gravel, catarrh of the bladder. May 15 to Sept. 30. Imported.

Pullna (BOHEMIA).—Aperient. Magnesium, Sodium and Potassium Sulphates Sodium Chloride. Chronic constipation, liver and intestinal affections, gallstones, gout and rheumatism, eczema. Imported.

Pymont (WALDECK, WESTPHALIA). Three springs. **HAUPTQUELLE** contains most iron.—Chalybeate. Chronic catarrh, digestive and urinary diseases, women's diseases, scrofula, rheumatism and gout. May 1st to October 10th (and imported).

Quicherat (FRANCE).—Ferruginous. Magnesium and Sodium Chlorides, with some Iron and Manganese, Carbonic Acid. Anæmia, stomach diseases. Imported.

Ragatz-Pfäfers.—Canton St. Gall, Switzerland. Thermal Spring 99° Fahrenheit. Calcium, Magnesium, and Sodium Chlorides, Bicarbonates, and Sulphates. Very free from bacteria. Rheumatism, gout, sciatica, neuralgia. May to October.

Recoaro (VENETIA, LOMBARDY). Sources : Lelia, Lorgnia and Giuliana.—Ferruginous Table Waters. Sulphates. Intestinal and liver complaints. Tonic, easily assimilated. Summer and imported. **ROYAL BITTER SOURCE.**—Is pure bacteriologically. Purgative for intestinal complaints.

Reichenhall (BAVARIAN ALPS).—Saline. Considerable proportion of Sodium Chloride. Employed principally as bath in scrofula and given for bronchial catarrh. May to September.

Rennine (REINFERTSWILDER, ALSACE).—Nitrated. Potassium Nitrate 0.19 Gm. per litre, Alkaline Chlorides. Diuretic, laxative, in heart disease.—L. ii./03, 107.

Renaion (FRANCE).—Alkaline, acidulated table water. Bicarbonates, free Carbonic Acid. Dyspepsia and gastric disorders. Imported.

Rhens (AM RHEN, GERMANY).—Alkaline, acidulated table water. Sodium Chloride, Sulphate and Bicarbonate. Imported.

Rippoldsau (BADEN).—Saline, Acidulous, Chalybeate. Calcium Bicarbonate, Manganous and Ferrous Bicarbonates, Sodium Sulphate, free Carbonic Acid. Anæmia, scrofula, skin affections, rheumatism, gout, neuralgia. 15th May to 1st October. Imported.

Roisdorf (PRUSSIA).—Alkaline, saline, acidulated table water. Easy of digestion, for catarrhs of stomach and intestines, and of respiratory organs, liver and spleen affections and calculi in the bladder.

Roncigno (VALSUGANA, SOUTHERN TYROL).—Each litre contains 0.109 Gm. Sodium Arsenate, 0.115 Gm. Arsenic Anhydride, 0.03 Ferric Phosphate, 3.12 Gm. Ferric Sulphate, also Sulphates of Copper, Magnesium, Nickel and Cobalt.

Baths (20–30 for a course). *Average dose*, four table-spoonsful thrice daily. (= 4.5 eg. arsenic.) Anæmia, chlorosis. April 15th to end Oct.—B.M.J. i./07, 93.

Graves' Disease, 20 out of 37 cases completely cured.—B.M.J. ii./09, 992.

Rosbach (near HOMBURG, GERMANY).—Saline, table water. Calcium and Magnesium Bicarbonates, Carbonic Acid. Gouty and acid dyspepsia. Imported.

Royat (PUY-DE-DÔME, FRANCE). Three Springs.—Saline, Arsenated [small quantity], Lithiated. Rheumatism, dyspepsia, nervous diseases, women's diseases, anæmia, skin affections and debility. Summer. Imported. Full description of this water.—B.M.J. i./07, 758.

Rubinat (PYRÉNÉES, SPAIN). "Llorach" Spring.—Aperient. Rich in Sodium Sulphate and Magnesium Sulphate, and contains Calcium Chloride. Stomachic disorders, constipation, liver and kidney affections. Imported.

Rubinat (SERRA).—Similar to the last mentioned, but stronger than the above in the proportion of Sodium Sulphate to Magnesium Sulphate. Uses similar to the above. Imported.

Saint Boès (BASSES-PYRÉNÉES, FRANCE).—Bituminous, Iodised, and Arsenated. Arsenic, Iodine. Skin, lung, and venereal diseases. Imported.

Saint Galmier (LOIRE, FRANCE).—"Badoit" Table water. Dyspepsia, intestinal catarrh, constipation, nervous disorders, hyperæmia. Imported.

"Noel."—Alkaline, Acidulated. Uses as latter. Imported.

Saint Gervais (HAUTE SAVOIE).—Saline. Sodium and Calcium Sulphates, Sodium Chloride. Skin affections, constipation, rheumatism and nerve diseases. 15th May to 30th September. Imported.

***Saint Lucasbad Brunnen (BUDA-PESTH).**—Sulphurous. Rheumatism, neuralgia, and skin affections. All the year round. See also BUDA-PESTH.

Saint Moritz (SWITZERLAND). "Paracelse" Spring.—Alkaline, Chalybeate, Tonic. Nervous and intestinal disorders, sick headache, hysteria, Graves' disease, and for convalescence. All the year round. Imported.

Saint Sauveur.—See Vernet les Bains.

Salies de Bearn (FRANCE).—Saline. Sodium Bromide and Iodide. Skin affections and as a general tonic.

Salins les Bains (JURA, FRANCE).—Tonic. Magnesium Chloride, Iodides and Bromides. Anæmia, tuberculosis, general debility, women's diseases, obesity, and scrofulous affections. Summer. Imported.

Sallyco.—Artificial. Is stated to contain Colchicine and Salicylic Acid.

***Salutaris.**—Still and aerated table water, distilled water. For washing out the system in kidney and liver disorders, also gout and dyspepsia.

***Salvator Forras (HUNGARY).**—Alkaline, Lithiated. Uric acid diseases of digestive organs. Imported.

Salzbrunn (AUSTRIA).—Alkaline. Chronic intestinal diseases, gall stones, rheumatic affections, emphysema. 1st May to 15th October.

Salzschlirf—See Bonifacius

San Pellegrino (NEAR MILAN).—Diuretic, Calcium and Magnesium Sulphates, some Carbonate with trace of Chloride, also Lithium. Mineral Salts amount to 1.264 Gm. per litre.—L. i./09, 43.

Saratoga (AUSTERLITZ, MORAVIA, HUNGARY).—Purgative. Gout, rheumatism and obesity. Imported.

Saratoga (U.S.A.). "Congress" and "Hathorn" springs.—Alkaline, Saline. A mild aperient in dyspepsia, skin affections, diseases of the stomach, liver, kidney, and blood, constipation. Imported.

Sauerbrunnen (HARTZ, GERMANY).—Table water. Very slight mineral constituents—Magnesium Carbonate and Sulphates. Imported.

Schinznach (SWITZERLAND).—Sulphurous. Skin affections (eczema, acne, psoriasis, urticaria), asthma, gout, rheumatism. 1st May to 15th September. Imported. Has reputation of curing sterility in women. c.f. Franzensbad.

Schlangenbad (GERMANY).—Very slight Mineral constituents. Considerable quantity of dissolved oxygen and nitrogen. General tonic. Imported.

Schwalbach (NASSAU). Weinbrunnen and Stahlbrunnen—Chalybeate tonic. Iron, Calcium and Magnesium Bicarbonates. Anæmia, and as a tonic. Imported.

Selters, or Seltzer Water (on the LAHN, NASSAU), OBER and NIEDER.—Alkaline, Acidulated, Table Water. Sodium Chloride, Bicarbonates, Carbonic Acid. Dyspepsia, obesity, gout, rheumatism, bronchial, bladder, kidney, and liver affections. Imported.

Soulac-sur-Mer (MEDOC, GIRONDE, FRANCE).—Health resort. Sea air.

Spa (BELGIUM).—Ferruginous. Anæmia, uterine and nervous disorders, rheumatism, gout. Summer, and imported.

Strathpeffer.—See British Health Resorts.

***Sulis (Bath Water, aerated).**—Aperient table water. Calcium and Sodium Sulphates, Magnesium and Sodium Chloride. Gives a radio-active emanation.

Tarasp (SWITZERLAND), St. Lucius Spring.—Alkaline, Saline. Diuretic, useful in chronic catarrh of the stomach, dyspepsia, gastralgia, habitual constipation, disorders of nutrition, obesity. 1st June to 15th Sept. Imported.

Taunus (FRANKFURT).—Muriate, alkaline table water. Digestive. ***Taunus Mineral Water.**

Teplitz (BOHEMIA).—Alkaline. Rheumatic and nervous diseases, paralysis Imported.

Tonalka. An alkaline tonic aperient water. Supplied in syphons and bottles.

Thonon (LAKE LÉMAN, FRANCE). Alkaline, Carbonated and Benzoated (Balsamic resins are contained). In liver complaints and urinary diseases. Imported bottled.

Tsagesi (GRECIAN). Chalybeate.—Ph. Notes.

Vals (ARDÈCHE, FRANCE). Springs: Madeleine, Précieuse, Désirée, Rigolette, St. Jean.—Alkaline, acidulated. (Contents vary with the spring.) Rheumatism, anæmia, skin affections. Imported.

Vernet-les-Bains (PYRÉNÉES ORIENTALES).—Sulphate. Sodium Sulphate and Thiosulphate. Constipation, skin affections, anæmia. May to October, and imported.

***Vichy (ALLIER, FRANCE).** Springs: Grande Grille, Hôpital, Célestins, Parc.—Alkaline, acidulated. Gravel, chronic urinary affections, diabetes, female complaints, gout, rheumatism, facilitates digestion. May 15th to September 30th, and imported.—M.P. Aug. 26, 1903.

For renal elimination but does not appeal to English visitors.—L. ii./09, 1276.

Villacabras (SPAIN).—Saline aperient. Sodium Sulphate. Obesity and constipation. Imported.

Vittel (Vosges, FRANCE). Spring: Grande Source.—Alkaline. Sodium and Magnesium Bicarbonates, Sodium, Calcium and Magnesium Sulphates, Carbonic Acid. Uric acid, scrofula, chlorosis, biliary and urinary congestion. In addition are Source Salée, stronger in Magnesium Sulphate; Source Marie and Source des Demoiselles, Chalybeate. The first two are imported.

Aortitis relieved, pain becoming less frequent. Dyspnoea practically disappeared by a course at Vittel.—B. M. J. ii./o8,80.

Weilbach (NASSAU).—Alkaline, Sulphurous. (A lithiated spring also.) Aperient, for obstructions of the abdominal organs, antisiphilitic, in lung and skin diseases. The beginning of May to the end of September. Imported.

Wiesbaden (NASSAU). Kochbrunnen.—Antacid. Uric acid affections, sciatica, bronchitis and laryngitis. Summer. Imported.

Wildbad (BLACK FOREST, GERMANY).—Alkaline. Warm, (37°C.) Rheumatism, paralysis, neuralgia, scrofula, rickets, bronchial catarrh, urinary diseases. May to October.

Wildungen (WALDECK, GERMANY). Three Springs.—Alkaline. Bladder and urinary diseases, anæmia. Summer. Imported.

Wittekind (HALLÉ, GERMANY).—Sodium Sulphate. Obesity, women's diseases, rheumatism, heart and nerve diseases. 1st May to 1st October.

Woodhall (LINCOLNSHIRE).—Saline, Bromo-iodised. Bromide, Iodine (free and combined), Sodium Chloride, Arsenic. Gout, sciatica, rheumatism, skin affections, goitre, women's diseases. End of March to end of October.

A large range of diseases from arthritis to eczema may be treated on orthodox principles.—L. i./o9,1478.

Wychia (DROITWICH).—Saline. Sodium Chloride 11.93 and Sodium Sulphate 7.39 per litre. Droitwich water is distinctly radio-active. Laxative, habitual constipation and plethora.—L. i./c6,38.

BRITISH HEALTH RESORTS.

Bath.—Climate mild and equable. Mineral springs. Suitable for gout and rheumatism.

Ben Rhydding (see also Ilkley).—Bracing. Medicinal springs. Suitable for gout, rheumatism, &c.

Blackpool (Lancashire).—Very bracing. During convalescence.

Bournemouth.—Mild and dry. Sand and gravel soil. 100 ft. above sea level; protected from N. and E. winds by pine woods. Suits persons coming home from the tropics, and for respiratory diseases.

Braemar.—Mountain Health resort. Very bracing climate. Sandy and gravel soil. 1,100 feet above sea level. Suitable for neurasthenia and convalescence from influenza, etc. Season, June to Oct.

Bridge of Allan.—Mild and equable. Saline springs. Suitable for consumption, bronchial affections, gout, rheumatism, &c.

Buxton.—Highest town in the Kingdom. Thermal springs. Suitable for gout, rheumatism and paralysis.

Channel Islands (Jersey, Guernsey, and Alderney).—Climate fine and healthy. Even temperature. Suitable for all pulmonary troubles and neurasthenia.

Cheltenham.—Spring, autumn, and winter resort. Chalybeate and saline waters. Suitable for respiratory diseases.

Clifton.—Climate equable. Alkaline waters. Suitable for respiratory diseases, also diabetes, liver and urinary disorders.

Cromer.—Climate very bracing, often too cold in spring; cool in summer. Suitable for anæmia, scrofula, nervous affections, and convalescence.

Deal.—Very bracing pebble beach, not fit for bathing; suitable for rest cure, nervous and chronic cases.

Droitwich.—Recommended for its Brine Baths, which are efficacious in rheumatic and gouty affections, congestion of liver and spleen and nervous debility. See Wychia Water.)

Eastbourne.—Good sea bathing; suited for convalescents from September to January, especially for cases of scrofula and consumption.

Exmouth.—The old town higher and windy; the new town beside the river and sea beach is more protected, mild and humid.

Falmouth.—A warm equable winter climate; a rival to the Riviera, and cool in summer.

Freshwater Bay.—Isle of Wight. Southern aspect for convalescents and consumptives.—B.M.J. i./c6,990.

Harrogate.—Has Sulphur, Chalybeate and other Saline Springs. See Mineral Waters.

Hastings.—Mild, being suitable as winter resort for convalescents. Unsuitable for phthisis with hæmoptysis and chronic nervous diseases.

Ilfracombe.—Bracing for recovery from illness.

Ikley (*see also* Ben Rhydding).—Bracing moorland air; good fishing; golf links; a hilly district.

Leamington Spa.—Equable climate. Saline Springs. Suitable for chronic liver and kidney complaints, dyspepsia and uterine congestion.

Llandudno.—Climate bracing and appetising; rather windy; a good place for summer health resort.

Llandrindod Wells.—Bracing climate. Thermal waters. Suitable for liver complaint, rheumatism, skin diseases. (*See also* Mineral Waters.) 700 feet above sea level.

Malvern.—Bracing air; equable climate. Brine and Saline Baths. Suitable in gout, rheumatism, scrofula, &c. (*See also* Mineral Waters.)

Margate.—Equable cool temperature, dry sub-soil, and a moderate altitude. Suitable for convalescence and lung complaints, and especially for gland enlargements and tuberculous joints; a very bracing climate.

Matlock Bath.—Thermal and Mineral Springs. There is here a Fango di Battaglia (hot volcanic mud cure) installation. Suitable for rheumatic and gouty affections.

Penzance.—A mild, equable, warm climate, but not much shelter from winds.

Scarborough.—Exceedingly bracing. Moors in vicinity. Suit nervous hypochondriacal persons and those recovering from illnesses.

Sidmouth (Devon).—Climate particularly favourable in catarrhal, bronchial and cardiac affections. In phthisis.—B.M.J. i./c6,990.

Silly Isles.—Mild and humid climate, temperature varying less than at any other watering place in Britain.

Southport (Lancashire).—Fine sands, bracing climate, suitable for laryngeal and pulmonary diseases.

Strathpeffer Spa.—Strong sulphurous (4 springs, richest in sulphur compounds of any in Great Britain), also an effervescing chalybeate spring. Suitable for rheumatism, gout, liver and skin diseases.

Torquay (Devon).—A summer pleasure season, hot and very humid, and a warm winter season; has a mild and equable climate, the soil quickly drying. Suitable for all pulmonary complaints.

Tunbridge Wells.—The old town, much sheltered, lies in a warm valley, while houses on the hills around have a bracing climate.

Ventnor and Weymouth.—Winter health resorts. Have reputation for phthisical sufferers.

Weston-super-Mare.—A mild equable climate; the town sheltered by hills on the north and east: fine sands and plenty of ozone; the tide recedes a great distance.

See also 'MEDICAL DIRECTORY'—Churchill, London—for further details.

IRISH HEALTH RESORTS.

Kingstown, Killiney, Greystones, Bray.—Mild and dry, comparing with Hastings and Ventnor.

Tramore, in Waterford.—Magnificent sandy beach.

Queenstown.—A suitable winter health resort, well protected from N. and E. winds.

Glandore, Glengariff, Parknasilla are similar.

Sulphuretted water at Lisdoonvarna (5'55), **Lucan** (2'7), **Donegal** (8'29). **Ballynahinch** (3'35 Cc. per litre). These are much stronger than Harrogate water in H₂S.

Mallow (70°) is the only warm spring in Ireland.

For several others B.M.J. ii./c7,1583 should be consulted.

See also 'MEDICAL DIRECTORY'—Churchill, London—for further details.

NOTES ON ANTISEPTIC POWER OF SOME 'CHEMICALS AND DISINFECTANT PREPARATIONS FOR SURGEONS' USE.

(ARRANGED ALPHABETICALLY.)

We recently carried out some bacteriological experiments with a view to determining the relative values of acknowledged Antiseptic and Disinfectant Chemicals. For composition of the preparations dealt with in the following notes the reader is referred to the body of the work.

The first experiments were conducted with stale Urine, 5Cc. of each of the Solutions being infected with a drop of same. After contact for the time stated in brackets, loopfuls of the mixtures were transferred to sterile broth tubes (containing 10Cc. approx.) and incubated. In recording our results 'U' = organisms in this stale Urine, + means growth, and - means absence of growth in the times indicated.

We then proceeded in similar manner with an active broth culture of *Staphylococcus pyogenes aureus* ('S'), a similar culture of *B. typhi abdominalis* ('T'), then with *B. coli communis* ('C') and finally with *B. anthracis* ('A'). In these four instances the time of contact was uniformly 2 minutes. In the case of the more resistant organisms only the stronger types of disinfectants were operated with.

In the case of anthrax and typhoid it should be borne in mind that these organisms show a variable resistance to disinfecting agents—c.f. L. i./09,815—but the fact did not apparently upset our experimental deductions to any extent.

Ordinary tap water was used throughout for diluting the chemicals; it was thought this would yield fairer results.

It is also necessary to point out that a small proportion of antiseptic is introduced into the broth tubes in this manner, in most cases the amount is so minute that it can have no effect on the results.

The data which we have obtained are intended to assist a medical man in his selection of an antiseptic for the purpose he may have in view.

An examination of the literature of the subject (c.f. Rideal's "Disinfection and the Preservation of Food,"—from whom we have quoted a number of facts—'R') shows an extraordinary variability in results as recorded in the past. In addition to the fact that strains of organisms vary, it is well known that the technique with individual workers also varies, but even if our results in a few instances may appear anomalous we feel justified in publishing our actual experimental figures.

A disinfectant should either be soluble in water or should be capable of forming a fine emulsion with it; it should be homogeneous in the bulk, for if it separates out on standing it is certain that under the conditions of use the fact is ignored, and it is probable that the disinfectant value of any one part of it is, in practice, less than that of the whole when properly mixed. All other things being equal, the finer the emulsion the greater will be the germicidal power of the disinfectant. (Kenwood & Hewlett.)

When comparing the various capabilities of Antiseptics it should be realised that the antiseptic power of any substance is not only different for different micro-organisms but for the same micro-organism under different conditions, hence it is by no means a constant quantity. The same is true of the poisonous power of a substance. (Tunncliffe.)

The Ideal Disinfectant must be capable of being used in presence of organic matter without greatly diminishing its power. It should with advantage mix with soap and water—Mercuric Chloride is, of course, precipitated. It should be innocuous to man, should be homogeneous, etc. The physical condition of the antiseptic is of great importance, *e.g.*, Trikresol 10% in emulsion was found to be equal to 30% in Solution when tested against *B. typhosus*. (Rideal, Partridge & Walker.)

See also "The Ideals for a Disinfectant."—Hewlett's Lectures, L. i./09, 741,815,889.

In addition to the last mentioned facts it should have no corrosive action on metals. It should have high germicidal power, and not be affected markedly by heat.

In the first of these lectures a useful hint occurs as to the use of a torch flame generated by a cyclone burner, burning paraffin, similar to that used on night works, &c., for disinfecting walls, floors, &c.

These lectures are abstracted in various parts of our work; *c.f.* Formalin p. 108, 853; Ammonia p. 851; Sunlight p. 589.—B.M.J. ii./09,211 (also abstracted) should be consulted, as also Carbolic Acid, p. 11 *et seq.*

A somewhat old standing record of experiments by Miquet, on a varied assortment of bactericidal substances, may be cited here. He obtained, *inter alia*, the following figures as showing the parts per 1,000 necessary to prevent the growth of common micro-organisms in culture media, two days' contact being allowed.

Mercuric Iodide ...	0.025.	Essential Oils, various ...	3 to 4.
Hydrogen Peroxide ...	0.05 (P).	Arsenious Acid ...	6.
Mercuric Chloride ...	0.07	Boric Acid ...	7.5.
Silver Nitrate ...	0.08.	Sodium Arsenate ...	9.
Iodine ...	0.25.	Sodium Salicylate ...	10.
Bromine ...	0.6.	Borax ...	70.
Salicylic Acid ...	1.	Alcohol ...	95.
Zinc Chloride ...	1.9	Potassium Iodide ...	140.
Carbolic Acid ...	3.2.	Potassium Chloride ...	165.
Potassium Permanganate ...	3.5.	Glycerin ...	225.
		Sodium Hyposulphite ...	275.

(The experiments of Koch proved Mercuric Chloride the most valuable both for killing bacteria and spores. It is particularly active in the presence of Hydrochloric Acid, *v.p.* 373.)

Particular attention is drawn to the recent **Report of the Lancet Commission on Disinfectants** which we have summarised, *v.p.* 17.

To summarise briefly our *Experimental Results* we can confidently advise all the following (arranged alphabetically):—

Acidum Carbolicum and some of the Phenoloid bodies (*v. p.* 17),

Argenti Nitras,

Formaldehyde (fumigation for rooms),

Hydrargyri Cyanidum,

Hydrargyri et Zinci Cyanidum,
Hydrargyri Iodidum (as Mercuric Potassium Iodide),
Hydrargyri Perchloridum,
Hydrogenii Peroxidum,
Iodum,
Lysoform,
Potassii Permanganas,
 for their specific purposes.

Acidum Benzoicum. *Generally acknowledged to be a mild antiseptic only.*

Acidum Boricum. *In no sense a disinfectant, antiseptic power low, but used in sufficient quantity it does preserve food. The figure necessary for milk preservation is variously stated; 1 in 500 is usually advised, c.f. p. 889. 4% is usually employed as douche for the eyes and vagina and as mouth-wash. This strength did not kill 'U' (3 hours), also 'S' +; and 'T' +.*

Acidum Carbolicum (see also *Lancet* and *Rideal-Walker Coefficients*, p. 16, 17). *Liquid Phenol (10% water added) is caustic and anæsthetic. A powerful antiseptic. 1% is used as vaginal injection, mouth wash and gargle. This strength is stated to kill Anthrax spores, but Government Report L.i./02,758, said they withstand 5% for 24 hours. In our experiments 1% killed 'U,' gave—rith 'S'; 'T' —; and 'A' —. Boer found that from 1 in 200 to 1 in 400 killed diphtheria, glanders, typhoid and cholera in 2 hours, indicating variable resistance of different organisms.—L. i./09,815. The activity of this disinfectant on *B. coli* is only slightly reduced by feces and urine.—Hewlett, i./09,816. Sodium Chloride increases activity of Carbolic Acid on Anthrax spores.—L. i./09,818. Alcohol diminishes activity of Carbolic Acid. Most Carbolic soaps of commerce are useless as disinfectants.—L. i./09,818. 1% solution requires 90 minutes to kill 'S'.—B.M.J. ii./09,213.*

Acidum Chromicum. *1 in 40 is used for ulcerated gums. This strength killed 'U' rapidly, also 'S' —; and 'T' —*

Acidum Cinnamicum. *2% prevents growth, 4% kills bacteria. (R.)*

Acidum Cresylicum. *See pp. 13 to 19.*

Acidum Formicum. *0.5% kills *B. typhosus* in 15 minutes. (R.)*

Acidum Hydrochloricum. *The acidity of the gastric juice probably serves as a protection against typhoid and cholera. Experiments by the late A. Macfadyen support this view.—Hewlett, L. i./09,743. Boer found that from 1 in 200 to 1 in 1,350 was necessary to kill anthrax, diphtheria, glanders, typhoid and cholera organisms, indicating variable resistance of different "non-spore-bearing organisms."—L. i./09,815.*

Acidum Hydrocyanicum. 0.04% sterilises Broth. (R.) Fumigation of Trees has been practised with this acid. See Royal Horticultural Society's Journals, 1907-8.

Acidum Iodicum. 1 in 2,500 is deodorant and preservative. 1 in 500 is used as mouth wash and for ulcers. In our experiments 1 in 2,500 (3 hours' contact,) failed to kill 'U,' also 'S' +; and 'T' +.

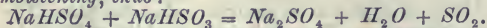
Acidum Salicylicum (Saturated Solution 1 in 500) Antiseptic. Administered may have cumulative action. Must not be used to the eyes. Failed to kill 'U' (3 hours) also + with 'S' - with 'T' and with + 'A.'

This acid is only very slightly dissociated on solution, is consequently a very weak acid, and owes its bactericidal action to the entire molecule and not its ions. Sodium Salicylate, on the other hand, is largely dissociated and shows no antiseptic power.—Pharmacol, 16.

Acidum Sulphuricum. 0.05% stated to be fatal to *B. cholerae* after 15 minutes' contact. 2 to 3 Gm. of Sulphuric Acid produce an effect = to 7 mgr. of Mercuric Chloride. (R.)

Acidum Sulphurosum is much more powerful than the Sulphites. (They have, however, disadvantages, e.g., corrosive action, etc. Formalin is easier to use as explained in our text). Gaseous sulphurous Acid was until recently much used to disinfect rooms. The gas, however, is not powerful enough to kill Anthrax spores.

It was found that *B. coli* and *S. pyog. aureus* were killed in 24 hours in a sealed room into which 20 ounces of SO_2 were passed. *B. subtilis* spores were not killed. R. mentions that a Bisulphate and Bisulphite together would be useful as they liberate SO_2 on moistening, thus:



SO_2 has quite lost its reputation in Germany.

Klein says although most pathogenic organisms do not thrive in acid medium some putrefactive and zymogenic bacteria, e.g., *B. subtilis*, *M. ureæ*, will, e.g., in acid urine.

Our results showed - with 1% of the Off. Acid = 0.05% SO_2 by wt. throughout. 'U' (3 hours), 'S,' and 'T,' and + with 1 in 1,000 = 0.005% SO_2 in each case. We found in addition that the Off. Acid on 'C' gave - and 'A' also -.

Alcohol in itself is seldom reliable as antiseptic—the strengths used and results vary enormously. C.f. also Ac. Carbolic and Argenti Nitras.

Acidum Trichloroaceticum. In throat affections (see Text) 1 in 1 or 1 in 2 Glycerin: astringent. 1 in 4 on a tampon with endoscope in gonorrhœa has been used. Less painful than Silver Nitrate. We found a 1 in 500 solution acting 3 hours killed 'U' but 'S' + and 'T' +.

Alum. Antiseptic power of Alums and Aluminium Sulphate is only slightly greater than that of the Sulphuric Acid they contain. (R.)

Aluminium Chloride 1·4 Gm. or *Potash Alum* 4·5 Gm. are required to sterilise a litre of broth. *Aluminium Chloride* is midway in power between *Copper Sulphate* 0·9 Gm. and *Zinc Chloride* 1·9 Gm. (R.)

Ammonia. 1·4 Gm. per litre stated to be required to preserve broth. (R.)

A solution of *Ammonia* containing 0·5 Cc. of strong solution of *Ammonia* in 600 Cc. of Normal Saline killed *B. typh.* and *B. cholerae* and partially *B. coli* and *M. pyogenes aureus* in 4 hours. In the case of *cholera* the germicidal effect takes place in a few seconds.—*Hewlett, L. i./09,743.*

Argenti Nitras Lotions, Eye Drops, and Urethral Injections 1 in 1,000 up to 1 in 500. In eye work is more penetrating and active than the organic silver compounds on the market (see Text). It is a bactericide 'equal to' *Mercuric Chloride*. *Rideal* found *B. Coli* was killed by 0·1% after 24 hours' contact, but the same strength did not kill *S. pyog. aureus*. (Cf. also p. 140 for organic Silver Compounds compared.)

We found that this substance in all cases yielded excellent results. 1 in 1,000 rapidly killed 'U' also 'S' — ; 'T' — ; 'C' — ; and 'A' —. This is probably by no means the limit in dilution.

Boer found that from 1 in 4,000 to 1 in 20,000 killed anthrax, glanders, diphtheria, cholera, and typhoid organisms in 2 hours—i.e., a very variable resistance by different non-spore bearing bacteria. —*L. i./09,815.*

Alcohol added up to 50% increases its germicidal power but beyond this decreases it.

Arsenic. *Arsenious Acid* is only "moderately antiseptic," i.e., 6 Gm. per litre stated to be necessary to prevent decomposition of broth. (R.)

Arsenic Acid. Very feeble antiseptic, 125 Gm. per litre necessary. *Sodium Arsenate*, however, only 9 Gm. (R.) The figures for arsenic compounds require further investigation.

Auri Cyanidum. 1 in 2,000,000, according to *Koch*, of *Au(CN)₃*, dissolved in *Potassium Cyanide* checks growth of *B. Tuberculosis*.

Bismuthi Subgallas is not a germicide. Growth of *B. anthracis* is not affected in any way. (R.)

Borates and Boric Acid. See *Acidum Boricum*.

Bromum was found by *Arbours* and confirmed by *Koch*, to be the most powerful of all destructives to Anthrax and Tubercle bacteria. Our results showed that it is undoubtedly most powerful. 1% killed 'U' rapidly, and 1 in 400 with 'S' gave — and same strength with 'T' gave also —.

Calcii Hydras (Slaked Lime) is not an antiseptic of any note.

Calcii Permanganas. See *Potassii Permanganas*.

Calcii Sulphas. Deodorant but not disinfectant. (R.)

Carbon Bisulphide. *Antiseptic, but odour and inflammability prevents its use.*

Carbon Dioxide, e.g., in Aerated Waters, has been found to have remarkable power in killing typhoid, cholera, anthrax bacilli, and *Staphylococcus*, but not anthrax spores. (R.)

***Chinosol.** A soap containing 5% Chinosol inferior to one made with 0.5% *Mercurio Biniiodide*. (R.)

Chlorine. A cold saturated solution of Chlorine Water contains 0.634% by weight. Intimate contact of the halogen with the centre of infection is essential. (R.) The halogens are active in proportion to their atomic weights.

It is satisfactory to note that 'Chlorine Gargle,' which contains about 0.125%, rapidly killed 'U'; we also obtained with 'S'—and 'T'—.

Chloroform. Our experiments showed 1 in 500 did not kill 'U' (3 hours), nor 'S' +, nor 'T' +.

Chromates and Bichromates should not be used (to wounds) as they are poisonous. 1 in 100,000 was in the past employed as preservative.

Copper Salts rank next to 'Mercurials'. (R.) *v. infra*.

Creolin Pearson contains 20% Cresols, *c.f. Liquor Cresol Saponatus*.

Creosote (Morson). 1 in 150 is used in phthisis, &c., see text. Said to be more powerful than Phenol. This strength 'acting' 3 hours we found killed 'U,' also 'S,' and 'T'.

Cupric Chloride. 5% kills most organisms after two hours, but weaker solutions only retard. (R.)

Kraemer has advised for treating water (*c.f. Text*) 1 in 5,000.

Cuprous Chloride is stated to kill *B. typhosus* also *B. coli* in an hour, and to be stronger than the Sulphate, *c.f. p. 297*.

Cupri Sulphas. 1% Disinfectant, 0.1% Antiseptic, *c.f. p. 297*. 1% is used for irrigation, see Text, *ibid*.

***Cyllin.** Wound Lotion 0.5%. Douche 0.25%. A powerful antiseptic in these proportions. We subjected to a more stringent test, *viz.*, 1 in 4,000. This killed 'U' (3 hours), giving—, also killed 'S' and 'T' but did not kill 'C' or 'A' in same time, *i.e.* 2 mins).

5% is more active than 4.7% Phenol on *M. pyogenes aureus in pus*. —L. i./09, 816.

Ethyl Iodide. Readily destroys *B. Tuberculosis*. (R.)

Fluorine. More active than Chlorine. Fluorides and Silicofluorides (*c.f. Salufer*) are antiseptic. Sodium Fluoride 0.4% is fatal to *Micrococcus Prodigiosus*. Fluoric Acid and Ammonium, Potassium and Sodium Fluorides are used in the brewing trade. 0.3% will prevent the acidity of butter, and in a trial found not to be injurious to health. (R.)

Formaldehyde said to be more powerful than *Mercuric Chloride*, but the usual strength for use seems to be about 1% to 2%. This is suitable for wounds, hands, instruments and room disinfection. $\frac{1}{2}$ % said to kill most organisms. We tried 1% of the 40% article of commerce (3 hours) on 'U' and obtained +, also + with 'S,' - with 'T' and - with 'C'. The results were not altogether accordant. In one experiment we obtained + with 2% on 'C'.—B.M.J.E. ii./08,7, found this to be killed in 60 minutes. (c.f. p. 108).

Rideal states Formaldehyde is 'among the first three or four antiseptics.' Even when the proportion is too small to prevent growth, development of the organisms is long postponed. His experiments showed that 1% (of actual Formaldehyde) kills *S. pyog. aur.* after 50 to 60 minutes' contact, *B. Typhosus* 40 to 50 minutes, *B. Coli* 30 to 40 minutes, *B. Anthracis* and *S. Cholerae* after less than 50 minutes. See also p. 108.

10% Solution most useful for deodorising. Use as milk preservative undesirable. r.p. 889 et seq.

Hewlett. L.i 09,744., says Formaldehyde is probably more active than Sulphurous Acid in general disinfection.

Guaiacol is stated to have greater bactericidal power than Phenol, i.e., as 5 : 2.

Glycerin is preservative for vegetable preparations (c.f. *Glyce-tracta*), but, as anticipated, our experiments gave + with pathogenic organisms.

Hermite is practically a dilute solution of Hypochlorous Acid, prepared by electrolysis of the Magnesium Chloride of sea water. Kills diphtheria, cholera and typhoid bacilli in 5 to 10 minutes, and Anthrax spores in 1 hour. (R.) c.f. also L. i./08,157 and pp.633,634.

Hydrargyri Cyanidum. 1 in 15,000 is said to be sufficient. We should prefer 1 in 5,000 at least. As gargle 1 in 10,000 is used. For fibroid rhinitis tampons impregnated with 1 in 2,500 have been employed (c.f. Text). It is extremely poisonous. We found that 1 in 10,000 acting 2 minutes did not kill 'U,' but killed 'S' and 'T' in the same time.

Hydrargyri Ethylen-diamin-sulphas. As vaginal douche and hand disinfectant 'non-irritant' 1 in 2,000 to 1 in 1,000 employed. We obtained + with 'U' acting 2 minutes with 1 in 2,000 solution, but - with 1 in 1,000, also + with 1 in 1,000 on 'S,' - with same on 'T,' 'C' and 'A' (= Sublamin).

Hydrargyri et Zinci Cyanidum. As first dressing to wounds 3% gauze and wool, 33% paste used (q.v.) non-irritant. We found a minute or two with the paste sufficed to kill 'U,' also 'S' and 'T.'

Hydrargyri Iodidum Rubrum. Is insoluble in water, but is used as *Mercuric Potassium Iodide*. For hands 1 in 4,000, Collyrium 1 in 5,000, wounds 1 in 7,000, vaginal douche 1 in 10,000. Not so irritant as the Perchloride. We found even 1 in 100,000 active on 'T' but not on 'S,' also killed 'C' and 'A.'

Hydrargyri Oxycyanidum. As pigment in syphilis 0·2 to 0·6 %. We found 1 in 1,000 killed 'U,' also 'T,' but not 'S.'

Hydrargyri Perchloridum is the most powerful antiseptic known. Its intensity is increased by presence of Hydrochloric Acid, e.g., 1 in 500 with 1 in 120 of acid, for disinfecting excreta. It is precipitated by soluble organic matter. For eye, nose and mouth lotion 1 in 4,500, vagina 1 in 10,000. For linen, rooms, gynecologists' hands and superficial wounds 1 in 10,000 to 1 in 1,000. 0·07 Gm. stated to be necessary to prevent growth in a litre of broth (1 in 14,300 approx.): this is an over-estimate. (R.) The minimum for disinfection (Woodhead) should be 1 in 500, preferably with about $\frac{1}{2}$ % Hydrochloric Acid added. Utility of this for *B. Tuberculosis* is doubted. Our experiments show power of 100,000 solution: this strength rapidly killed 'U,' also 'S,' 'T,' 'C' and 'A' (2 mins. each), c.f. also p. 373.

Paul and Krönig showed that of Equimolecular Solutions of this salt, the bromide and the cyanide, the antiseptic power (on *B. Anthracis* Spores) was in this order—corresponding to the degree of dissociation in the three solutions.—Pharmacol., p. 15.

A little Hydrogen Sulphide should be added to subcultures in testing power of this substance to prevent the sublimate carried over with the bacteria from interfering with results.—L. i./09,815.

Sodium Chloride reduces power on anthrax spores.—L. i./09,818.

Hydrogen Peroxide is variously employed: even the strong official solution may be employed on mucous membrane. In otitis 10 to 15%. In diphtheritic conjunctivitis, also stomatitis 3%, cystitis 1 to 3%. In chronic gonorrhœa $\frac{1}{2}$ to 1%. It has been stated 1 per 1,000 destroys cholera and typhoid bacilli in 24 hours (experiments with water purposely infected). Suggestion was made to disinfect water for domestic use by adding 10 Co. of 10% solution to the litre of water. It is used in the Budde process of sterilising milk (q.v.) and is contained in Sanitas q.v. Our results proved that even in 2% dilution the official Hydrogen Peroxide Solution is an active germicide, i.e., killed 'U' after short contact, and 'T' after 2 minutes, but not 'S.'

Bacteriologists refuse to credit this chemical with any true antiseptic power—maintaining action due to the minute bubbles of oxygen which are given off mechanically in presence of pus or other decaying matter.—Hospital, April 4, '08. This we cannot quite agree with. We certainly found it most active in above experiments.

Iodine is used to sterilise catgut (q.v.). The solution is efficient. We tried 1% and found it to kill 'U,' also 'S' and 'T.' In the proportion of 7 in 1,000,000 of liquid has been stated to kill *B. Anthracis*. 1 in 10,000 destroyed *Sarcina lutea* in half an hour, but, unfortunately, to check *B. Anthracis* once established in the human body 12 Gm. of Iodine would have to be in constant circulation in the system. (Koch.)

Iodine Trichloride 5 in 100,000 killed *B. Typhosus* in half an hour. (R.)

Iodoform is used as a bladder injection with glycerin, also as

a dusting powder and wool dressing. The activity of this as an antiseptic has been doubted. In our experiments the results with Iodoform were satisfactory, although the test was applied in a drastic manner, i.e., a paste of it killed 'U' in a few minutes, also 'T,' but 'S' gave +.

Iron. Frankland proved that Metallic Iron is destructive to bacteria. Ferrous Sulphate 1% is antiseptic but not disinfectant. Ferric Sulphate and Chloride check fermentation and bacterial growth.

*Izal is described at length by Rideal. See also Klein, B.M.J. ii./04,13. and p. 17.

Lead Salts. Strongly antiseptic: next to Zinc Chloride. 2.0 Gm. per litre of broth required. Dangerous as antiseptic on account of absorption. (R.)

Liquor Carbonis Detergens. A remedy in skin affections, strength used 1 in 8 up to 1 in 160 (see Text). We found 2% solution killed 'U' (3 hours), also 'T,' 'C' and 'A.' It inhibited 'S' but did not kill.

Liquor Cresolis Saponatus, U.S. For midwifery 1% usually employed. Is stated to be $1\frac{1}{2}$ times as active as Liquid Phenol. We found 1% acting 10 mins. killed 'U,' but 1 in 5,000 did not, similarly 'T,' but 1% did not kill 'S.'

Lister's Antiseptic. See Hydrargyri et Zinci Cyanidum.

*Lysoform. This is employed for wounds and irrigation. Contains Formaldehyde. Lathers with water. 2% kills 'U,' also 'S' and 'A,' but at least 10% is necessary for 'T' and 'C.' Non-poisonous.

*Lysol. In gynaecology 1% is used. Said to contain 50% Cresols. We found 1 in 300 killed 'U,' also 'S,' 'T,' 'C' and 'A.' Highly poisonous. c.f. p. 17.

Manganates. Sodium Manganate (impure) with some Permanganate and Chloride constitutes Condy's Green Fluid. (R.)

Mercuric Chloride. See Hydrargyri Chloridum.

Mercuric Cyanide. See Hydrargyri Cyanidum.

Mercury Vapour Lamp is bactericidal, e.g. to *B. prodigiosus*.

Naphthalene. Enemata of 8 grains have been used (see Text). Parasitic in scabies, 10 to 20% solution in oil. Is commonly employed as deodorant in closets, but not a disinfectant in this way. Employing a paste we obtained + with 'U' (3 hours), also 'S' +, but 'T' -.

Naphthol β .—Oily Solution 10% has been used. This appears to be active. We obtained - with a paste in the case of 'U' (3 hours), also - with 'S' and 'T' -.

Oxygen in the nascent condition, e.g., from Potassium Permanganate, is more powerful than atmospheric oxygen.

Ozone in the dry state has little action on micro-organisms.

***Paraform.** The spontaneous vapour (Formaldehyde) is useful to maintain instruments and catheters in sterile condition. For fumigation of rooms during and after disease. Tablets (15 grains) are made. 20 of these disinfect 10,000 cubic foot space thoroughly. Using a paste with water we found to kill 'U' rapidly, also 'S' and 'T' in 2 mins.

Persulphates are Antiseptic. Ammonium Persulphate. 1 to 2% kills Cholera organisms and others in a few minutes. Sodium Persulphate 0.2% is fatal to *Sp. Cholerae*.

Phosphates, Acid. Said to be of value as bactericides. Calcium Acid Phosphate 1 in 1,000 was tried. (R.)

Potassium Hydroxide is equal to Sodium Hydroxide q.v.

Potassium Permanganate is best employed in strong solution. 1 in 125 prevents growth. It is a good deodorant. (R.) Our experiments showed the Permanganates on the whole to be satisfactory. We found 1 in 100,000 of Potassium Permanganate no avail on any of the organisms, but 1 in 1,000 killed all of them rapidly: 'U,' 'S,' 'T,' 'C' and 'A.' Calcium Permanganate is stated to be stronger than the Potash Salt. 1 in 100,000 should sterilise water in 5 mins. We did not find this strength to kill either 'U,' 'S,' or 'T,' but 1 in 5,000 killed 'U,' 'S,' 'T' and 'C' (not tried on 'A').

In gonorrhœa 1 in 1,000 gargle and vaginal douche 1 in 5,000 of either salt are employed.

Tested in the ordinary way shows a very high Carbolic coefficient, but in presence of organic matter its power is reduced by it oxidising the organic material.—*B.M.J.* ii./09,212.

"Potassium Permanganate 10% practically useless on organisms in pus."—*Li.*/09,816. But c.f. Bousfield's results. p. 448.

Pyoktanin. 1 in 500 or even 1 in 2,000 arrests *B. typhosus* and *B. coli*. (R.)

Pyrogallol. 3% kills most organisms. (R.)

Quinine Sulphate 1 in 500 Solution necessary for killing infective organisms (in a common cold).—*L.* ii./08,1661. See also Quinine Sulphate.

Resorcin is sufficiently antiseptic in 1% solution to kill most organisms. (R.) Is non-irritant on mucous membrane, e.g. bladder, 5% is used. As collyrium 2%, as enema 0.5%. See also Text. 1 in 5,000 did not kill 'U' (10 mins.), nor 'S,' nor 'T.'

Soap. Though not giving a high Carbolic coefficient is generally acknowledged to be germicidal. We tried a 2% solution which was useless on 'U,' 'T,' 'S' and 'C' but this did not simulate the process of scrubbing or washing, which is well known to be effectual.

Sodium Hydroxide. 2% to 5% exercises an influence on bacterial growth, as also the Carbonate 5 to 10 $\frac{1}{2}$ %. Bicarbonate is hardly antiseptic. Sodium Chloride is not a disinfectant, though largely used for meat. (R.)

Sodii Metabisulphis. Said to be a strong antiseptic. A pigment 10 grains to the ounce of glycerin has been used for thrush. We found this to kill 'S,' but not to kill 'U' or 'T' (2 mins. all).

Sodii Sulphas Acida. For water sterilising see Text. 1 Antityphoid Tablet to the pint of water stated to destroy 'T' and *B. enteritidis* in 15 mins. We found it killed 'T' and 'S' in 2 mins. in above proportion.

Sodii Sulphis. Made use of in the 'Warwick Air Purifier' with glycerin to 'catch' the organisms (see Text). 1 in 500 we found of little avail, giving + with 'U' (10 mins.) also with 'S' and 'T.'

*Sublamin. See Hydrargyri Ethylen-Diamine-Sulphas.

Tar. See Liquor Carbonis.

Terpineol. 1% is stated to prevent growth of Anthrax and 10% to kill *Staphylococci* in 10 mins.

Terpin Hydrate. 0.25% said to arrest Tubercle Bacilli.

Thymol arrests fermentation better than Phenol. (R.) 1 in 800 is used as gargle. It is soluble 1 in 1,500 water and 1 in 200 glycerin. We found 1 in 1,000 killed 'T' and 'C,' but not 'U' or 'S.' '1%' (? what used to dissolve) was found to kill 'S' in 3 minutes. 0.5% killed it in 5 minutes.—B. M. J. ii./09, 213.

Toluol (c.f. Benzol, which it resembles in action). Did not hinder development of 'U' or 'S.'

Trikresol. In general surgery $\frac{1}{4}$ to 1%. Said to be more powerful than Phenol. Eye wash 1 in 1,000 to 1 in 2,000. Experiments with 1 in 2,000 gave with 'U' (10 mins.) +. It appeared to hinder 'S' and 'T,' which ultimately developed (in 60 hours). $\frac{1}{2}$ % on the other hand killed 'U,' 'T' and 'C,' but not 'S.'

Zinc shaken with water stated to kill *B. typhosus* and *B. coli communis* in a few hours. Copper has a similar effect. (Kræmer.)

Zinci Chloridum. 1 in 500 is an astringent lotion. It is very poisonous. Ranks below Mercuric Chloride and Copper Sulphate. A 2 $\frac{1}{2}$ % Solution was found to destroy bacteria, but Koch found even 5% would not kill Anthrax spores. 1.9 Gm. stated to be necessary to prevent growth in a litre of broth. The results of our tests showed that Zinc Chloride was not of much avail. 1 in 1,000 failed to kill 'U' (3 hours) and 'S' and 'T.'

Zinci Permanganas. Employed similarly to the Potash Salt. Absence of irritation is a feature. 1 in 5,000 did not kill 'U' (10 mins.) but prevented growth of 'S' and 'T.'

Zinci Suphanilas. 1 in 500 to 1 in 250 is used in gonorrhœa. Experiments showed with 1 in 100 'U' (2 mins.) —, the same with 'S,'

but + with 'T' and 'C,' also + with 1 in 250 on 'U' (2 mins.) - in case of 'S,' and + with both 'T' and 'C.'

Zinci Sulphas. *No value as germicide. (Koch, Klein, etc.) Our experiments show that Zinc Sulphate, even 1 in 500, is of no use, the + is very marked all through (with 'U,' 'S' and 'T').*

Zinci Sulphocarbolas. *Said to be a 'Strong Antiseptic.' Our results showed the action of this substance to be only slight. 1 in 200 did not kill 'U,' 'S,' 'T' or 'C.'*

Sunlight according to Koch will kill the *Tubercle Bacillus* in from a few minutes to 5 or 7 days, according to the thickness of the medium. Light, in short, is one of the most important agencies for diminishing the number of bacteria.

B. typhosus is killed rapidly by sunlight. 240,000 organisms in 2 hours were reduced to nil (in India).—L. i./09,742.

Heat owes its bactericidal power to its coagulating effect on bacterial proteins. Moist heat is best because apart from its penetrating power it is well-known the protein in the dry condition coagulates at a much higher temperature than when moist.—Hewlett L. i./09,815.

Filters. The 'Pasteur-Chamberland' or 'Berkfeld,' or similar apparatus of the porous candle type are efficient instruments.

ANALYTICAL MEMORANDA.

I.—CHEMICAL TESTS AND MICROSCOPIC METHODS FOR THE EXAMINATION OF URINE, BLOOD, &c.

The **Specific Gravity** of Urine (at 60° F.) is usually between 1.015 to 1.025. The volume passed per diem (24 hours) in health is about 50 ounces (1,500 Cc.). The capacity of the bladder is, as an average, 20 ounces (600 Cc.).

It is pointed out that temperature makes a considerable difference in taking the Sp. Gr., e.g., a urine Sp. Gr. 1.015 when passed may be 1.020 when cooled to room temperature. The specific gravity increases about one point for every fall of 8° F. of temperature.—L. i./07,252.

In women the Sp. Gr. frequently ranges higher than in men. 1.035 to 1.040 is not at all uncommon even in health and not entirely accounted for by small consumption of liquid.—B.M.J. ii./09,652.

Acetone and Allied Bodies in Urine.

Lieber's Test is generally employed. Distil the sample and make distillate alkaline with potash, add a little iodine solution (not an alcoholic solution). The formation of iodoform, recognised by yellow turbidity and the odour, indicates presence of acetone.

Examine the Iodoform crystals microscopically; the test by the smell is not much use.—L. i./07,805.

Legal's Test is also useful:—

Fresh concentrated Sodium Nitroprusside $[\text{Na}_4\text{Fe}_2(\text{CN})_{10}(\text{NO})_2 +$

$4\text{H}_2\text{O} = 592.38 (595.884 \text{ I.Wts.})$] Solution (soluble 1 in $2\frac{1}{2}$) added to a specimen or its distillate containing Acetone, made slightly alkaline with caustic potash, produces a red colour which changes rapidly to yellow. On adding Acetic Acid a reddish-violet colour is produced, which changes to blue on standing.

Ammonia to alkalis in place of Liquor Potassæ is recommended, and do not use Acetic Acid. Proceed thus—Add a little Ammonia so that it remains on top as a clear solution with the nitroprusside and urine below. If acetone is present in 1 to 3 minutes a well marked ring of magenta (petunia) appears at the juncture of the liquids and spreads upwards. An orange-red ring is to be distinguished from the acetone ring.—L. i./07,805.

Lange uses 15 Cc. Urine, $\frac{1}{4}$ to 1 Cc. of Glacial Acetic Acid, a drop of freshly made Nitroprusside Solution and 1 Cc. of strong Ammonia Solution by which $1/400\text{th}\%$ can be detected.—Cambridge, L. i./07,911.

Acetone having a specific gravity of 0.8 will obviously decrease the specific gravity of a urine, and may lead to error if its presence be unsuspected in diabetic urine. This is apt to occur in an advanced stage of the disease.

Acetonuria in cases of gastric ulcer.—L. i./03,1230.

May be associated with the administration of chloroform.—L. ii./05,583.

Salicylic Aldehyde. $\text{C}_6\text{H}_4.\text{OH}.\text{COH} = 121.13 (122.048 \text{ I. Wts.})$.

A yellowish liquid, Sp. Gr. 1.165—1.17. Miscible with alcohol and ether. As a test for acetone in urine. To 10 Cc. of the specimen add about 1 Gm. Potassium Hydroxide, and without waiting for solution, 10 to 12 drops of Salicyl Aldehyde. Purple ring indicates presence.—M., 1906.

Diacetic Acid, $\text{CH}_3.\text{CO}.\text{CH}_2.\text{COOH} = 101.28 (102.048 \text{ I. Wts.})$,

Gerhardt's Test for. Ferric Chloride gives red colouration. A few drops of Potassium Citrate solution instantly removes the colour. Reaction with Sodium Nitroprusside as above. The acid is soluble in ether, and may be removed by it after acidifying the specimen with Sulphuric Acid. Dilute Ferric Chloride solution shaken with this ethereal solution, becomes red.

Occurs in urine in cases of gastric ulcer.

In employing the ferric chloride test care must be taken to distinguish from colour produced by salicylic acid and compounds, e.g., salicin, aspirin, diuretin, salol.

Boil the urine first for five minutes, then apply test. As the diacetic acid is converted by so doing into acetone there is considerable reduction in colour if dependant on diacetic acid, but is unaltered if due to salicylic acid.—B.M.J. ii./04,114; L. i./07,511.

Iodic Acid Test for.—Add to 1 or 2 Cc. of normal urine 2 Cc. of 10% Iodic Acid Solution and 3 Cc. Chloroform. Uric Acid, etc., reduce the Iodic Acid—the Chloroform becoming coloured with the Iodine. Now add a little of the specimen to be tested and shake thoroughly. If Diacetic Acid (Aceto-Acetic Acid) present the colour disappears, if absent it is intensified.—M., 1906.

Hydroxy- or β -Oxy-Butyric Acid $\text{CH}_3.\text{CHOH}.\text{CH}_2.\text{COOH} = 103.28 (104.064 \text{ I. Wts.})$, and any increase in the amount of fat (lipæmia—granules stained by Osmic Acid), should be carefully looked for in the urine and blood respectively of diabetics. It may be extracted from the specimen with ether, and gives a reddish-violet colour with Ferric Chloride. Occurs only if Diacetic Acid be also present, *c.f.* —B.M.J.E. i./06,49. The specimen may be fermented to remove sugar, precipitated with lead acetate and ammonia; if the filtrate be levorotatory β -Oxy-Butyric Acid is probably present.—B.M.J. i./03,1205.

In diabetes, Acetone, Diacetic Acid and β Oxy-Butyric Acid are excreted in this order as the disease advances, and if metabolism can be improved they disappear in the inverse order. The main source of Acetone is the imperfect metabolism of fat, either of food or the body.—B.M.J.E. ii./06,49.

In some of the gravest forms of renal disease albumin may be absent from the urine, at any rate temporarily. An address on diagnosis of certain forms of renal disease.—B.M.J. i./07,725. Conversely serious renal disease should not be diagnosed merely by finding blood or albumin in the urine.

In following the progress of a case it is of importance to examine the urine of a whole day, because if, e.g., the percentage in a specimen examined were to suddenly show a rise, the quantity excreted per diem might be the same if the amount of urine, had decreased owing to the consumption of less liquid, or change of diet, occupation,

&c., and *vice versa*. The same remark, of course, applies to all pathological constituents in the urine.

For the various views as to reasons for appearance of β Oxy-Butyric Acid, Diacetic Acid and Acetone in the Urine consult Mann. The tendency he says, at the present time, is to consider them as products which are found during the splitting up of fat in the tissues generally—according to some authorities in the muscles and large glands particularly such as the liver.

Albumin Tests.

Proteins occurring in urine are classed by Mann as—

(a) **Serum Proteins:** *Serum albumin*, *Serum globulin* or *paraglobulin* and *fibrin*.

(b) **Compound proteins:** *Nucleo-albumin*, *Chondro-albumin*, *Taurochol-albumin* and *Mucins*.

(c) **Proteolytic products:** *Albumoses*.

Secondary Albumoses excepted, all the urinary proteins are precipitated by Nitric Acid. With most, excepting Albumin, the precipitate thus formed is soluble with heat.

ALBUMINURIA denotes the presence in the urine of Serum Albumin accompanied by varying proportion of Globulin.

Albumin is precipitated by excess of mineral acid, but not by Acetic Acid.—*Ibid*.

Acetic Acid with heat. Fill a test tube about half full with filtered urine, slightly acidify with dilute acetic acid. Boil the upper portion. Albumin, if present, will precipitate in the form of a cloud which will be insoluble after cooling on further addition of acetic or nitric acids in moderate amount.

Nucleo-proteids also affect this re-action.—L. i./99,1085. The urine may be saturated with salt before adding the acid. It is claimed that this will prevent their precipitation.

Asaprol, *q.v.*, precipitates albumin, peptone, &c., from acid solution. On boiling, peptone and albumose redissolve, albumin remains.

Riegler's Test ("Beta-naphthalene-Sulphonic Acid") is this—L. ii./08, 1824; B.M.J. i./09,542.

Tablets are made—4 to be dissolved in 5 Cc. of water for use.—Add to 5 Cc. of the specimen filtered if necessary.

Carbolic Acid (saturated solution in absolute alcohol) recommended.—L. i./99,221.

Not so delicate as Salicyl-sulphonic Acid, but the latter (see below) may be too delicate for clinical work. Further, the milkiness produced by the Phenol emulsifying with the water is a drawback.—L. i./99,1393.

Said to be as delicate as Nitric Acid.—L. i./99,1456.

Albumose (Benoe Jones's) occurs in myelopathic albumosuria, a disease associated with morbid conditions of the bones, *vide also* B.M.J. ii./06,1442. This albumose is detected by (1) coagulating at 58° C. lower than serum albumin, which coagulates at 75° C., (2) precipitates with hydrochloric acid, (3) nitric acid in the cold—on raising to the boiling point, however, the coagulum dissolves more or less completely and reappears on cooling, (4) with potassium ferrocyanide and citric acid (often takes time to develop, differing in this respect from albumin). The hydrochloric acid test is exceedingly sensitive and does not depend on excess of salts. The result is obtainable after very free dilution of the specimen. See also Mann, p. 136.

A table of proteids and reactions is given.—L. i./05,207.

Esbach's Picric Acid Solution.

Minn warns against the voluminous precipitate which one occasionally gets with Esbach's reagent giving a fictitious estimation. He

says many albuminous urines give a pale blue with the Biuret reaction without any tendency to violet: others will give a reddish purple. Such urine indicates by the reddish color some hydrolytic change and will give the incorrect reading referred to.

Picric Acid 10 Gm., Citric Acid 20 Gm., dissolve in about 900 Cc. boiling water, cool and add water to 1,000 Cc. This reagent is used for the approximate determination of albumin by an Esbach tube about six inches long, and 0.6 inch in diameter, the graduations of which are the results of experiment, and indicate approximately 0.1 up to 0.7% albumin.

By comparison with a standard dried albumin solution, 1 in 1,000, and by heating to 180° F. and centrifugalising, the process can be terminated in a few minutes.

For exact determinations, albumin should be precipitated by some suitable reagent, itself nitrogen-free, *e.g.*, carbolic acid or tannin and the washed precipitate, dried and weighed, or better the nitrogen contained in it should be estimated by a Kjeldahl analysis, the amount of nitrogen found being multiplied by the factor 6.3 to obtain the amount of proteids.

N.B.—Methylene blue—in case of patients undergoing treatment with, precipitates Esbach's picric acid solution.—L. ii./o6, 1450.

Ferrocyanic Acid Test Pellets,

Potassium Ferrocyanide, $K_4Fe(CN)_6 + 3H_2O = 419.66$ (422.358 I. Wts.) and Acetic or Citric Acid mixed in solution set free Hydroferrocyanic Acid and precipitate. In about a drachm of urine, an acid pellet is first dissolved, next a ferrocyanide pellet is added; if albumin is present a precipitate is formed. This test does not precipitate peptones. May also be applied as a ring test.

Heller's Nitric Acid Test.

Nitric Acid is placed in a test tube and the filtered urine, or diluted filtered urine, carefully 'layered' on to it. A white ring at the juncture of the liquids indicates presence of albumin; confirm by another reliable test. Not so delicate as the heat and Acetic Acid, but will show 1 in 12,000 at once. Bilious urines may produce play of colours characteristic of Gmelin's test. Nucleo-proteids may hinder this test, but these are precipitated by vegetable acids.

The test may also be applied by heat—*i.e.*, add a little Nitric Acid, mix and boil the upper portion.

Glass Capsules of Nitric Acid contain one minim; are convenient.

Citric Acid 10 Gm., water 7.5 Cc., may be used as confirmatory test. Apply by layering in similar manner—if mucus present the Citric Acid test will cause turbid ring.—M. 1906, 6.

Copaiba Balsam, Sandal Oil and Turpentine—Treated patients pass urine which cannot be tested for albumin with Nitric Acid, as the whole precipitate—albumin and resin dissolve in the alcohol usually added to dissolve the resin. The addition of strong alcohol is, however, applicable if chromic acid be used as a test—also in case of patients treated with cubebs and coal tar. A false precipitation also occurs in case of patients treated with terpin hydrate.—L. ii./o6, 1450.

For special notes on the conduct of the Nitric Acid Test for Serum Albumin see Mann, p. 143. Occasionally in doing the test carefully a cloud appears in the upper part of the urine with a clear layer between this and the urine (or the Serum Albumin precipitate if present.) This may be Nucleo or Chondro-Albumin or Mucin.

Mann says that the Nitric Acid and boiling test are the best and least likely to give incorrect result.

Meta-Phosphoric Acid, $HPO_3 = 79.44$ (80.008 I. Wts.).—A fresh

solution of a little of this acid is added to the clear filtered urine. A cloud or precipitation indicates presence of albumin.

Millon's Reagent.—Nitroso-Nitrate of Mercury. Mercury 10, Nitric Acid (Sp. Gr. 1·185) 25 by weight, Water 25. Dissolve in a flask at lukewarm heat, shaking often, and add to a solution formed by dissolving Mercury 10, in Nitric Acid (Sp. Gr. 1·25 to 1·3) 22 by weight without artificial heat. With albumin or urea this gives a yellow, then red colouration on heating.

Nitric Acid Test see Heller's above.

Picric Acid Solution, see Esbach's solution (*ante*).

The administration of alkaloids may cause urine to give a precipitate with picric acid, but this is redissolved on heating to the boiling point.

Roberts' Albumin Test.—Nitric Acid 1 part, Solution of Magnesium Sulphate (10 in 13) 4 parts. Is found to be very satisfactory—advantage: has high density. Slope the tube containing a little test solution and allow the urine to slowly run down into it with a dropper.

Salicyl-sulphonic Acid.

$C_6H_3,SO_3H.OH.COOH = 216\cdot47$ (218·118 I. Wts.).

In colourless crystals, prepared by action of sulphuric anhydride on salicylic acid. Soluble in water and alcohol. This test requires careful 'layering' of the urine upon a crystal, or a concentrated solution.

Is an extremely precise, reliable, and quick test, giving a dense white precipitate with all proteids.

In confirmation note the following:—

Albumin, globulin, myosin, etc., coagulate on heating.

Albumoses dissolve on heating, and reappear on cooling.

Peptones are not precipitated, except in solutions saturated with ammonium sulphate.

Strongly recommended. Not affected by phosphates, bile, urates or alkaloids.—L. i./99,1085. Also by the late A. H. Allen.—P.J. ii./04,9.

Trichloroacetic Acid. See p. 28. A saturated solution is used in the same manner as the last test, or a crystal may be used. May precipitate uric acid and nucleo-proteids.

Tannin-Hydrochloric Acid Test.

Mix 5 Cc. of the specimen with 5 Cc. of 1·5% Alcoholic Tannin Solution warm, and add 5 Cc. of Dilute Hydrochloric Acid (1 in 3). Turbidity or yellowish precipitate. Interfering substances such as urates, phosphates and alkaloids are kept in solution by the acid and resins and alkaloids are redissolved by the alcohol and peptones by heating.

Serum Globulin.

Globulin (held in solution by the salts) coagulates by heat and by Acids—readily soluble in an excess of Acetic Acid. The quantity of Globulin is usually extremely small, but in the advanced stage of many cases of Bright's disease a marked and persistent increase in the proportion of it is a very unfavourable sign.

Roberts' Test for Serum Globulin.

Add the serum drop by drop to a tall cylinder of water. Opalescence is produced, redissolving on addition of a little Acetic Acid or Liquor Potassæ.
To separate Serum Globulin from Serum Albumin:—

Faintly alkalise and then saturate with Magnesium Sulphate. Globulin

is precipitated whilst the Albumin remains in solution. This may be made quantitative by operating on 100 Cc., collecting precipitate, washing with Magnesium Sulphate, dissolving in weak Saline, adding Acetic Acid (few drops) and boiling to coagulate, collecting, drying and weighing.—Mann, p. 154.

Globulins. The proteid of cerebro-spinal fluid is in the main globulin. In general paralysis the proteid is increased, albumin is constantly present. The principal globulin in the fluid in general paralysis is **Euglobulin**. It is the carrier of the interesting antibody operative in the Wassermann reaction (*q.v.*) Euglobulin differs from Serum Globulin in that it is precipitated in a 33% solution of Ammonium Sulphate, whilst 50% is necessary to precipitate Serum globulin.—L. ii./09,210.

Albumoses.

To detect Albumoses.—Acidulate the specimen with Acetic Acid, add 10% Potassium Ferrocyanide Solution. This precipitates primary Albumoses. This ferrocyanide precipitation distinguishes albumose from *Compound protein*. On warming the precipitate dissolves, to reappear on cooling. This distinguishes from that due to Serum Albumin. For various albumoses see Mann.

Albumoses dissolve on treating (after precipitation by a reagent) and reappear on cooling. What was formerly called 'peptone' should really apply to albumose. True peptones (as described by Kuhne—true albuminous substances not precipitated by salting with Ammonium Sulphate) do not occur in the urine.

May safely regard all proteids in urine as albumoses, which dissolve, and reappear on cooling, as above mentioned.—L. i./09,682.

Biuret Reaction.

After testing for albumin in the usual way with Heller's contact method, this is removed if present by 10% Trichloroacetic Acid Solution, and the filtrate then tested with the Biuret Test. The author employed this as follows:—

In a test tube place 1 drop of Copper Sulphate Solution (2%), add 5 Cc. urine, then 5 Cc. of Sodium Hydroxide Solution (10%). *A rose pink indicates the presence of albumose.*—L. i./09,682.

Clinical Significance of Albuminuria.—The amount of albumin detected at any time does not measure the importance of the albuminuria. A large output naturally implies failure of nutrition, but a small quantity may be of equal danger. Note Sp. Gr. and color.

The finding of Casts may be of assistance, but too much importance need not be paid to presence of a few hyaline casts (especially in centrifugulised sediment). They are likely to be found, when albumin is present, in acid urine. They may be found in any of the forms of albuminuria not associated with definite renal disease, etc. Casts and albumin are often absent from the urine for considerable time in chronic interstitial nephritis. It is not safe to base a diagnosis on the non-finding of casts where serious structural renal change is suspected. Temporary albuminuria is frequently associated with athletic exercise. The sphygmograph is often of assistance in distinguishing functional from organic types of albuminuria.

A large amount of albumin without blood or pus may generally indicate chronic tubal nephritis; confirm by high Sp. Gr., microscopic examination of deposit, and appearance of patient. A small amount in a middle-aged or elderly man will probably point to chronic interstitial nephritis. In a young man a mere trace may be only the evidence of a functional albuminuria and the diagnosis must rest on negative evidence to a large extent, a most

important factor being relatively high Sp. Gr. unless this has been influenced by nervousness or recent consumption of a large quantity of liquid.—N. Tirard, L. ii./09,1062.

Albuminuria caused by toxic effects of poisonous substances, *e.g.*, lead, mercury, phosphorus, cantharides, etc.—B.M.J.E. ii./07,81.

For the consideration of various forms of functional albuminuria distinct from pathological, *vide* Mann, p. 128. For the various conditions of disease causing pathological albuminuria, *vide ibid.*, p. 133.

Bile.

Nitric Acid (B.P. strength is best, W.H.M.) *i.e.* Gmelin's Test produces a bluish-green ring and play of colours.

A moderately icteric urine diluted even 1 in 50 will give this usually.—W.H.M. on application of.—C.D. i./03,171.

Peptone Test.—Peptone, in powder 30, Salicylic Acid 4, Acetic Acid 30, Distilled Water 3,500.

Dissolve and filter. Add 1 of urine containing bile salts to 3 of this solution, opalescence (or p.p.) appears; it dissolves completely on adding acetic or citric acid, and diminishes, but does not disappear, on boiling.—*Oliver*.

Sulphanilic Acid. (*Vide* also p. 244).

1% Solution with Sodium Nitrite 1% and Hydrochloric Acid as test for bile pigments.—L. i./06,923.

For further details of the test, *c.f.* M. 1906, p. 17.

Tincture of Iodine.—A few drops "layered" on to the specimen and the tube shaken gently, produce a green colour if bile pigment be present.

Pettenköfer's Test for Bile Salts. Add a few drops of Syrup, shake, and then Sulphuric Acid—reddish violet colour *c.f.* Acid Cholalic and Sodli Taurocholas in Organic Analysis Chart.

Hay's reaction for Bile Salts. Sublimed Sulphur sprinkled into *clear* urine containing Bile Salts commences to sink almost immediately.—B.M.J. i./02,702.

Chromic Acid. 5% solution added gradually produces a green colour.

Sodium Nitrite with Sulphuric Acid (Vitali's Reaction) gives green colour.

The spectroscope is employed for detecting Urochrome, Urobilin, Hæmatoporphyrin, Uroerythrin.

Urine of patients taking Trional, Tetronal and Sulphonal should be watched for possible Hæmatoporphyrinuria.

Hæmatoporphyrinuria does not alone account for the altered color of the urine.—L. i./09,1106.

For these various pigments consult also Mann, 188, *et seq.*

Urobilin.

Simple test for (Schlesinger). To the unfiltered urine add alcoholic solution of Zinc Acetate. Shake and add a few drops Lugol's Solution. Fluorescence in varying intensity indicates presence.—B.M.J.ii./08,1357,

Cholesterolin (*q.v.*) is rarely found. It is usually derived from a collection of pus that has been retained in a cavity for some time, ultimately discharging into the urine. A few recorded cases are detailed.

To separate cholesterolin extract the specimen with alcohol-free Ether. Purify the residue on evaporation by dissolving in strong alcoholic potash, evaporating, extracting again with Ether, and this again with boiling alcohol—rhombic plates.—Mann.

Chloroformic solution of Cholesterolin with Sulphuric Acid gives a red to purple colour. An Alcoholic solution so treated gives red to blue.

Cholesterolin crystals in urine, in diabetes with neuritis, in cystitis, in Bright's disease, in pyonephrosis, in epilepsy, in a case of hæmaturia with fibrous casts, in tabes and lipuria, in fatty degeneration of the kidneys.—B.M.J. i./03,1008.

Tyrosin, β -Oxyphenylalanin- α .

$C_6H_4.OH.C_2H_3(NH_2).COOH = 179.77$ (181.098 I.Wts.)

Is recognised by its characteristic crystalline appearance being in shining needles, either in bundles or star form.

Synthesis of, from Potassium Cyanide.—L. ii./06,1583.

Russula delica.—The juice of this fungus is a test for Tyrosin; changes it from red to black.

The fungus has stem short 1 to 2 in. high, $\frac{1}{2}$ in. or more thick, even, smooth, white cap, fleshy, 3 to 5 in. broad, funnel-shaped when full grown, regular, even, smooth margin, involute, without striae, flesh firm, dry, white.

Enzymes as Reagents.—Y.B.P. 1907, 55.

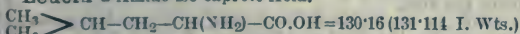
Further Tests for Tyrosin:

Two Cc. of Sulphuric Acid mixed with 3 to 5 drops of a Solution of Aldehyde in twice its volume of Alcohol 90%, care being taken that the liquid remains colourless—a few drops added to the suspected liquid produces a gooseberry red colour. This test is supposed to detect Tyrosin up to 1 in 10,000.

Piria states on adding a few drops of strong Sulphuric Acid to a little Tyrosin in a dish it dissolves with slight reddening, on saturating with Barium Carbonate (after diluting) and adding to the filtrate neutral Ferric Chloride Solution a violet colour is formed.—Schmidt.

Frøehde's Reagent, *q.v.*, gives blue to violet colour.

Leucin α -Amido iso-caproic Acid.



Leucin occurs as an early result of protein cleavage. There are two isomeric forms of it—respectively *lævo*- and *dextro*-. For methods of detection, and some cases (liver diseases) in which it has been found, consult Mann, p. 58.

Leucin and Tyrosin usually occur together. For method of separation *see* Mann, p. 61.

Is in crystalline spheroidal clumps. An arterial depressor. Is given in arteriosclerosis.—B.M.J. i./05, 126.

Blood Corpuscles

may be recognised microscopically; blood Pigments microspectroscopically.

Precipitin Test for Blood (Uhlenhuth's).—Precipitins are formed when the serum of one kind of animal is introduced into the body of another species, *e.g.*, the serum of a horse injected into a goat causes the serum of the goat to be capable of forming a precipitate with normal horse serum. This has been suggested as a possible means to distinguish the blood of different animals, but is not specific for human blood.—Bosanquet. *Vide also* B.M.J. ii./05, 1301, 1371.

Some unusual cases of Echinococcus (Hydatid) Cyst.

Hydatid Fluid may be used to give precipitin test as aid in diagnosis. Interaction between hydatid fluid and serum from hydatid patients has been obtained.

In the rarer cases where the echinococcus has invaded bone structures diagnosis is difficult. The hydatid fluid must be fresh for the test. The presence of eosinophilia is a useful help to diagnosis.—B.M.J. ii./09, 957.

Blood in Urine.—Heller's test consists in heating the specimen with strong potash or soda. If present a colour described as bottle-green is produced, and earthy phosphates coloured brownish-red by blood are precipitated.

Ozone Ether and Guaiacum Test for,—add a drop or two of fresh Tincture of Guaiacum—Guaiacum Resin 1, in Alcohol (90%) *q.s.* to 10—to a small quantity of the urine and shake, 'layer' Ozonic Ether on to the mixture. A blue colour at once, or on standing, indicates presence of blood—Iodine in the urine also gives this colour (*e.g.*, if patient has been treated with iodides). Further, pus gives it with Guaiacum Tincture alone, the colour disappearing on heating.

Reactions of Hemoglobin to the guaiacum test discussed.—B.M.J. i./09, 1375.

Blood, Recognition of in Stains.—Plunge the cloth into boiling water for a few moments, place on slide, and add few drops of Ammonium Sulphide. Examine microspectroscopically for absorption bands of hemochromogen. May be increased by 10% Potassium Cyanide Solution. If on a weapon or piece of jewellery, moisten with Ammonium Sulphide and scrape off sufficient and examine as before.—B.M.J. ii./05, 1261.

Oxyhæmoglobin in solution with a little Sodium Chloride evaporated over Sulphuric Acid to syrup consistence. Mixed with 15 times its volume of Glacial Acetic Acid and heated on a water bath several hours yields on cooling flat rhombic crystals of Hæmatin Hydrochloride with dark violet colour and lustre—this is one of the recognised tests for blood stains.—B.P.C.

Cases of intracorpuseular sulph-hæmoglobinæmia (*enterogenous cyanosis*) probably due to increased formation of sulphuretted hydrogen in the intestine.—*L.i.*/07,275.

Benzidine. *Syn. p-Diamidodiphenyl.*— $\text{NH}_2 \cdot \text{C}_6\text{H}_4 \cdot \text{C}_6\text{H}_4 \cdot \text{NH}_2 = 182.80$ (184.116 I. Wts.). Grey crystalline powder soluble in alcohol, is used as blood test. Mix the specimen with a little hydrogen peroxide, add a few drops of Acetic Acid and then a little Benzidine Solution—if present greenish colour.—*M.*/06,55.

Choline.—Halliburton and Rosenheim's Test for in the Blood and Cerebro-spinal Fluid.—Dark brown crystals (Choline Periodide) resembling hæmin appear on adding a strong solution of Iodine in Potassium Iodide to Choline-platino-chloride crystals. To prepare the Platino Chloride of Choline is, however, not essential, as the test can be applied direct to the Alcoholic Extract of the fluid.

Acetyl-Choline (artificial) has a powerful depressing action on blood pressure, being capable of overcoming the effect of Adrenalin. *V. also p. 438.*

Blood, Estimation of Hæmoglobin.—Sir Wm. R. Gowers' apparatus consists of two tubes, flattened or round, one closed, containing glycerin jelly coloured with picro-carmin—the standard equal to the colour of a dilution of average normal blood one hundred times (20 cmm. in 2 Cc.), and the other, graduated in 100 degrees = 2 Cc., for the dilution of the sample of blood with distilled water. The outfit further includes a pipette, pricker, india-rubber stand, &c.

The lobe of the ear or the finger is pricked and 20 cmm. of blood are drawn up into the pipette, injected into the graduated tube, which should at the time contain a few drops of water to prevent possible coagulation and facilitate mixture. Water is then added sufficient to produce a tint the same as the standard, the two being frequently compared during the process. The degrees of dilution needed indicate the percentage amount of hæmoglobin. For example, 20 cmm. of blood from an anæmic patient giving the standard tint at 30 degrees of dilution would contain only 30% of the normal quantity of hæmoglobin.

Haldane's Modification of Sir W. Gowers' Hæmoglobinometer is now extensively used where coal gas is available. The standard tint tube is a 10% solution of blood containing the average percentage of hæmoglobin found in the blood of healthy adult men, and having an oxygen capacity of 18.50, as determined by the ferricyanide method. The solution is saturated with carbon monoxide, and hermetically sealed. It is both definite and permanent. The graduated tube holds 2 Cc. when filled so that the inside is completely wetted and the liquid stands at the mark 100 after half a minute has been allowed for the upper part to drain. The tube is graduated in percentages of 2 Cc.

A cap for attachment to a gas-burner serves to deliver gas for saturating the diluted blood with CO.

The advantages of the modifications are: (1) that the standard solution is a definite one, so that an instrument can be verified at any time by making a determination with ox-blood of which the oxygen capacity has been determined by the ferricyanide method; (2) that the standard solution is permanent; (3) that the apparatus can be used with equal correctness by daylight and artificial light.

As coal-gas is not always available in examining the blood of patients the instrument can always be supplied with an additional standard tube containing picro-carmin jelly, as in the original Gowers' Hæmoglobinometer. The picro-carmin jelly is standardised to correspond with blood of 18.50% oxygen capacity, but is liable to slow alteration on keeping. Its value in terms of the sealed tube of blood solution should therefore be occasionally ascertained by determining the hæmoglobin in blood from the same person, first by the picro-carmin standard and afterwards by the sealed blood standard. The difference gives the percentage correction needed for the picro-carmin standard. The picro-carmin standard tube should be kept in the box, and not exposed unnecessarily to light.

Other Hæmoglobinometers are those of Oliver, Fleischl and Sahli.

Hæmoglobin Scale according to Tallquist consists of a scale with strip of blotting paper to suck up the blood for examination. The tint thus produced is compared by direct light with the scale. The scale indicates 10, 20, 30, &c. up to 100. This refers to amount of hæmoglobin—100 being taken as normal.

Rotary Hæmoglobinometer. A. J. Hall has devised an instrument on similar lines. For directions for use, *vide* L. i./09, 696.

Blood, Number of Corpuscles.—One cubic millimeter contains normally about 5,000,000 to 6,000,000 red corpuscles in man, and about 4,500,000 in woman. The average number of white corpuscles per cubic millimeter is about 7,000 to 8,000 in adults, and 10,000 in children.

The hæmacytometers chiefly employed are Gowers' modification of Hayem's, and that of Thoma-Zeiss.

In the Gowers Instrument the cell is $\frac{1}{2}$ mm. deep, and each side of a square is $\frac{1}{10}$ mm., hence the volume of the small square is $\frac{1}{1000}$ cmm. This instrument contains, in addition to the cell, a small pipette which, when filled to the mark on its stem, holds exactly .995 cmm., a capillary tube marked to contain exactly 5 cmm., a glass stirrer, a lancet needle, &c. The dilution employed is 1 to 200. The number of corpuscles in 10 squares is counted, and this multiplied by 10,000 gives the number in a cubic millimeter. The above dilution and squares are so arranged that normal blood presents 50 corpuscles per square, or 100 in 2 squares; and by counting 10 squares so as to get the average for two, the percentage of corpuscles to that of health is evident, and may be compared with the percentage of hæmoglobin as ascertained by Sir Wm. R. Gowers' hæmoglobino-meter, *v.p.* 866.

If, for instance, the blood contain 80% of corpuscles and only 40% hæmoglobin, the value of each corpuscle is represented by the fraction $\frac{1}{2}$. Sometimes in pernicious anemia the corpuscles sink below the amount of hæmoglobin, and there may be 30% of corpuscles and 40% of hæmoglobin, in which case the value of the corpuscle is $\frac{1}{3}$. The corpuscles having settled, and the percentage ascertained, the objective may be raised so that the corpuscles are somewhat out of focus, the leucocytes then appear as bright points, in consequence of their greater refraction, and their number may be counted. Sir Wm. R. Gowers prefers this method to that of staining, *v.p.* 868.

The Thoma-Zeiss instrument consists of micrometer slide divided into 16 squares, each square again divided into 16 smaller squares. It has two pipettes, one for diluting the blood 1 to 100 and 1 to 200 for counting the red corpuscles, the other is intended for estimation of the leucocytes, and dilutes the blood 10 or 20 times. The number of red corpuscles seen in 4, 6, or if greater accuracy is required, 16 (larger) squares, i.e., in 64, 96 or 256 smaller squares, is counted. To ascertain the number of Red Corpuscles in 1 cmm. of blood, knowing the volume of the cube standing on each small square to be $\frac{1}{10000}$ cmm., multiply the total number of red corpuscles counted by 4,000 times the number of times of dilution of the blood and divide the result by the number of small squares in which red corpuscles have been counted. It is always desirable to have an assistant to note the numbers observed, and to count the corpuscles touching and overlapping the two adjacent boundary lines on the left upper corners of the squares, but those on or overlapping the other two sides are excluded to compensate.

The normal dilution is 1 to 200; in polyemia 1 to 400; and in excessive anemia to 100 may be used. 5 or 6 corpuscles per square are a convenient number for counting.

The Thoma-Zeiss cell is $\frac{1}{2}$ mm. deep, and each side of a small square is $\frac{1}{10}$ mm., hence the above figure $\frac{1}{10000}$ cmm. as the volume of a small square.

The fluid used for diluting in both the above instruments is Sir Wm. R. Gowers' Hæmacytometer Solution:—Sodium Sulphate 104 grains, Acetic acid 1 drachm, Distilled Water 4 ounces. Filter.

Hayem's Solution is also employed. Sodium Chloride 2, Sodium Sulphate 5, Ferric Perchloride 0.5, Water 200.

Correction of Error with formulae.—B.M.J.E. i./08, 12.

Edington's Hæmacytometer Solution.—Sodium Citrate (neutral) 5 Gm. Formalin (10% Commercial) 2.0 Cc. Dahlia (Methyl Violet), 0.03 Gm. Chloroform 5 drops, Distilled Water 250 Cc. Mix the stain with the water, then add the Sodium Citrate and the Formalin. Has the advantage that in less than

1 minute, all the corpuscles are deposited on the slide and in focus. The refractive index of the corpuscles is well maintained.—L. ii./o7,86.

Ehrlich's Blenden Eyepiece is stated to simplify counting either red or white corpuscles. It consists of an ordinary No. 2 eyepiece with a screen which cuts out a square from the field of vision. The number of corpuscles seen per square (average of several counts) $\times 4000 \times$ the dilution (1 in 100 or 1 in 200) gives the number per cubic mm.—L. ii./o9,1421.

Estimation of Red Corpuscles by means of the Hæmatocrite (not satisfactory for the white). This instrument consists of two graduated capillary tubes in a metal frame for inserting in a centrifuge to be revolved at high speed. The finger is pricked after cleansing with carbolic solution; the first drop of blood is rejected—this is important—and the next exuding is taken up into both tubes by capillarity; it is then centrifugalised for one minute with 10,000 revolutions. The red corpuscles having the higher sp. gr. are separated at the distal extremity of the tube. Normal blood should reach the mark 45 to 50, indicating 4,500,000 to 5,000,000 corpuscles per cubic mm. Taking the 5,000,000 as a standard, if the corpuscles reach the mark 25 this indicates a percentage by volume 50 or 2,500,000 red corpuscles per cubic mm.

The 'Color Index' is the percentage of Hæmoglobin divided by percentage of Red Corpuscles, *i.e.*, the index of corpuscular richness in Hæmoglobin.

In primary anæmia is generally high. In secondary anæmia it is generally low.

The number of Leucocytes may be estimated in a similar manner, by the Thom-Zeiss instrument, but in this case it is desirable to stain them before counting by using Gowers' diluting fluid, with an appreciable addition of Löffler's Methylene Blue, or by Toison's Solution (Dissolve Methyl Violet 5B 0.025 Gm. in a mixture of Glycerin 30 Cc. and Water 80 Cc. Dissolve separately Sodium Sulphate 8 Gm. with Sodium Chloride 1 Gm. in Water 8 Cc. Mix and filter.) Leucocytes stained violet, red corpuscles greenish. For accuracy count as many squares as possible.

A further formula for the staining fluid is Formalin 1.5, Sodium Chloride 0.5, Sodium Sulphate 2.5, Methyl Violet 0.01, Water 100.

Another method is to use an aqueous $\frac{1}{4}\%$ acetic acid solution as diluent, in this the red corpuscles become invisible while the leucocytes remain visible (Thomas Zeiss).

In Leucocytosis the number of white corpuscles may be increased from the normal 7,000 or 8,000 up to 12,000, or even to as many as 1,000,000 per cubic mm.—L. i./o3,361.

The Red Corpuscles are normally fairly uniform in size and shape, but altered in both of these in disease. The varieties of the red corpuscles are:—The normal corpuscles (erythrocytes), the small red corpuscles (microcytes), the large red corpuscles (macrocytes), the normal sized nucleated cells (normoblasts or erythroblasts), small sized nucleated cells (microblasts), large sized nucleated cells (megablasts), extra large nucleated cells (gigantoblasts), those staining irregularly (polychromatophilic), and those altered in shape (poikilocytes).

The White Corpuscles in health are composed of polymorphonuclear leucocytes 70 to 72%, small lymphocytes 22 to 25%, large mononuclear leucocytes (or large lymphocytes or hyaline cells) 1%, coarsely granular eosinophiles 2 to 4%, transitional 2 to 3%, mast- or basophile cells 0.5%. Myelocytes are present in leukaemia, but not in health.—L. i./o3,360; B.M.J. i./o3,314.

Strong and Seligman's Method. The stain is composed of Methyl Violet 0.012 Gm., Sodium Chloride 0.75 Gm., Formalin Solution 1.5 Cc. Distilled Water 100.0 Cc.

A new method of blood-counting producing permanent preparations which may be used subsequently. Eliminates ruled counting chamber and error due to variations in the depth of cells.—B.M.J. ii./o3,74.

Enumeration of leucocytes after staining by Leishman's stain (*v. infra*).—Leishman B.M.J. i./o6,680.

Leucocytes, Improved Method of Counting. To stain, a 3% sodium chloride solution deeply coloured with gentian violet is sufficient. It is simpler to count whole microscopic fields of known area rather than squares. Employing the 1 in 20 pipette, count whole microscopic field, not the squares, move the draw-tube

microscope into such position that $7\frac{1}{2}$ squares in diameter (Thoma-Zeiss scale) are in view. The cubic contents of this = $\frac{1}{125}$ Cmm. Make a mark on the draw-tube—o be used for all occasions. Count twenty fields with above dilution, and add two cyphers to the number so obtained.—B.M.J. i./05,410,576,696,914,1132.

Leucocytes.—A simple method of counting.

Draw up measured quantity of blood with capillary tube and pipette, and in the same manner 10 times as much water, mix on watch glass. Drops (all the same size) of the mixture are arranged on a slide (*s.a.*) in line. Dry slowly in the sun or before a fire, then gently agitate in a dish of water until all pigment is washed off. Examined under the microscope each spot will be seen to consist of a faint mount of debris with dark conspicuous leucocytes. They may be stained with Methylene Blue if preferred. Count the cells in several fields, using $\frac{1}{4}$ in. objective, a stiff paper obturator (pierced with ranks of 20 or more holes made by a large needle,—each, on an average with normal blood, to show 2 or 3 leucocytes per hole) is fitted in the eyepiece. If 10 films be searched thus, a good average will be obtained. Two to four fields, each from a different film, is sufficient to count as a rule. The average number per field for normal persons is noted—*i.e.*, 600 per c.m.m. A simple comparison indicates degree of leucocytosis.—B.M.J. i./09,1749.

A simple method of obtaining a preparation of living isolated, leucocytes (not necessarily for opsonic work).—L. ii./08,1746.

H. C. Ross has devised a method of determining whether leucocytes are living or dead by examining the blood on an agar film containing atropine and a stain.—L. i./09,389, B.M.J. ii./09,514.

On the Value of Blood Examination to the General Practitioner. Value of Blood Examination in treatment of Chlorosis. Fallacy of giving more iron in one week than the body contains under ordinary circumstances. Chlorosis will improve and recover without any iron at all. In chlorosis the total amount of hæmoglobin is normal even though the readings by the hæmoglobinometer may give figures below normal. A given unit of blood removed from a patient suffering from chlorosis contains less hæmoglobin than the same volume in health—this is due to the fact that in chlorosis the blood plasma is increased in quantity, and there is therefore less room in the particular volume of chlorotic blood for the number of corpuscles usually extant. Though the number of red corpuscles may by a count show as low as 3,222,000, the absolute number of same is really much greater even by as much as three times or more. And, therefore, as the total amount of hæmoglobin is normal in chlorosis, each red corpuscle will contain less hæmoglobin than normally.—the investigations of Lorrain Smith.—Batty Shaw; B.M.J. i./07,973.

Blood examinations in 30 cases of rickets showed that only 9 presented anemia, in not one of which was the number of red cells less than 4,100,000 per c.m.m. In 19 there was a slight increase in the number of white cells.—B.M.J. i./09,1177.

Volume of Blood.—Method of estimating. The principle employed was to inject into the blood stream a known amount of hæmoglobin, and then determine degree of resulting hæmoglobinæmia.—B.M.J. i./09,1357.

IN PERNICIOUS ANEMIA the red corpuscles, instead of 5,000,000 or more per c.c. min., are only 2,000,000, or even as low as 1,000,000. Hæmoglobin is also reduced, but not to an equal extent. *A very useful account of the microscopy of blood in this condition.*—B.M.J. i./09,1348 *q.v.*

Blood Staining. Smear clean coverslips with a small drop of blood to be examined, fixing with saturated Aqueous Mercuric Chloride Solution for minute, or by Alcohol 2 minutes when using Eosin and other Acid stains. Slight heat coagulation is sufficient if Eosin be not employed, *i.e.*, when only basic stain such as Gentian Violet or Methylene blue are used.

Stain by A. (i.) Five per cent. Aqueous Eosin 5 to 10 mins. stains the red corpuscles copper coloured, then

(ii.) Loeffler's Alkaline Methylene Blue for a few seconds.

or B. By the Ehrlich - Biondi - Heidenhain Stain (*v.p.* 873).

Jenner's Stain is also to be strongly recommended. It may be prepared by mixing freshly 100 Cc. 0.5% Solution of Medialinal Methylene Blue in Absolute Methyl Alcohol with 175 Cc. of a 0.5 Solution of Eosin (water soluble, yellow *de*). Filter.

Stain for five minutes, washing in *distilled water* until pink tint replaces greenish colour. Dry and mount.

Should be kept in stoppered bottles well closed, and is best recently prepared. The Methylene Blue and Eosin are said to combine, forming a chemical compound. In staining it is important to cover with a watch glass to prevent evaporation of the Methyl Alcohol.—L. i./99,370.

Blood-film spreader.—B. M. J. ii./05,1650.

Polychrome Methylene Blue also as a blood-stain.—B. M. J. i./05,402.

Romanowsky's Stain, Leishman's Modification.—There are various modes of making and supplying this stain. The following as suggested by Leishman gives the best results (the fixing and staining is done in one process so that fixing by heat is unnecessary):—

This is a solution in pure Methyl Alcohol of an Eosin-Methylene-Blue-precipitation-compound, 0.15 grammes of the compound being dissolved in 100 Cc. of Methyl Alcohol. The solution thus formed is a clear dark blue liquid, showing a green iridescence by reflected light. The Stain is used by preparing films of blood in the usual way on clean cover glasses, and allowing to dry in the air. The films should be as thin as possible. Three or four drops of the Stain are dropped on to the film and the cover glass is rotated, no attempt being made to check evaporation as in the case of Jenner's Stain. After about half a minute six or eight drops of water are added, and allowed to mix by rotating with the Stain, and staining is allowed to proceed for five minutes; in certain cases ten minutes may be necessary. The film is now washed with distilled water, and a few drops of the water are allowed to remain on it for one minute. It is finally dried without heating, mounted in Xylol Balsam and examined with an oil immersion lens. The following results are obtained:—

RED BLOOD CORPUSCLES are stained pink or greenish.

POLYMORPHONUCLEAR LEUCOCYTES red. Nuclear network blue. Extra-nuclear protoplasm colourless. Fine eosinophile granules red.

MONONUCLEARS or hyaline, or large lymphocytes.—Nuclei pale blue. Extra-nuclear protoplasm blue, occasionally showing red granules.

TRANSITIONAL.—As with large mononuclears, except that nucleus is reniform.

SMALL LYMPHOCYTES the same as mononuclears, except nuclei deeper stained.

COARSELY GRANULAR EOSINOPHILES.—Nucleus blue but not so deep. Granules pink.

BASOPHILES.—Granules deep-stained purple black. Nucleus red but usually somewhat masked by granules over-laying it.

NUCLEATED RED CELLS.—Nucleus almost black with sharp outline. Extra-nuclear portion grey.

MYELOCYTES stain pale red nuclei pale blue.

BLOOD PLATES deep red with spiky margins, often with pale blue peripheral zone.

BACILLI and MICROCOCCI blue.

MALARIAL PARASITES.—Body stains blue and its chromatin deep red.—B. M. J. i./01,635; ii./01,757 (with some slight revisions by Wyatt Wingrave embodied).

Vide also Malarial Parasites, pp. 773, 904.

A useful blood film stain is Hamalum (*q.v.*) followed by Eosin.

Leishman's Stain (Wright's Modification).—Add Methylene Blue 1 Gm. to 100 Cc. of 0.5% Sodium Bicarbonate Solution. Sterilise in a flask in a steam steriliser for one hour. Place in a large dish and add, while sterilising, enough 1 in 1,000 Eosin Solution (yellowish, soluble in water) until the mixture changes to purple and shows yellowish scum on the surface. About 500 Cc. of the Eosin Solution will be required. Collect precipitate formed and dry in an incubator without washing. When thoroughly dry, dissolve 0.3 Gm. of the powder in 100 Cc. pure Methylene Alcohol. Filter this saturated solution and add to the filtrate further 25% of Methyl Alcohol, *i.e.* to 80 Cc. add 20 Cc. It is now ready for use.

Method of use.—Pour stain on to film and stain one minute. Add water drop by drop until greenish scum forms on surface (for $\frac{1}{4}$ inch cover glass 6 to 8 drops required), stain with this further two minutes, wash in distilled water, and soak in same 2 minutes or more, until the thinner parts of film appear yellowish pink. Dry with filter paper (no heat) and mount in Xylol Balsam.

Normal Erythrocytes appear yellow or pink. In cells deficient in hæmoglobin the colour is from a pale pink with large central clear space to dirty yellow. Polychromatophilic cells bluish. Granular degeneration or basophilic degeneration shows well as small bluish dots in a pink cytoplasm. Normo-blasts have a pink cytoplasm.

and blue nucleus (in some the cytoplasm is yellowish, purplish, or bluish). Megaloblasts show blue nucleus and yellowish or bluish cytoplasm.—M.A. 1906, 139.

Leishman's Stain (Joseph's Modification).—By the method described blood films are produced similar to those colored by Leishman's Stain. The method of making the stain is clearly described, but exigencies of space prevent us abstracting. Reference should be made in the event of a 'short cut' being required.—L. ii./08, 875.

Hæmoconia.—In the intercorpuscular spaces in fresh blood films, made with aseptic precautions, moving bodies are observed of varying shapes ranging in size from a small micrococcus to a small microcyte. F. Porter has classified these into 5 groups and describes changes which take place in such a film during 6 days.

C. H. Bastian (B.M.J. i./06, 629) asked, Could bacteria be made to appear where previously they were non-existent? and was of the opinion that they could.

H. C. Ross (B.M.J. i./06, 1027, 1318) investigated the diffusion of red blood corpuscles through solid nutrient Agar incubated at 42° C. (examined microscopically the corpuscles appear as if they had been imbedded one by one). It was thought to be mechanical, with the possible exception of the blood plates, the erythrocytes alone diffuse entire through the medium.

The phenomenon, which is irrespective of gravity, may be explained by the assumption that the salts in the dried blood cause differences in electrical potential between the different layers of the Agar.—J. S. MacDonald, B.M.J. i./06, 1194.

De Korté has shown motile 'spores' in vaccine (*q.v.*) and F. C. Eve has observed motile filaments and globular bodies in certain pathological cerebro-spinal fluids.—B.M.J. ii./07, 1399.

Calcium Salts in Blood, Estimation of by Blair Bell's Calcimeter. v.p. 203.

Examination of Blood and Urine by determination of the freezing point.

Lately methods of examination have been introduced to show the excretory power of the kidneys. One important method is the determination of the molecular concentration of the specimen, by a process of "Cryoscopy." The excretory action of the kidney causes different degrees of concentration of the fluid flowing into the kidney as compared with the fluid flowing out of it. Molecular concentration influences osmotic pressure, and is independent of the nature of the substance dissolved in the fluids,—it is determined more particularly by the number of molecules dissolved in unit volume; the osmotic pressure of a liquid is proportional to its molecular concentration. We have a very easy way of measuring indirectly the changes in the molecular concentration and, therefore, in the osmotic pressure of a solution by determining the freezing point of the liquid in question. The freezing point of a solution is so much below that of distilled water as its molecular concentration is greater, and *vice versa*. Solutions with the same freezing point have the same molecular concentration and, therefore, the same osmotic pressure.

The apparatus used is the well-known Beckmann's Apparatus, consisting of a thermometer, divided into hundredths of a degree, which is situated in a tube, and in the same test tube there is arranged a stirrer made of platinum wire. The tube is then filled with about 20 to 50 Cc. of the solution to be examined, and is inserted in an outer vessel containing the freezing mixture, salt and ice. Gradually the liquid reaches the freezing point—the mercury in the thermometer falls slowly at first, and then quickly, until ice formation starts, and at this instant the mercury rises on account of the warmth which is liberated on the formation of the ice. The mercury remains at this higher point for a short time, and this point is taken as the freezing point.

Two determinations have to be made—firstly, of the liquid under consideration and secondly, distilled water. The difference between the two measures the molecular concentration or the osmotic pressure of the liquid. For the purposes of comparison it is obviously necessary to determine the molecular concentration of the blood and of the urine. The value for the blood (which is commonly denominated "delta"), both in the case of man and animals, is fairly constant—namely, about 0.56°; on the other hand, the value for the urine is somewhere about 1 to 2°. It is obvious that any disturbance of the function of the kidneys would make itself evident in these figures—the molecular concentration of the blood

would increase, and that of the urine would decrease. A heightening of the molecular concentration of the blood above the normal by the storage up of decomposition products is very often a valuable sign of insufficient kidney activity—in short, of so-called kidney inefficiency.—From “*Pathologie des Harnes*,” Blumenthal.

Urine testing by Cryoscopy.—B.M.J. i./06,1063; L. ii./06,1286.

The objection is the large volume of blood necessary. Sir A. E. Wright's method consists in determining the salt content of a fluid, *e.g.*, urine, by a comparison of the hemolyzing power of such urine with the hemolyzing power of varying strengths of decinormal salt solution—L. ii./05,1164; i./07,975.

Blood Pressure is determined by some form of the Riva Rocci Sphygmomanometer, *e.g.*, that of Lockhart Mummery.

Directions are supplied with the instruments. Another modification of the Riva Rocci Sphygmomanometer is that of C. J. Martin, which is now the leading instrument for the purpose.

The *Hæmomanometer* of Oliver (Registered) is another form. In this instrument the recorder is constructed on the principle of the ‘Compressed Air Manometer,’ for many years employed in measuring the hydrostatic pressure of gases, the pressure of the gas being equilibrated by the compression of the air contained in a closed tube beyond the indicator, which is thus manometrically balanced between the two compressions. A glass tube 8 or more inches in length and having a capillary bore, has a bulb at its upper end and a smaller bulb at its lower, where it is bent up to receive a rubber tube. Just above the lower bulb the bore is contracted; the tube is mounted on a strip of wood, through the lower end of which a pin, fixed to the sides of the box, passes, so that the tube may be raised from the horizontal position to a vertical one, before and after an observation. The indicator contains a few drops of absolute alcohol, coloured with blue, which does not stain the glass. Should it be allowed to dry up, it is quickly dissolved by adding a few drops of alcohol. The compressor consists of a strong canvas bag adherent to two small boards (12×18 cm.), through which a strong rapid screw passes.

The *Armet* is more portable and more adaptable to the shape of the limb than those now in use (*vide* Studies in Blood Pressure, 2nd Edition, by Geo. Oliver, M.D.).

The advantages of this compressed air manometer with spirit index, are sensitiveness, horizontal scale, avoidance of leakage, index free from inertia, and much more rapid and responsive than mercurial manometers. Description in review of Oliver's Book.—L. i./07,1300.

Barnard & Hill's Instrument.—B.M.J. i./07,1253.

The *hæmomanometer* is valuable as giving a record of the contraction and relaxation of the arterial wall rather than of the blood pressure. L. i./09,451.

Evolution of *Manometers* of Stephen Hales, Poiseuille, Ludwig, von Basch, Potain, Gaertner's tonometer, Riva Rocci, and Hill and Barnard's, C. J. Martin's and Oliver's Modification of, *vide* L. ii./08,1126; B.M.J. ii./09,64.

For Blood Pressure, see also p. 468.

Viscosity of the Blood is determined by aid of the Viscosimeter (Du Pre Denning and Watson).

Electrical Conductivity of the Blood.—The ‘hæmo-renal salt index’ is the ratio of the electrical resistance of the blood to that of the urine. In health the figure would be 3, 4, or 5, thus—

$$\frac{\text{Electrical Resistance of Blood, } e.g.,}{\text{Electrical Resistance of Urine,}} = \frac{900}{225} = 4.$$

The higher the figure (other things being equal) the healthier the patient.—B.M.J. ii./06,1873.

If the index increases it indicates that the blood contains fewer salts or is richer in corpuscles and that the urine contains more salts and the functional activity of the kidney is increasing. The method is of value in surgical affections of the kidney where one kidney is chiefly affected, where there is a question as to its removal.—B.M.J. ii./08,719; L. ii./08,733.

Coagulation time of the Blood. Capillary tubes 6 inches long with internal diameter 1½ mm. are filled the moment the blood flows from the

finger on incision. On breaking the tube (and the column of blood) fibrin formation indicates coagulation point—the time taken is noted, *e.g.*, 7 to 11 minutes in case of the author's blood. The variation in temperature of the room is negligible.—*B.M.J.* ii./07, 1580.

Another method, and simpler, is to drop the blood from a broken capillary tube on to a glass plate. Seal the fractured end of the tube and use the sealed as a rod to dip from time to time into the drop of blood. Ultimately a fine thread of fibrin will be drawn up—this is the coagulation point; the time can be ascertained to a second.—*B.M.J.* ii./07, 1774. *C.f.* also p. 203.

The value of the estimation is confirmed. There is lessened coagulability in hæmophilia. The prophylactic use of lime salts or serum injections before operations on bleeders is advised.—*L.* ii./09, 34.

Cerebro-Spinal Fluid.

Centrifugalized or allow to stand for any sediment to deposit.

Examine sediment for Leucocytes and Bacteria.

Leucocytes indicate an acute process, *e.g.*, septic.

Lymphocytes in excess—a chronic process such as tabes; tubercular meningitis, &c.

Red corpuscles when intact indicate hæmorrhage of meninges.

If the fluid be clear test for Globulin by mixing equal volumes of Cerebro-Spinal Fluid and Saturated Solution of Ammonium Acetate,—precipitate in 3 to 10 minutes = Globulin.

Make Culture for Bacteria.

Hæmatoxylin Test Solution, U.S. 0·2% Hæmatoxylin, $C_{16}H_{14}O_6 + 3H_2O = 353·48$ (356·16 I. Wt.), in alcohol. About 5 drops for a titration. Assumes yellow to orange colour in acid solution and violet to purple in alkaline. The titration is complete when the change in colour remains permanent on adding 1 drop of volumetric solution after stirring.

Ehrlich - Biondi Stain. *Syn.* **EBELICH-BIONDI-HEIDENHAIN MIXTURE, EBELICH'S TRIPLE STAIN.**

This nuclear stain is prepared by dissolving separately Methyl Green 1 Gm. in water 200 Cc., Acid Fuchsin 1 Gm. in water 80 Cc., Orange G. 4 gm. in water 400 Cc., and mixing afterwards. The stain is then ready for use; it is *not* to be further diluted. Sections should be allowed to stain from 6 to 24 hours. Dehydration is effected with Alcohol, and the sections are cleared with Xylol, and mounted in Xylol Balsam. Slides stained 2 to 10 minutes by this process show:—

ERYTHROCYTES, orange. NEUTROPHILE POLYMORPHONUCLEAR GRANULERS, violet. NEUTROPHILE MYELOCYTES, violet. ACIDOPHILE GRANULES OF THE POLYMORPHONUCLEAR CELLS, brick red. BASOPHILES, not stained. LYMPHOCYTES. Nuclei, pale greenish blue. Cytoplasm, faint pink or grey. In disease the nuclei of the erythroblasts are greenish black. This triple stain should be distinguished from—

Ehrlich's Triacid Stain.

Orange G. saturated aqueous solution 12, Acid Fuchsin saturated aqueous solution 8, Methyl Green saturated aqueous solution 10, water 30, absolute Alcohol 18, Glycerin 5.

The former of these two stains is the more used. The Triacid Stain appears to be more powerful, but is perhaps less delicate.

Ehrlich's Hæmatoxylin Solution.

Dissolve Hæmatoxylin 1·5 gm. in Alcohol Absolute 100 Cc., and mix the solution with 100 Cc. of saturated solution of Ammonia Alum in water to which has been added Glacial Acetic Acid 5 Cc. and Glycerin 100 Cc.

Ehrlich's Acidophilous Mixture consists of Eosin 1, Indulin 1, Aurantia 1 in Glycerin 15.

Grenacher's Alum Carmine. Carmine 1, Alum 5, water 100. A small amount of Phenol may be added to preserve. For nuclei and muscle staining.

Grenacher's Hæmatoxylin Solution.

Dissolve Ammonia Alum 45 in water 430. Dissolve separately Hæmatoxylin 2·4 in Absolute Alcohol 12. Mix and allow to stand 14 days. Filter and add Glycerin 66 and Alcohol 90% 75 Cc.

Delafield's Hæmatoxylin Solution is similar.

Mayer's Borax Carmine. This solution is prepared by boiling Alcohol 70% with Carmine and Borax in excess, and filtering after cooling.

Mayer's Carmalum.—Carmine 2, Alum 5, boil 1 hour with water 10 filter.

Mayer's Hæmalum.—Hæmatein [$C_{16}H_{12}O_6 = 297.84$ (300.096 I. Wts.)] dissolved in Alcohol absolute 50. Mix this solution with one of Alum 50, water 1,000.

Mayer's Acid Hæmalum consists of the above, with 2% Acetic Acid added.

Mayer's Hæmatoxylin or Kleinenberg's Hæmatoxylin Solution. To a saturated 70% Alcohol Solution of Alum and Calcium Chloride, dilute with 8 times the amount of Alcohol of the same strength, is added Alcoholic Solution of Hæmatoxylin, until the characteristic violet colour is produced.

Mayer's Paracarmine.—Carminic Acid 1, Aluminium Chloride 0.5, Calcium Chloride 4, in Alcohol 70% 100.

Mayer's Picrocarmine.—Saturated Picric Acid solution is added to solution of Carmine 8 Gm., in 100 Cc. of Ammonia until a precipitate commences to form.

Perenyi's Solution (Hardening Reagent).—Dissolve chromic acid 0.15 Gm. in water 30 Cc. and add alcohol 30 Cc. and nitric acid (10%) 40 Cc. Employed for fixing plant and animal preparations.

Picro-Nigrosin (Martinotti's).—An aqueous saturated solution of picric acid and nigrosin.

Picro-Sulphuric Acid (Kleinenberg-Mayer).—According to Mayer a saturated solution of picric acid in 2% sulphuric acid, containing a few drops of creosote in the finished product. For use dilute 3 times. According to Kleinenberg 3% of sulphuric acid is employed. In use 1 Cc. of the filtered solution is diluted further with 3 Cc. of water.

Van Gieson's Stain. Saturated aqueous Acid Fuchsin solution 2, saturated Picric Acid solution 100.

Chlorides in Urine.

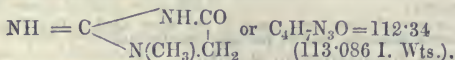
Instead of evaporating and incinerating with ammonium nitrate, oxidise the organic matter contained in 10 to 20 Cc. urine with potassium permanganate *q.s.*, and sulphuric acid 2 Cc., warm, then neutralise with potash in presence of litmus paper. Dilute to 50 Cc. with water, add potassium chromate and titrate with silver nitrate as usual.—Allen, P.J., ii./04,8.

Chyluria.

Opacity due to passage of chyle—the milk-white fluid absorbed by the lacteals during digestion. Thought to be caused by disordered condition of the lacteals, and is also connected with presence of filariæ. Note on a case.—L.i./07,733.

Creatinine.

Glycocoll-Methyl-Guanidin.



To test for the presence of this body add a little Sodium Nitro-Prusside and Caustic Soda. A red colour develops which fades on boiling the mixture. If a little Acetic Acid be added to the boiling liquid, Prussian Blue is produced.

Retarding effect of Creatinine, Creatine and Mucin on the precipitation of Cuprous Oxide from Fehling's Solution. Urates have auxiliary effect.—L. ii./06,1136; ii./07,290.

[The red colour produced with Jaffe's Colorimetric Method of estimating Creatinine is due to the reduction of the picric acid in alkaline solution to a mixture of amido-dinitro-phenol (picramic acid) and diamido-nitro-phenol the alkaline salts of which are deeply coloured. The colouration is due to the somewhat complex reducing action and the conditions must be carefully specified. Temperature and time are important.—*Vide* Chapman, Int. Cong.]

In determining Creatin or Creatinine add 30 Cc. of 1.2% Picric Acid Solution. It is advisable to allow to stand 5 minutes after adding the reagents, then react with result.—Cook. *ibid.*]

Cystin.

$(\text{CH}_3-\text{C}(\text{NH}_2)_2-\text{CO}(\text{OH}))_2=238.5(240.276 \text{ I.Wts.})$.

Cystin is a cleavage product of protein-metabolism, apparently loosely bound and easily split off at an early period of the intestinal digestion. Normally it becomes oxidised and hence is unrecognisable, but in cystinuria it is excreted unchanged.

Separation of Cystin. Free from oxalates and phosphates by Ammonia and subsequent addition of Calcium Chloride until this no longer precipitates, add equal volume of Acetone and Acetic Acid in slight excess. Cystin crystallises out in 3 or 4 days, and may be purified by dissolving in Ammonia and reprecipitating.—Mann, p. 61.

Is occasionally found in urinary deposits as transparent six-sided crystals—insoluble in alcohol but soluble with ease in mineral acids, caustic alkalis and ammonia. Uric acid occasionally crystallises in similar form, but gives the murexide reaction; Cystin does not.

Recent research on some problems of urinary excretion.—L. i./06, 674.

Cystin Calculi two cases.—B.M.J. i./07, 489.

Garrod on Cystinuria.—L. ii./08, 142, 214. These lectures should be consulted by those desirous of the latest information on the subject.

Glucose Tests.

The maximum quantity of reducing sugars normal to urine is from 0.025 to 0.15%. 0.25% Glucose is easily detected by Fehling's Solution.—L. ii./06, 1136 *et seq.*

Alimentary Glycosuria occurs when the limit of assimilation for the individual is reached. Braul gave 200 Gm. of grape sugar to a man and examined the urine during the succeeding 4 hours. When at rest he excreted 2.14 Gm., when at work 0.09 Gm.—Mann.

Phloridzin Glycosuria. This was first observed by Mering who, by giving 1 Gm. of Phloridzin night and morning, produced the daily excretion of nearly 100 Gm. of glucose in the urine. In phloridzin glucosuria there is no increase of glucose in the blood. According to one hypothesis the phloridzin is split up in the kidneys into sugar, and phloretin, *vide ibid* p. 74 for further consideration of the subject. Also our own pages 240, 718.

Renal Glucosuria is due to an abnormal excretion of the sugar normally present in the blood.

In **pathological glycosuria** the sugar may be formed in the system from other carbohydrates, but also from alimentary and systemic proteins and fats. Much discussion has arisen on this subject. Some claim that sugar cannot be derived from proteins containing no preformed carbohydrate molecule; for a full consideration of the matter, however, *vide ibid* p. 77 *et seq.*

Diabetic and non-diabetic glycosuria, i.e., the dangerous disease diabetes in which oxybutyric acid (*q.v.*, p. 859) and its derivatives are passed, designated 'composite diabetes,' and in which coma may set in; and the relatively harmless alimentary glycosuria have to be distinguished.—B.M.J. i./03, 667; L. i./06, 776. Significance of small quantities of sugar.—B.M.J. i./06, 126.

DELICACY OF VARIOUS TESTS:—

Fehling's Solution	will indicate	...	...	...	0.0008%
Trommer's	"	"	...	...	0.0025%
Nylander's	"	"	...	...	0.025%
Fermentation	"	"	...	...	0.1 to 0.5%
Phenylhydrazine	"	"	...	...	0.025 to 0.05%
Polarimeter	"	"	...	...	0.025 to 0.05%

B.M.J. i./07, 1472, *q.v.*,

Fehling's Solution, Potassio - Cupric Tartrate Solution (Off.).

Glucose being an aldehyde has strong reducing action. In the test the alkaline glucose-cupric oxide when heated causes deposition of the cuprous oxide. 1 molecule of Glucose reduces as near as possible 5 molecules of Cupric Oxide.—Mann.

In making use of Fehling's Solution it is important when looking for small quantities of sugar to dilute the urine to about Sp. Gr. 1.015. Mix with an equal volume of Fehling's Solution. Boil for a few seconds—if no precipitate within two minutes there is no sugar of pathological import. For Life Insurance purposes the Alkaline Safranin test (*q.v.*) deserves to come more into use.—L. i./06,1136, *et seq.*, *vide* also B.M.J. i./07,1471.

Fehling's Solution is prepared in two solutions:—No. 1. Cupric Sulphate 34.64, Sulphuric Acid 0.5, Distilled Water to 500.

No. 2. Sodium Hydroxide 77, Sodium Potassium Tartrate 176, Distilled Water to 500.

Mix equal volumes when required. Of this, 10 Cc. will be decolourised and reduced by 0.05 Gm. (or 53 minims = $\frac{1}{4}$ grain) of glucose or diabetic sugar in solution, with precipitation of yellowish red cuprous oxide, when the two are boiled together. No. 2 solution should not be kept in a very cold place, or it may crystallise. By keeping the copper solution separate from the alkaline solution the test is prevented from becoming erroneously sensitive.

A curve or chart is arranged showing proportion of Glucose when working with 30 minims of Fehling's Solution. 'Mass' action explains the deposition of the Suboxide in bright red as distinct from the yellow condition.—L. i./09,680. *Vide* also our table for figures using Gerrard's Fehling Solution. The figures there given apply exactly as if 10 Cc. of 'Fehling's' had been used in place of the Gerrard's Solution.

A little Calcium Carbonate or Barium Sulphate greatly assists the deposition of the cuprous oxide and enables the colour of the supernatant liquid to be more easily seen.

Uric Acid and urates, theine and theobromine have no retarding influence on the precipitation of Fehling's Solution.—L. ii./06,1136.

Cupric Pellets,—the salts of Fehling's Solution are prepared compressed into tablets.

The Fehling's Reagent Tablets made by Merck are directed to be used as follows:—

Dissolve 1 copper and 1 alkali tablet in 2.5 Cc. water, heat to boiling, and add 2 Cc. of urine and boil 1 minute. After reaction has set in, denoting the presence of sugar, filter; the colour of the filtrate gives an indication of the amount of sugar. If the filtrate be yellow or brown more than 0.5% present, if it is green or blue there is less, the test is then repeated. If the urine contains more than 0.5% 1 Cc. of it is added to the boiling test solution. If there is evidently less than 0.5% 4 Cc. of urine are added. The colour of the filtrate is an indication for repeating again, as now it has been ascertained whether the urine contains over or under 0.25 and 1% respectively of sugar. A pale green colour of the filtrate is taken as the end point. The result is usually obtainable by three or four tests. If there is a high percentage of sugar dilute the water with 1 to 10 to ensure greater accuracy.

0.5 Cc. of actual urine employed = 2% sugar.

1	"	"	"	"	1	"
2	"	"	"	"	0.5	"
3	"	"	"	"	0.33	"
4	"	"	"	"	0.25	"
5	"	"	"	"	0.20	"
7	"	"	"	"	0.15	"
10	"	"	"	"	0.1	"

Glass Capsules, containing about 1 Cc. of Fehling's Solution, are also prepared.

Glycuronic Acid $C_6H_{10}O_7 = 192.62$ (194.01 I. Wts.), Uric Acid, Creatinine, **pyrocatechin** (*see* p. 709), **Hydroquinone** (*see* p. 709), **Salicylic Acid Compounds**, Chloral, Chloroform and similar bodies reduce Copper Solutions, these may be removed by simple repeated filtration through animal charcoal. None of these bodies ferment or give **Osazone Crystals**. (*vide* Phenylhydrazin, p. 879).

Glycuronic Acid is closely allied to the Pentoses. It conjugates with **phenol**, **doxyl** and **skatoxyl**, and normally occurs chiefly as **phenolglycuronic acid** combination with potassium.—Mann, p.87; Detection of, 100.

Glycuronic Acid can be distinguished from **Glucose** by fermentation and by phenylhydrazin tests.—L. ii./06,1136.

Creatinin to extent of 3 mgr. per Cc. may be present in normal urine.—L. i./06,779.

Creatinin most markedly of all substances interferes with **Fehling's test**—it holds the otherwise precipitable **Cuprous Oxide** in solution not directly by producing **Ammonia** as Pavy thinks.—L. i./08,85. *Cf.* also M.J. i./07,1472.

"**Fehling**" is reduced by dextrose, levulose, mannitose, milk sugar, galactose, arabinose, aldehyde, chloral, chloroform, valeraldehyde, resorcinol, pyrogallie acid, gallotannic acid, trichloroacetic acid, arsenious anhydride, and similar reducing-bodies, glucosides, and acetone.

"**Fehling**" is not reduced by mannite, dulcite, sucrose, inosite, cellulose, dextrin, cabin, alcohol, glycerin, phenol, benzaldehyde, salicylaldehyde, acetic, lactic, galic, succinic, tartaric, citric, gallic, saccharic, mucic, gluconic, lactonic, benzoic, glycolic, and sulphurous acids, and alkaloids.—Allen's Urine Analysis.

Ammoniated Cupric Test (Pavy).

Tartarated Soda, and Caustic Potash, of each 178 grains.

Distilled water	q.s.
Dissolve and add in aqueous solution	
Copper Sulphate	36½ grains.
When cold add	
Strong Solution of Ammonia, sp. gr. 0.88	6 ounces.
Distilled Water	to 1 pint.

This solution is not hyper-sensitive. **Ammonia** is a solvent for the cuprous oxide, but it does not interfere with the reduction of the oxide in sugar testing. 10 Cc. of the solution further diluted are kept boiling in a flask, air being excluded, while the urine *q.s.* is added to discharge the colour; this solution is one-tenth the strength of Fehling's solution, 10 Cc. of it are equivalent to 0.005 Gm. Glucose.

Glass Capsules containing 10 Cc. of this solution are prepared.

Fehling's Test, Allen's modification.—For small quantities of sugar in urine. Heat 8 Cc. of the urine to boiling point and add 5 Cc. of the copper solution, cool and add 2 Cc. saturated solution of sodium acetate, slightly acidified with acetic acid, to complete precipitation of uric acid, phosphates, and xanthine. Filter, add 5 Cc. of the alkaline solution, and boil for a few seconds. If more than 0.25 per cent. of sugar be present, cuprous oxide is precipitated before boiling point is reached, but if less than this proportion, it is deposited during cooling.—Analyst, xix. 178; P.J.ii./95,307.

Pavy-Fehling Solution.

Copper Sulphate	34.65 Gm.
Potassium Sodium Tartrate	170.00 Gm.
Caustic Potash	170.00 Gm.
Distilled Water	to 1 litre.

Pavy states that more **Caustic Alkali** is necessary than in the ordinary Fehling's Solution.—L. ii./07,363.

Haines' Modified Method, in one solution: Copper Sulphate 3 Gm., Caustic Potash 9 Gm., Glycerin 100 Gm., Water 600 Cc.—P.J. ii./97,57.

Another modification consists in doing away with the Tartrate altogether. **Ammonium-Cupric Sulphate** is used instead of ordinary Sulphate of Copper.—L. i./07,1638.

Barfoed's Reagent.—Neutral Copper Acetate (*q.v.*) 13·3, Acetic Acid solution (1 per cent.) 200. A Glucose solution warmed with a small quantity of this precipitates Cuprous Oxide.

Fermentation Test.—A useful confirmatory test. Prior to conducting, determine the specific gravity of the urine as exactly as possible. Then fill a Doremus tube completely with the specimen; place a little fresh yeast in the bend; keep in a moderately warm position for 24 hours. If sugar be present, carbon dioxide will be produced, and the gravity of the urine will fall—each degree of density lost being equivalent approximately to 1 grain of glucose per ounce. Is stated to be untrustworthy for small quantities.—*L. ii./06, 1136, et seq.*

⑩ Gerrard's Solution.

This is prepared by diluting 100 Cc. mixed Fehling Solution with about 300 Cc. of water and almost decolourising, whilst boiling, with 5% solution of Potassium Cyanide (about 63 Cc. are required), and making up the volume when cold to 500 Cc.

For the Estimation of Sugar by this Process.—Mix 50 Cc. of the solution with 10 Cc. of mixed Fehling's Solution (5 Cc. Fehling's No. 1, and 5 Cc. Fehling's No. 2). Boil in a basin and pour into it, whilst boiling, diluted urine, $\frac{1}{2}$ to 1 Cc. at a time by means of a burette, until the blue colouration just disappears, taking care not to add an excess. An average diabetic urine may be diluted 1 with water to 10.

The calculation is then simple—as in the case of the Fehling method:—

The number of Cc. of actual undiluted urine used contains 0·05 Gm. of Glucose. From this the "percentage"—grammes per 100 Cc.—is easily obtained. To convert this into grains per fl. oz. multiply by 4·375. This quotient multiplied by 20 gives the number of grains of Glucose per pint. The following table will be found useful:—

	No. of Cc. of diluted Urine used.					No. of Cc. of diluted Urine used.			
	Gm. Sugar per 100 Cc.	Grains per fl. oz.	Grains per pint.			Gm. Sugar per 100 Cc.	Grains per fl. oz.	Grains per pint.	
Urine diluted 1 with Water to 10.	4·0	12·5	54·69	1093·80	Urine diluted 1 with Water to 2.	3·0	3·30	14·45	289·00
	4·5	11·1	48·56	971·20		3·5	2·90	12·70	254·00
	5·0	10·0	43·75	875·00		4·0	2·50	10·95	219·00
	5·5	9·1	39·86	797·20		4·5	2·20	9·64	192·80
	6·0	8·3	36·35	727·00		5·0	2·00	8·76	175·20
	6·5	7·7	33·73	674·60		5·5	1·80	7·88	157·60
	7·0	7·1	31·10	622·00		6·0	1·70	7·45	149·00
	7·5	6·7	29·35	587·00		6·5	1·50	6·57	131·40
	8·0	6·3	27·29	551·80		7·0	1·40	6·13	122·60
	8·5	5·9	25·84	517·80		7·5	1·30	5·69	113·80
	9·0	5·6	24·97	499·40		8·0	1·25	5·49	108·80
	9·5	5·3	23·21	464·20		8·5	1·18	5·17	103·40
	10·0	5·0	21·90	438·00		9·0	1·11	4·86	97·40
	10·5	4·8	21·02	420·40		9·5	1·05	4·60	92·00
	11·0	4·5	19·71	394·20		10·0	1·00	4·38	87·60
	11·5	4·3	18·83	376·60		10·5	0·95	4·15	83·00
	12·0	4·2	18·40	368·00		11·0	0·91	3·96	79·20
	12·5	4·0	17·52	350·40		11·5	0·87	3·81	76·20
	13·0	3·8	16·61	332·20		12·0	0·83	3·64	72·80
	13·5	3·7	16·21	325·20		12·5	0·80	3·50	70·00
	14·0	3·6	15·77	314·40		13·0	0·77	3·37	67·40
	14·5	3·4	14·86	297·20		13·5	0·74	3·24	64·80
						14·0	0·71	3·11	62·20
						14·5	0·69	3·00	61·80
						15·0	0·67	3·00	60·00

For less quantities of sugar a stronger dilution is recommended. The ur columns on the right on the previous page give the results with the urine diluted with an equal volume of water. If the urine contains less sugar than this, it is desirable to use the urine in an undiluted condition. The calculation is then as before: the number of Cc. of actual urine used contain 0.05 Gm. of Glucose.

Gowers' Test for roughly estimating glucose:—

Dilute with an equal volume of Liquor Potassæ, this makes all urine pale enough to prevent important error in such a rough test. Boil the upper half well it not too long—a lemon tint corresponds to about 5 grains per fluid ounce, a pale cherry to 10 grains, a dark cherry to 15 grains, and a port wine tint to 20 grains and upwards.—*vide* Branton on "Diabetes," Reynolds' System of Medicine, Vol. i., 1879, p. 396.

The method can be made quantitative.—L. i./07, 1416. Gowers' note on.—L. i./07, 1673.

For Bang's Test.

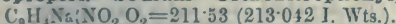
This consists of a copper sulphate solution with an excess of potassium carbonate. Potassium sulphocyanide in excess is further added to keep the copper oxide colourless combination in solution.

Dissolve potassium carbonate 500 Gm., potassium sulphocyanide 400 Gm., potassium bicarbonate 100 Gm., in water, with heat to 1,200 Cc. After cooling add copper sulphate 25 Gm. dissolved in water, and make up to 2 litres. Separately dissolve Hydroxylamine sulphate 6.55 Gm., potassium sulphocyanide 200 Gm. in water, *q.s.* to 2 litres. 1 Cc. of the hydroxylamine solution is equivalent to 1 Cc. of the copper solution. For further details *vide* XIIIth Edn. p. 957 or—M. J. E. i./07, 57.

It gives good results with pure sugar solutions but not with urines.—J. C. S. A. 08, 902.

Johnson's Test.—See Picric Acid, p. 880.

Inditropropiol. Sodium Orthonitrophenylpropiolate.



Has long been used for detection of sugar in diabetic urine. Owing to reduction, indigo blue colour is produced, or indigo-blue itself precipitated. Tablets are prepared. This re-action is based upon Bayer's synthesis of indigo-blue (*q.v.*), which is briefly:—Cinnamic Acid \rightarrow Orthonitrocinnamic Acid \rightarrow Dibrom compound \rightarrow Orthonitrophenylpropionic Acid, which, warmed with alkali, decomposes as:— $2\text{C}_9\text{H}_5(\text{NO}_2\text{O}_2)=\text{C}_{18}\text{H}_{10}\text{N}_2\text{O}_2$ (Indigo Blue) + $2\text{CO}_2 + \text{O}_2$. This substance is to be distinguished from Sodium phenyl-propiolate (*Syn. Thermiol*), *v.p.* 30.

For testing permeability of the kidney with Indigo-carmin, *v.p.* 250.

Solution of Sodium o-Nitrophenylpropiolate is employed of following composition: Place 5 Gm of o-nitrophenyl-propionic acid in a mortar and wash alternately with 1 to 2 Cc. of water and 1 to 2 Cc. of 10% Sodium acetate Solution until dissolved (altogether about 8 to 10 Cc. required). Dilute to 1 litre. On boiling 5 Cc. with 1 Cc. of Urine blue colour of indigo appears either immediately or in $\frac{1}{2}$ minute according to amount of glucose.—08, 116.

Flander's Reagent.

Bismuth Subnitrate 2, Rochelle Salt 4, Sodium Hydroxide Solution (8%) 100, and Almen's re-agent consisting of Bismuth Subnitrate 1, Rochelle Salt 2, Sodium Hydroxide Solution (35% strength) 50, are used for detecting Glucose. A small quantity of either warmed with the urine will blacken if glucose be present.

Phenyl-hydrazine Hydrochloride, $\text{C}_6\text{H}_5\text{NH.NH}_2\text{HCl}=143.53 \text{ (144.552 I. Wts.)}$, is used as a test for sugar. It is in colourless, shining, crystalline scales; and should be free from azo-compounds. A small quantity is warmed with twice its weight of sodium acetate in solution, an equal volume of the suspected solution added, and boiled for 20 minutes. On cooling, yellow crystals of phenyl-glucosazone, $\text{C}_{12}\text{H}_{16}\text{O}_4 \text{ (N}_2\text{R.C}_6\text{H}_5)_2=355.68 \text{ (358.216 I. Wts.)}$, are deposited if sugar be present.—B. M. J. i./10, 453, 454; L. II./04, 211, 329, 564.

This substance should be handled with care as it may produce eczema.—Brit. J1. Dermatology, Aug. 1905.

Boil 2 to 3 Cc. of the urine with equal quantity of water and phenylhydrazine hydrochloride 0.1 Gm. and Sodium Acetate 0.5 Gm. Add 10 Cc. of Sodium Hydrate 10% solution, invert test tube a few times and allow to stand. A pink to red colour of the whole liquid in 5 minutes indicates sugar of clinical significance.—B.M.J. ii./07,19.

(Acetyl-Phenylhydrazin. *Syn.* Pyrodin, Hydracetin. *Dose.*— $\frac{1}{2}$ to 3 grains in antipyretic and analgesic. 10% ointment in parasitic skin diseases.)

Picric Acid. JOHNSON'S or BRAUN'S TEST. This has been suggested as a test for Glucose in urine, as a solution of this sugar, if boiled with Picric Acid and Solution of Potash, reduces the yellow Picric Acid to the deep red Picramic Acid, $C_6H_2(NO_2)_3OH + 9H_2 = C_6H_2(NH_2)_3OH + 6H_2O = 138.16$ (159.102 I. Wts.) forming Potassium Picramate (M.W. 175.99) 177.194 I. Wts.), the depth of colour depending on the amount of sugar. By the aid of Johnson's Picro-Saccharimeter this reaction is made a quantitative test.

Solution for use with same: Strong Solution of Ferric Acetate (B.P.'85) 15 drachms, Glacial Acetic Acid 7 $\frac{1}{2}$ ounces, Ammonia Solution 0.953, 3 $\frac{3}{4}$ ounces. Water to 3 pints.

Safranine Solution.—1 in 1,000. One volume of this, with one of urine and one of liquor potassæ is heated to boiling, avoiding agitation. If the urine contain sugar to the extent of 0.1% the liquid will be decolourised. Each additional volume of the safranine solution that may be decolourised represents roughly 0.1% of sugar.—L. i./95,314.

Safranine Solution (unlike Fehling's Solution) is unaffected by Creatine, Creatinine, Uric Acid and Urates. The test deserves to be better known.—L. ii./c6,1138. It is only slowly affected by albumin.

For estimation of glucose by polarisation see Mann, p. 109.

Bromo-Methyl Furfural Test.—Pour 5 Cc. of the liquid on to an excess of solid anhydrous calcium chloride so as to form a semi-solid, or pasty, mass. Add to this 10 Cc. of toluene containing two or three drops of phosphorus tribromide and then carefully boil the mixture for a few minutes, bearing in mind the inflammable nature of toluene. Pour off the toluene solution, and, after cooling, add to it about 1 Cc. of malonic ester and a little alcohol. On neutralising the mixture by adding alcoholic potash drop by drop, a characteristic pink colour will usually be observed. The mixture is now considerably diluted with alcohol and a few drops of water, when, if sugar was originally present, the solution will exhibit a beautiful blue fluorescence.—L. i./07,215.

Alkaptonuria (rare), due to presence of Di-oxyphenyl-acetic Acid $C_6H_3(OH)_2CH_2.COOH = 166.8$ (168.064 I. Wts.). Urine reduces Fehling's Solution, and turns brown with alkali. See also Mann (p. 213) *q.v.* also for oohronosis (p. 215) and melanuria (p. 217).

A case.—L. i./07,660. Of 31 cases of alkaptonuria 15 were in children of first cousin marriages.—Garrod, L. ii./08,5.

Laevulose reduces Fehling's Solution, ferments with yeast, forms an osazone with Phenylhydrazin like glucosazone. *Vide* also Org. Anal. Chart. Exceptionally found in urine alone—more commonly with dextrose. For details of causes, effects and cases see Mann. For detection *vide ibid*, p. 97.

For Lactose, Maltose and Isomaltose, Pentose and Heptose in the urine *vide ibid*.

Pentose.

Bial's Test.—Orcin $\frac{1}{2}$ Gm. in 500 Cc. of 30% Hydrochloric Acid containing 20 drops of Liquor Ferri Sesquichloridi.

Method of use.—4 Cc. are heated in a test tube to boiling—then add not exceeding 1 Cc. of the specimen. If pentose present, green colour either at once or shortly. Glycuronic Acid does not interfere.—Mann.

Glycerin.

Glycerin in the urine is claimed to be indicative of pancreatic disease, and to result from the decomposition of fat. For the method of detection, which depends on the formation of crystals with phenylhydrazin, *vide* L. i./04,783; L. i./05,14. Value of Cammidge's Test questioned. At any

rate the urine must be perfectly fresh.—B.M.J. i./06,438. Chronic pancreatitis with notes of examinations of the urine, blood and faeces by Cammidge.—L. ii./05,1824.

The pathogeny of diabetes.—(Pavy). L. i./06,1230.

If the reactions were thoroughly reliable would be of great value, enabling prompt diagnosis of pancreatic affections from malignant disease of bile duct—however, *sub judice*.—B.M.J. ii./07,9.

Value of Cammidge's Reaction in diagnosis. The characteristic needle-shaped crystals can be obtained from the urine in pancreatitis, acute and chronic. In malignant disease they are found only in about a quarter of the cases, and in these a zone of inflammation probably surrounds the cancerous area.—B.M.J. ii./09,937.

Hippuric Acid.

Syn. Benzoyl-glycocoll, *vide* p. 5.

Hippuric Acid is excreted daily to extent of about 0.5 to 1 Gm. on mixed diet, or it may reach 2 or 3 Gm. on vegetarian diet. It is formed by interaction of dehydrated Benzoic Acid and Glycocoll in the system. Protein in the intestines produces amino-acids which are oxidised to benzoic acid. Glycocoll is a normal product of metabolism, and by this reaction renders the benzoic acid (*inter alia*) harmless,—this occurs, it is thought, in the kidneys.

1 of the free acid in 55,000 of water will change Congo red paper to blue, but urine does not cause the change,—showing that the Hippuric Acid that is present is in the combined condition.

For several theories to explain the fact that the amount of Glycocoll requisite to remove Benzoic Acid is apparently insufficient in the system for the purpose, *e.g.*, as result of consumption of large quantities of vegetable food, consult Mann.

Indican.

Indican, Potassium Indoxyl Sulphate, $C_8H_7NSO_4$, $R=249.39$ (251.228 I. Wts.), may be detected by **Ehrlich's Test**: a Solution of 0.33 Gm. of Dimethylamidobenzaldehyde in water and strong Hydrochloric Acid of each 50 Cc.

Boil the urine with an equal quantity of this solution. Cool and render alkaline with Ammonia or weak Potash Solution. If Indican be present a red colour results.

Jaffe's Test.—Indican may also be detected by adding to the specimen an equal volume of strong Hydrochloric Acid, and adding drop by drop concentrated Liquor Calcis Chlorinata; blue colouration, due to Indigo, if Indican present, which may be taken up by shaking with Chloroform. If shaken with Ether this solvent will dissolve the Indigo-red.

Care must be taken not to use too much of the bleaching liquid or the indigo blue may be changed to indigo white.—B.M.J. ii./08,867.

The addition of hydrochloric acid and shaking with Chloroform in cases of persons treated with Iodides is almost certain to give violet colour; add a crystal of sodium hyposulphite to prevent confusion.—L. ii./06,1459.

Indol.—In faeces. Dimethylamidobenzaldehyde is test for. Centralblatt für Bacteriologie.—XL. Bd. 1905, Heft. 1.

Indoxyl. $C_8H_7(NH)OH=132.1$ (133.066 I. Wts.).

Add an equal volume of hydrochloric acid. Shake and add a drop or two of sodium hypochlorite solution. Blue colour appearing indicates presence. May be shaken into a small quantity of chloroform to render more evident.

For further information on Indoxyl bodies consult Mann (p. 202), Skatoxyl (p. 209), Urosein (p. 210).

Nitrogen.

The quantity in Urine is approximately 0.9% as an average—(90% of this is in the form of urea).

Determination.—Heat 25 Cc. in porcelain basin with 10 Cc. of strong Sulphuric Acid until volume reduced to about 10 Cc. Finally, add about 5 Gm. of Potas-

sium Sulphate to the residue in a flask in inclined position with small funnel in neck to act as condenser. Heat until colourless; cool and add very cautiously 20 Cc. water drop by drop, and introduce with utmost care a strong solution of Caustic Soda to alkalinity, for Kjeldahl method by distillation into a known quantity of Standard Acid and ultimate back-titration with alkali, or to near neutralisation by this modified method. Make up volume to 100 Cc.; take of this 10 Cc. = 2.5 Cc. of original urine, and treat this quantity with Hypobromite in a Doremus or other form of Urea Apparatus.

In this way 24 Cc. of moist Nitrogen = approx. 0.028 Gm. Nitrogen or
 = 0.034 „ Ammonia
 = 0.06 „ Urea.

Ammonia

In urine may be estimated by distillation and Nesslerisation of the distillate or by aid of Volumetric Acid, as above.

The average amount of total ammonia in urine is 0.30% by weight.

Ammonia excretion varies during 24 hours—it is greatest during the night. Bodily exercise by producing acids increases output as also does consumption of fat (usually seen after interval of 1 to 2 days).

In fevers, malignant disease, diseases of the liver, ammonia is increased. In pernicious anemia the amount may be considerably above or it may be rather below the average.

Distillation as a preliminary to estimation is best conducted *in vacuo* to prevent risk of decomposing the urea and thus causing error in result.—For details, *vide* Mann, p. 31.

Schlösing's Method of Estimating is simple, but according to Mann gives results rather too low. The specimen must be fresh. A bell glass is placed over a ground glass plate and the juncture rendered air-tight with a little grease. 10 Cc. of Decinormal Acid are placed in a shallow dish in the chamber and 20 Cc. of the specimen with an equal volume of milk of lime, supported above (as near as possible, *e.g.*, with a wire triangle). Allow to stand 48 hours, and estimate the free acid remaining—the combined acid indicating the amount of NH_3 liberated by the urine.

Malfatti's Method, using the formation of hexamethylene-tetramine from formaldehyde and ammonium salts, is favoured:—

Add to urine 25 Cc., in a 250 Cc. conical flask water 50 Cc., and 4 drops of alcoholic phenolphthalein solution 1%. N/10 sodium hydrate solution is added to neutralization which also gives the amount of acidity. 5 Cc. of 40% Formalin, neutral to phenolphthalein, is added and the titration continued until the pink colour reappears. From the number of Cc. used in the second titration the amount of nitrogen present as ammonia in the twenty hours' urine can be readily calculated. Better colour changes are stated to be obtained if 15 Gm. of potassium oxalate is added to the urine two minutes before titrating. The results obtained by this method are usually somewhat too high.—B.M.J. i./09, 715.

It has been pointed out that there is a marked increase in the proportion of Ammonia to total Nitrogen—it may rise from the normal proportion 3 to 5%, up to even 45%, of the total Nitrogen—in women suffering from pernicious toxæmia. Vomiting of pregnancy indicates the existence of a serious toxæmia, which, if permitted to continue, will be found to be accompanied by lesions of the liver and other organs inconsistent with life. A coefficient of 10%, according to the author, is a danger signal.—L. ii./05, 1172; B.M.J. i./07, 316.

If in the course of a case of diabetes, late in which disease the diurnal excretion of urea is usually increased, there is a drop in the quantity excreted and a corresponding rise in the ammonia salts, this is an evil omen—probably a warning of acid intoxication and therefore of coma.—L. i./07, 784.

Peptones. See Albumoses.

Phosphates in Urine.

(Mean content is 0.15 to 0.2% P_2O_5 .)

These are estimated by means of a Standard Uranium Nitrate Solution, prepared by dissolving 35 Gm. of the Nitrate in 900 Cc. of water, and standardising it against 50 Cc. of a solution of 5.042 Gm. of pure Sodium Phosphate (*Off.*) in 1 litre of water: 5 Cc. of a solution of Sodium

Acetate 100 Gm., with 100 Cc. of Acetic Acid in water *q.s.* to 1 litre is added, both in standardising and in the estimation of the sample of urine. A few small crystals of Potassium Ferrocyanide on a white tile serve as an indicator, the Uranium Nitrate Solution being added to the *hot* Standard Phosphate Solution (or the specimen) until a drop removed by the aid of a rod commences to cause a brownish precipitate with them. This amount of the Uranium Nitrate Solution corresponds to 0.05 Gm. P_2O_5 . The solution may either be diluted so that 10 Cc. shall be equivalent to this quantity (1 Cc. of the Uranium Solution = 0.005 Gm. P_2O_5), or better, its strength may be noted and verified from time to time; 50 Cc. of the Urine is the quantity taken for examination, the conditions being the same as above.

Or the Phosphate Solution may be run into the Uranium—the end reaction being clearer, the disappearance of the brown colour is said to be more easily visible than its formation.—P.J. ii./04,9.

Organically Combined Phosphorus is in addition present in urine. The daily average is stated to be 11 to 28 mgr. About $\frac{1}{3}$ of the total ingested Phosphorus is excreted by the bowels.

Lime taken in large amount, either apart or in food, causes the Phosphoric Acid in the urine to diminish—(insoluble) Calcium Salts being excreted in the faeces.

The excretion of Phosphoric Acid is increased by the ingestion of small quantities of *Nucleinic Acid*. On a fixed diet for 2 periods of 8 days the N : P_2O_5 quotient, during one of the periods without Nucleinic Acid was 5.12 to 1, whilst in the other in which Nucleinic Acid was given, the proportion was 3.7 to 1. (The normal is about 5 or 6 to 1. P_2O_5 is not furnished by ordinary proteins but by tissues rich in nuclein.) But administration of (Mineral) Metaphosphoric Acid did not give a P_2O_5 increase in the urine corresponding to the amount given.

In human milk the combined P is 41.5% of the total it contains; in cow's milk it is only 6%. N to P_2O_5 in the former is 3.3 to 1 and in the latter 2.3 to 1, yet the urine of the child at the breast gave ratio 7 : 1, whilst when fed by hand it was 1.7 : 1, i.e., organically combined phosphorus is retained. Organically combined phosphorus in the urine is probably derived from metabolism of the nuclein containing tissues and not influenced by ingestion of food rich in nuclein—feeding experiments confirm this.—Mann.

q.s. Also for causes of increase and decrease of Phosphoric Acid in the urine in disease.

Purins.

Of the known Purin bodies, Xanthin, Hypoxanthin, Adenin, Guanin, Caffeine, Theobromine, are met with in food, and Uric Acid, Xanthin, and traces of Methylxanthin are found in urine.

They all contain the grouping C_5N_4 —Xanthin is dioxypurin, Uric Acid is trioxypurin. Uric Acid is in the largest proportion of the purins—about 10 to 1 of the others.

There is no special therapeutic effect in a purin-free diet.—B.M.J. ii./07,1759.

A purinometer has been designed for estimating. Full directions are supplied with the apparatus.—L. i./03,899; ii./03,171; B.M.J. i./06,300.

Purin in human faeces.—Walker Hall, B.M.J. ii./03,583; i./04,819.

Further directions for using the purinometer, with tables.—B.M.J. i./06,129.

Solutions for use:—

SOLUTION No. 1.—Ludwig's Magnesium Mixture 100 Cc., Ammonia (20%) 100 Cc., Calc. in fine powder 10 Gm.

SOLUTION No. 2.—Silver Nitrate 1 Gm., Ammonia Solution (strong) 100 Cc., Calc. in fine powder 5 Gm., Distilled Water 100 Cc.

(Both Solutions require vigorous shaking before use.)

Ludwig's Mixture consists of Magnesium Chloride (crystalline) 110 Gm., Ammonia Solution 250 Gm., Ammonium Chloride 110 Gm., Water 1 litre.

Sulphuric Acid.

Total Sulphuric Acid.—Dilute 50 Cc. of specimen with equal volume of water, add 10 Cc. HCl. Heat to nearly boiling, add Barium Chloride Solution in excess. Allow to stand on water bath for an hour or two. Collect wash and weigh.



$$233.44 = 98.086 \text{ (I. Wts.)}.$$

Ethereal Sulphates, Estimation of, —SALKOWSKI'S METHOD.

Add to 100 Cc. of specimen an equal volume of a solution composed of Saturated Barium Hydroxide Solution 2 and Saturated Barium Chloride Solution 1, allow to stand a short time, filter. Add HCl in strong excess to 100 Cc. of filtrate (representing 50 Cc. of the specimen). Heat to nearly 100°C . Collect precipitate thrown out and weigh. This gives the amount of ethereal sulphates. If subtracted from the amount of total Sulphuric Acid, the proportion of Sulphuric Acid is obtained.

The Ethereal Sulphates normally found represent $\frac{1}{3}$ of the total sulphates. Partially derived from tissues, the greater part are due to protein decomposition in the intestine—hence their increase in disease brought about by putrefaction and obstruction—or in foul empyemata or gangrene of internal organs. —Pharmacol, p. 56.

Urea in Urine, Estimation of.

Average 2.5 to 3%, or about (in health) 500 grains (33 Gm.) per diem; it may range between 15 and 40 Gm. The majority of methods are based on the decomposition of Urea into nitrogen, carbon dioxide, and water when treated with sodium hypobromite. The carbon dioxide is absorbed by the excess of alkali present, and the nitrogen can be measured, from which, on reference to tables, the percentage can be found—theoretically 1 Cc. of nitrogen at 0°C . = 0.0027 Gm. approximately of Urea. In the process about 8% of the total nitrogen is suppressed, but the increase in volume of the gas due to the room temperature (taken as 18°C .) and the vapour tension (the gas being measured moist) has been found to almost exactly compensate for this loss in practice.

For Sodium Hypobromite Solution, v.p. 635.

A little Glucose added to a urine increases the evolution by preventing a secondary reaction—formation of Cyanates and Nitrates—but, as indicated above, this is compensated for.—B.M.J. i./03, 194, 288, 341, 403.

Patients treated with Urotropine pass urine which gives orange precipitate with Bromine water. If due to albumin, however, does not dissolve on warming.—L. ii./06, 1459.

The Doremus form of Ureometer is graduated on the one side in decimal parts of a Gm. of Urea obtained from the 1 Cc. of Urine operated upon, and on the other, the figures 5, 10, 15, and intermediate ones indicate grains of Urea per fluid ounce.

With the Victoria Ureometer (an improvement on the old Doremus) no pipette is required, as the urine is added through a tap at the side.

Importance of estimating urea in disease. In renal disease maintenance of normal relation between intake and output of nitrogen is essential. This is far more important than testing for albumin. The gouty patient should have the urea estimated continuously to indicate progress of metabolism. The ordinary person lying in bed will on an average, unless there be some special interference with metabolism, pass urine containing a solution of urea of strength not less than 1.4%.—B.M.J. ii./08, 1498; L. ii./08, 1426.

If there is less urea to excrete the quantity of urine is lessened, not the strength of the solution.

See also Nitrogen p. 881.

Uric Acid in Urine, Estimation of.

Luff expressed the opinion that Uric Acid possesses no toxic properties whatever, —L. ii./05, 1864.

Uric Acid, $\text{C}_5\text{H}_4\text{N}_4\text{O}_3 = 166.95$ (168.072 I. Wts.), when pure is in white crystals, very slightly soluble in water, insoluble in alcohol and ether.

Heated to dryness on a water bath, with a little Nitric Acid or Potassium Chlorate and Hydrochloric Acid in a white dish, cooled, and a little Ammonia solution carefully added gives red colour.—The Murexide Reaction.

(Mean Content 0.05 to 0.06%) **Hopkins' Method.** To 100 Cc. of sample add about 30 Gm. Ammonium Chloride in powder, dissolve as completely as possible, or a small quantity may remain undissolved, add a little ammonia to neutralise and allow to stand 10 minutes. Filter off the precipitated Acid Ammonium Urate, wash with saturated Ammonium Sulphate solution* and rinse off the precipitate from the filter with water to 100 Cc. Add 20 Cc. Concentrated Sulphuric Acid to raise temperature of the liquid to about 60°C., or, if necessary, warm to that temp. Titrate with $N/_{20}$ Potassium Permanganate (1.578 Gm. in 1 litre), taking as end-reaction the point at which the Permanganate ceases to be instantly decolorised. Each Cc. of the Permanganate Solution = 0.00375 Gm. Uric Acid.

The Gowland-Hopkins' method is as above to *, then proceed as follows:—Wash off the precipitate into a small beaker with a jet of hot water, add a little hydrochloric acid, and heat to just boiling. Allow to stand two hours in the cold. Collect the separated Uric Acid measuring the filtrate at the same time, for which an allowance of 1 mg. must be added on to the final result for every 15 Cc.; it need not exceed 20 to 30 Cc. Wash the uric acid crystals with a little distilled water, rinse off the filter with hot water, warm with sodium carbonate till dissolved and make up with water to 100 Cc. Add 20 Cc. Sulphuric Acid and titrate with Permanganate as above, adding slowly towards the end of the reaction, the finish being the first appearance of a pink colour which is permanent for an appreciable interval. Previously the disappearance of the colour is instantaneous.—P.J. i./99, 266.

The acid Ammonium Urate may also be decomposed by means of Hypobromite.—L. ii./03, 471.

Uric Acid Outfits are arranged containing Glass Tubes of Concentrated Permanganate Solution to produce extemporaneously 100 Cc. of $N/_{20}$ Potassium Permanganate, and the other solutions and apparatus necessary for the entire estimation either by the Hopkins or the Gowland-Hopkins' method.

Other methods are (i.) Bartley's and the measurement of volume of Ammonium Urate in a graduated tube specially pointed; (ii.) a volumetric process, *i.e.*, Decomposition of the Ammonium Urate by a known quantity of Silver Nitrate and Titration of the Silver Nitrate, not converted into urate, quick and convenient; (iii.) the acid Ammonium Urate is decomposed by Hypobromite and the nitrogen measured.—L. i./07, 14.

Bread may be a source of Uric Acid by setting free an excess of Phosphoric Acid (0.239 Gm. per 100 Gm. of new bread) an acid which does not find any base that can neutralise it—a case supporting this—Gautier's Opinion.—L. ii./07, 87.

Acidity of Urine.

The **Acidity of Urine**, due mostly to the Sodium Acid Phosphate, is determined by titration with Decinormal Alkali using Phenolphthalein as indicator. Each Cc. of this standard solution = 0.012 Gm. of Sodium Acid Phosphate. Acidity is frequently reported in terms of the number of Cc. of this Alkali per 10 Cc. of Urine, *e.g.*, 3 Cc. = 3°. The Alkalinity may be given in similar manner.

The nitrogenous compounds in Urine, (i.) Uric Acid; (ii.) Creatinine; (iii.) Urea, may be fractionally precipitated by special reagents.—C.D. i./03, 430.

The urine of half-a-dozen individuals in health was found by us to have the following 'degrees' of acidity—0.8°, 0.9°, 0.9°, 4.4°, 5.5°, 7.2°.

It was noticeable that this gradation did not correspond with the acidity as shown by delicate litmus paper—on the contrary, the two with 0.9° were distinctly different.

The acidity of the urine, according to Joulie, is dependent on the 'acidity' of the blood (due to acid phosphates). *Cf.* Sodium Sesquiphosphate.

Sodium Bi-urate. $C_5H_3NaN_4O_3 = 183.83$ (19.0064 I.Wts.) May be prepared by neutralising Uric Acid with Sodium Carbonate. Various opinions as to whether the crystals are the cause or effect of the inflammation in arthritis.—M.P. i./07, 363.

A **Portable Urine Test Case** is arranged, containing the apparatus and reagents for the qualitative and approximate quantitative examination of urine for albumin, glucose and urea.—B.M.J. ii./99, 1556; L. ii./99, 1005.

A separate **Urea Apparatus** is also arranged.—C.D. ii./01, 835.

WATER ANALYSIS NOTES (*Chemical*).

Work in an atmosphere ammonia-free. The sample of Water should be received in a 'chemically clean' Winchester quart-stoppered bottle, and dated. Note Physical Characters, smell, taste, sediment, and colour in a 3 feet tube.

Total Solids are ascertained by evaporating 100 Cc. in a platinum crucible on water-bath, the result being expressed in parts per million. The quantity being determined, it is essential that the amount of volatile and non-volatile matter should be determined, or, in other words, the amount of organic and inorganic solids, or those that will disappear on ignition and those that will not. Also notice the appearance on ignition, i.e., charring (indicating organic matter), fuming, scintillation &c.

Oxygen absorbed.—Warm $\frac{1}{2}$ litre of the sample about 20 minutes in a flask with 1 Gm. $\text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$ acidified with dilute Sulphuric Acid, then back-titrate with $\frac{N}{10}$ Potassium Permanganate.

Free and Albuminoid Ammonia.—Prepare some water NH_3 free, by acidulating some good tap water with Sulphuric Acid, about 2 drops of a 1 in 3 solution to a litre of water and distilling. By so doing (the retort and condenser being chemically clean) even the first drop of distillate is Ammonia-free. Distillation may proceed, but must not be pushed too far. The distillate should be Nesslerised to verify its purity. Distil 500 Cc. of sample in a boiling flask with rubber cork to connect with condenser. Nesslerise each 50 Cc. of distillate with standard NH_4Cl of which 1 Cc. = 0.01 mg. NH_3 . Add together the equivalent quantities of NH_3 , and double the result to arrive at number of mgrs. of Free Ammonia per litre = parts per million. Stop distilling and add 50 Cc. of a solution of 0.4 Gm. Potassium Permanganate and 10 Gm. Potassium Hydrate which has been freshly boiled 20 minutes. Distil again and Nesslerise the Albuminoid Ammonia in 50 Cc. of the distillate at a time until it is NH_3 free. Add the equivalents together and double as above for parts per million.

Wanklyn divides waters into the following:—

Class I. Of extraordinary purity, yielding from 0.00 to 0.05 parts per million of Albuminoid Ammonia, which cannot be objected to organically. Class II. The general drinking waters of this country, containing 0.05 to 0.10 parts Albuminoid Ammonia per million—this amount may be considered safe organically. Class III. Dirty waters, yielding more than 0.10 parts of Albuminoid Ammonia per million.

© Nessler's Reagent for Ammonia (*Off.*).—*Syn.*

SOLUTION OF POTASSIO-MERCURIC IODIDE.

Dissolve Potassium Iodide 7 and Mercuric Chloride 2½, in Distilled Water 160. To this add more of the Mercuric Chloride in solution until the precipitate no longer disappears on well stirring, and a slight permanent precipitate remains. Then add Sodium Hydroxide 2½, dissolve, add a little more solution of Mercuric Chloride and Distilled Water *q.s.* to 200.

On the addition of this test to ammonia or an ammonium salt in solution, it lets fall a brown precipitate of Oxy-di-Mercuric-ammonium Iodide.

Chlorine. Titrate 100 Cc. in a white basin with standard AgNO_3 of which 1 Cc. = 1 mgrm. of Chlorine, using potassium chromate as indicator. The reagents must be Cl-free and the water must not have an acid reaction. The average content is about 2 parts per 100,000, though frequently one finds a content of 5 to 15 parts per 100,000. It should be remembered that urine and sewage are, comparatively speaking, highly charged with chlorine—this enables the analyst to determine whether a high albuminoid Ammonia content is attributable to sewage or vegetable influence. *Per contra* almost entire absence of chlorides, coupled with excess of Albuminoid Ammonia, and little free Ammonia suggests vegetable contamination of a dangerous character. One frequently obtains waters for examination with an exceedingly high Cl-content in conjunction with an almost total absence of organic impurity. Such waters, though 'saline,' are suitable for drinking purposes.

Nitrites. To 100 Cc. of the sample add a weak, slightly acidulated, colourless solution of Meta-phenylenediamine. Nitrites give an amber to mahogany colour according to the amount. Conduct a control experiment.

Nitrates. The test employed is to mix 1 part of saturated solution of a Brucine Salt with 3 parts of the specimen, and to 'layer' beneath this carefully 1 part of pure Sulphuric Acid—a pink colouration indicates their presence.

Total Hardness.—To 100 Cc. of specimen add the least amount of soap solution (standardised so that 1 Cc.=1 mgrm. Calcium Carbonate or its equivalent) that will give a lather which will have an unbroken surface at the end of 5 minutes. 1 Cc. of the soap solution must be deducted from the amount required, as 100 Cc. of Distilled Water would require 1 Cc. to furnish a lather. The number of Cc. of soap solution required gives the number of mgrm. of Calcium Carbonate in the 100 Cc. of the specimen or the parts per 100,000.

Standard Soap Solution for the above determination:—Dissolve 10 Gm. of B.P. Hard Soap in 1 litre Alcohol 30%. 1 Cc. of this solution will contain soap approximately equivalent to 1 mgr. CaCO_3 . To standardise to this equivalent dissolve 1 Gm. Powdered Marble or Calcium Carbonate in slight excess of Hydrochloric Acid, evaporate to dryness and redissolve in distilled Water, *q.s.* to 1 litre. Take, say, 12 Cc. of this solution, add Water to 100 Cc., and then Soap Solution, *q.s.* to form lather as above. Adjust the Soap Solution until 13 Cc. are required. (100 Cc. of distilled water alone would consume approximately 1 Cc. of the Soap Solution in forming a lather.) We find London tap water varies between 15° and 17°.

Poisonous Metals.—Concentrate the water 5 times after acidulating with two drops of Hydrochloric Acid. Add Ammonium Sulphhydrate solution. A darkening indicates Pb, Cu, or Fe, but not Zn. This darkened water should be divided into two parts. To one add Hydrochloric Acid—if darkness goes Fe is present. To the other portion add Potassium Cyanide Solution. If darkness goes now the metal is Cu; if it does not, it must be Pb. This latter proceeding is, of course, only necessary when the darkness does not go with Hydrochloric Acid. Confirmatory tests should always be employed. The confirmatory test for Fe and Cu is, to some original concentrated water in a test tube add Hydrochloric Acid and Potassium Ferrocyanide; a blue results with Fe, and a bronze with Cu. For Pb the Potassium Chromate test is employed. Zn gives a white precipitate with Ammonium Sulphhydrate, and a white precipitate with Hydrochloric Acid and Potassium Ferrocyanide.

WELSH WATER.—A pure soft water acts upon zinc, *e.g.*, on galvanised kettles, in a solvent way, so as to become dangerous to health.—B.M.J. ii./05, 1674.

EXCESSIVELY PURE WATER may be solvent of lead in service water. Recommendation to harden it by adding lime.—*Id.* ii./08, 1183.

PEATY WATERS owing to acidity often dissolve lead from main pipes in the form of lead hydrogen carbonate. On standing or on boiling, it is thrown out with the calcium carbonate. Methods of detection and estimation.—P.J. ii. 09, 673.

LONDON WATER.—Houston.—B.M.J. ii./09, 85.

MILK ANALYSIS.

Average Chemical Composition:—

Water approx. = 87.44%. Milk fat approx. = 3.81%; Non-fatty solids, 8.75; including the following, Lactose (average 4%); Proteids (Ca casein average 3.5%); Mineral matter. Milk also contains small quantities of Citric Acid and an enzyme.

The following data are necessary to determine quality of a specimen:—

- (1) The Specific Gravity may be determined by a Specific Gravity bottle or Lactometer; the average reading is 1.031.

N.B.—Low gravity may indicate added water, or in some instances richness in fat.

- (2) To Determine Total Solids. Evaporate 5 Gm. of the specimen on a water bath in a tared platinum capsule; the residue, which should be nearly white, averages 12.5%. Board of Agriculture requires at least 11.5%.
- (3) Fat. Two determinations at least should be conducted, particularly if the figure for the non-fatty Solids is to be taken as the difference between the Fat result and that of the Total Solids. The Werner-Schmidt method is as simple and convenient as any:—

Shake the milk and place 10 Cc. of same in a Schmidt tube (graduated to 50 Cc.) and provided with a cork. Add 10 Cc. Hydrochloric acid. Heat corked 10 minutes on water-bath, shaking occasionally: then cool rapidly under water stream, when quite cold fill the tube to 50 Cc., mark with ether (pure). Insert

cork and shake vigorously 1 minute, allow to separate and read off the volume of ether. Remove 2 separate 10 Cc. and evaporate in tared dishes. Take the mean and calculate % of fat. *It must not be less than 3%.*

Cream in normal milk is about 10% varying with season, pasture, etc.

Milk that has been adulterated with water throws up its cream readily. Refrigeration of Milk prevents cream rising. Milk that has been Pasteurized will not throw up its cream at all.

Non-fatty Solids can be determined:—

By subtracting the fat content from the Total Solids. *Must not be less than 8.5%.*

Lactose, or Milk Sugar Estimation (Average content 4%).

Dilute 50 Cc. of sample with water 150 Cc., add a few drops of Acetic Acid to throw out Casein and Albumin, boil for a short time and after cooling make up to 250 Cc., finally allow to stand and filter. 5 Cc. of the filtrate represent 1 Cc. of the original milk. Into 5 test tubes marked '1' to '5' place 5 Cc. of freshly mixed Fehling Solution; dilute with an equal volume of water and add from a burette to No. '1' 3 Cc., to No. '2' 3.5 Cc., to No. '3' 4 Cc., to No. '4' 4.5 Cc., to No. '5' 5 Cc. of the above filtrate, place on a sand bath and boil for six minutes. According to the colour of the supernatant fluid in the tubes one notes whether the reduction is complete. It may be necessary to repeat the test, using intermediate quantities, e.g., 4.1, 4.3, &c., Cc. of the filtrate. The calculation is on the following lines:—

In an experiment 4.15 Cc. of the filtrate were necessary 1 Cc. of Fehling Solution = 0.00875 Gm. Lactose ∴ 4.15 Cc. Filtrate = 0.03375 Gm. Lactose, i.e.,

$$\frac{4.15}{5} \text{ Cc. Milk} = 0.03375 \text{ Gm. Lactose} \therefore 100 \text{ Cc. Milk} = \frac{0.03375 \times 5 \times 100}{4.15} = 4.07 \text{ Gm.}$$

Lactose.

Lactose Determination by Polarimeter:—

Add to 60 Cc. of the Milk 10 Cc. of a solution of Mercury in twice its weight of Nitric Acid 1.43 diluted with four times its volume of water. Make volume up to 102.4 Cc., filter. Note rotation in 200 m.m. tube,—divide by 2 and by 53 the specific rotation for lactose. Result is the amount of lactose per Cc. in the solution. Multiply by 100 to give the amount in 60 Cc.—P.J. ii./04,850.

Mineral Matter of Milk can be obtained by igniting the milk solids, and usually averages 8.3% of them.

N.B.—A dilution of normal milk with water will reduce the ash almost proportionately to quantity of water added, so the combination of a low ash and low non-fatty solids would point strongly to addition of water.

Casein Estimation (Average content 3.5%).—Dilute 20 Cc. of the sample with 300 Cc. water, and add strong acetic acid drop by drop to complete precipitation. Pass in carbon dioxide for 20 minutes, collect the casein and fat on a weighed filter paper; wash thoroughly with, firstly, alcohol, then ether to remove fat (well conducted in a Soxhlet thimble on water bath), dry and weigh.

For method of estimating proteids by Kjeldahl's process, see P.J. ii./04,851.

Milk, Cream and Butter Preservatives.—The most commonly occurring are:—Salt, Sodium Bicarbonate, Boric Acid, Formalin, Hydrogen Peroxide, and Glycerin.

The Board of Agriculture in 1901 issued certain 'Sale of Milk Regulations' which require a minimum of 3% milk fat, also at least 8.5% milk solids other than fat. Skimmed or separated milk to have at least 9% milk solids.

Mr. J. Burns introduced a Pure Milk Bill in the House of Commons in May, 1909, which, owing to pressure of business was dropped for a time; ultimately (April 1910) legislation was refused on the matter. So far as London is concerned the County Council will apparently be taking some much needed steps. The Bill was intended to summarise orders by the Local Government Board, powers of Sanitary Authorities, Enactments by Borough Councils, etc. For provisions of the Bill see P.J. Supp. i./09,363; Leader on, B.M.J. i./09,1378; See also B.M.J. i./09,1451 (Provisions for Scotland).

For the legal requirements as to Butter, Cream, etc., "The Law and Chemistry of Foods and Drugs," Robinson and Cribb, (Rebman) may be consulted. Though the Local Government Board Committee, a few years ago recommended that no

preservatives should be used in Milk, but that Boric Acid (Boron Preservatives) 0.25%, might be used in Cream and 0.5% in Butter, Parliament has never yet legalised these recommendations. The position, therefore, is governed by the Sale of Food and Drugs Act, 1875-1899, but there is nothing in the Act dealing with the *exact quantities* of preservatives.

It would appear from the Act *that any food may be sold providing no false description be given, that the article is in accordance with purchaser's demand, and that no substance be incorporated so as to render the article injurious to health.* Cases brought into Court are decided on evidence.

The following are amongst the offences: Section 3 of the 1875 Act: To mix, color, stain, or powder any article of food with any ingredient or material so as to render the article *injurious to health*. Section 6, to sell any food or drug not of the nature, substance and quality demanded. (No offence is committed if the added matter is not injurious to health, but is required for its production or preparation as an article of commerce, in a state fit for carriage or consumption, etc.).

'Sale of Food and Drugs Act' 1899 (62 & 63 Vict. ch. 51).—

Section 1 virtually enacts that if there is imported into the United Kingdom any of the following articles, Margarine, Margarine-cheese, Butter-milk, Cream, Condensed, Separated or Skimmed milk, or any article of food adulterated or impoverished the importer shall be liable, unless the same articles be imported in packages or receptacles conspicuously marked with a name or description indicating that the article has been so treated.

Further Sections deal with the method of marking packages. An article of food shall be deemed to be adulterated or impoverished if it has been mixed with any other substance, or if any part of it has been abstracted so as, in either case, to affect injuriously its quality, substance or nature, but an article of food shall not be deemed to be adulterated by reason only of the addition of any preservative or coloring matter of such nature and in such quantity as not to render the article injurious to health.

Local authorities in various Boroughs issue their own regulations as to the use of preservatives,—the Borough Council of Kensington has recently issued a *ukase* that no preservatives are to be used in cream.

The Departmental Committee's Blue Book issued in 1901 and Dr. Hamill's recent report on Preservatives in Cream should be consulted.

Hamill states (C.D. ii./99, 473) that "Thickeners" such as *gelatin*, *starch-paste* and *sucrate of lime* are used for cream. Mixtures of *Boric Acid* and *Borax* mixed in such proportion so as to be neutral, are used as preservatives. *Saccharin* is used to mask insipient sourness. *Sodium Sulleylate* and *Benzoate* are also used in the hope of their being overlooked after the Boric Acid (which is allowed to the extent of 0.25%) has been detected. *Formalin* is unsuitable, *Sodium Fluoride* is used and is thought dangerous, *Hydrogen Peroxide* is also employed—100 Cc. of 3% to each gallon maintained at 120° F. in a closed vessel for 1½ hours, then 1 or 2 drops of 'Catalase' added to decompose excess of Peroxide. Dealers in 'Jug Cream' think the Boric Acid permitted is insufficient.

The "British Food Journal" provides weekly reports on prosecutions, and reports relating to the question of preservatives in foods.

Detection of Boric Acid in Milk (*to preserve, 1 in 500 is suitable*)—This, the most frequently employed preservative, is detected by evaporating at least 10 Gm. of milk to dryness, then acidify the ash slightly with dilute hydrochloric acid (to Litmus). A strip of turmeric paper is now placed in the capsule, so as to be only partly wetted by the liquid. Evaporate to dryness at 100° C.

If boron compounds are present, the part immersed in the liquid will turn brownish-red (formation of rosocyanin). On moistening with a drop of caustic soda, green and purple colours will be produced. On acidulating with hydrochloric acid, the red colour is restored, and is again changed to green and blue with excess of alkali.

The flame test is well-known. Evaporate to dryness, treat the ash with a few drops of strong sulphuric acid, and then add a little methyl alcohol, and apply a light. The alcohol will burn with green at the edges of the flame (at the moment of ignition more particularly).—Allen, Vol. 4, pp. 175 *et seq.* A further test.—B.M.J. i./99, 1216.

Toxic Symptoms.—Gas in the stomach and intestines, colic, pain in the epigastrium and diarrhoea may be caused by excessive consumption of Boric Acid.

Possible cause of increase of appendicitis.—C. Williams.

A content of 21.91 grains per lb. of cream considered injurious to children and invalids. Appeal case, Cullen v. McNair.—L.i./08,124.

Formalin.—A teaspoonful will preserve 10 gallons of Milk for 3 days in hot weather.—Pharm. Form.

Detection of Formalin in Milk.

According to Rideal, 1 part of formalin in 2,500 of milk can be detected by simply warming; but it is better to distil the milk; the distillate has the odour of formaldehyde, but the preservative is not wholly volatilised even when evaporated to dryness at 100° C. A portion of the formaldehyde forms non-volatile compounds with certain of the milk constituents. Thus in employing colour tests for formaldehyde a notably weaker reaction is obtained when milk containing formalin is distilled and the distillate tested than when water containing the same proportion of formalin is similarly treated.

O. Hehner has determined the rate of disappearance of formalin when added to milk. He found that after one week no formalin could be detected in a sample which originally contained 1 part of formalin in 100,000 parts of milk; after two weeks none could be found in the 1: 50,000 sample; while after three weeks there was only the faintest trace to be detected in the 1: 25,000 sample. The experiments were made in cool weather, and the formaldehyde was tested for by Schiff's reagent in the distillate from the milk, see also Hehner's Test *infra*.

Schiff's Reagent.—Mix 40 Cc. of a 0.5% solution of magenta with 250 Cc. of water, add 10 Cc. of sodium bisulphite solution Sp. Gr. 1.375, and then 10 Cc. of pure strong sulphuric acid; allow to stand for some time, when it will become colourless. It may also be prepared when required for use by adding sufficient of a solution of sulphurous acid to decolorise some of the magenta solution. If the sulphurous acid is added in large excess, traces of formaldehyde will not be indicated. Reddish violet colour proves presence of formalin. Other aldehydes, including aromatic aldehydes, also give this; but these would hardly be suspected.

The colour is given with milk which certainly had no formalin added,—due to the presence of a fixed aldehyde. It is better to distil as above mentioned or to use Hehner's Test, i.e. a purplish violet ring on layering milk on to strong sulphuric acid; vide also M. Reagent Verzeich, p. 60. It is, however, a group reagent for various aldehyde bodies.—Am. Jl. Ph. Aug./09,394. Alcock gives a test Y.B.P.'07, 105. c.f. also C.D. i./08,814.

Phloroglucin Test.—To 10 Cc. of the milk add 10 drops of 5% phloroglucin solution; shake and add further 15 drops Liquor Sodæ 5%. Salmon colour (not yellowish tint) indicates addition of formalin.—P.J. ii./04, 851.

The presence of Formalin 1 part in 200,000 can be detected with Hehner's Test above, also by the following modification:—

If to the distillate from a sample of milk one drop of a dilute aqueous solution of Phenol is added and the mixture poured upon some strong Sulphuric Acid in a test tube, a bright crimson ring appears.

Added to foods tends to derange metabolism. Wiley in United States investigated the effect of doses of 100-200 milligrams of Formaldehyde (given with milk) on 12 men during 15 days, the total being 2.5 Gm. to each man. Burning in throat, itching rash, retardation of Nitrogen and Sulphur metabolism, acceleration of phosphorus metabolism, and loss in bodyweight were observed. Apart from harmfulness as a milk preservative, it is inadvisable, as in dilute solution it prevents the growth of acid-forming bacteria, while not retarding many harmful organisms.—L. i./09,411.

Rimini's Test.—A most satisfactory confirmatory test, being almost specific for Formaldehyde. Phenyl-Hydrazine Hydrochloride, and Sodium Nitro-prusside followed by Solution of Sodium Hydroxide produces decided blue in presence of 1 of Formalin in 500,000 Solution.

The general public and members of the profession do not realise the extent to which milk, butter, and preserved meats are drugged with Boric Acid and other preservatives.—Pr. Feb. '09,268.

Various forms of apparatus are on the market for detecting adulteration of milk e.g. The Lactometer, Cream Tube and Lactoscope—the last mentioned detects by the optical properties of milk its adulteration with water—or removal of

cream. The Cream in 'Pure Milk' should be about 10%—it is frequently considerably more and varies with season, pasture, etc. (*c.f. antea*).

Bacteriological Standards for milk.—B.M.J. i./06, 452. For *B. tuberculosis* in milk, *v.* p. 913.

Condensed Milk should have a minimum of 32% of total milk solids, with 10% of fatty solids.

Harrison's method of estimating cane and milk sugar in Condensed milk.—Analyst xxix, pp. 243-256. See also C. D. H./09, 560.

BUTTER ANALYSIS.

Average Chemical Composition of Unadulterated Butters:—

Water 6.5 to 11.2, Curd 2.4 to 3.1, Salt 1.6 to 2.0, Fat 83.7 to 89.5%.

The following data are necessary to determine quality of a specimen.

- (i). **Estimation of Water:**—Heat 5 Gm. in an air-oven to 110° C. The loss should not exceed 17%, if more suspect careless making or intentional adulteration.
- (ii). **Estimation of Curd and Salt:**—Melt the residue of (i) and treat with 10 Cc. ether, filter through tared filter, repeat the process and wash until all ether-soluble matter is removed, dry residue and weigh; the residue consists of curd and salt.
- (iii). **Estimation of Ash:**—Ignite residue from (ii) and weigh. Should be wholly salt; confirm this by standard Silver Nitrate solution.
- (iv). **Estimation of Fat:**—Should be taken by difference by subtracting the sum of percentages of water, curd and salt from 100.
- (v). **Detection of Foreign Fats:**—Prepare some butter-fat by melting 8 Gm., pour off and filter through dry filter, being careful not to pour any of the water on to same. Saponify on a water-bath 5 Gm. of the clarified fat in a tared flask, capacity about 250 Cc. marked at 150 Cc.; add 50 Cc. Alcoholic Solution of Potash (3%) and distil off the alcohol. Dissolve the residual soap in a little hot water, add 25 Cc. Sulphuric Acid (5%) and make up with distilled water to 150 Cc. add a little pumice and capillary glass tubes and distil off 100 Cc., filter same and titrate with N_{10} NaOH (using Phenolphthalein). 5 Gm. pure butter-fat should require not less than 25 Cc. of alkali; lard, tallow, beef-fat, &c., require only about 1.5 Cc., cocoanut fat would require about 7 Cc.

Exception.

In the winter some butters require only about 21 Cc. of alkali, the sample should therefore not be condemned unless it requires less than the minimum amount.

CARBON MONOXIDE AND DIOXIDE TESTS.

Frequent deaths have recently occurred from Carbon Monoxide poisoning. Ordinary Coal Gas and Carbon Dioxide are also sources of danger.

WATER GAS and PRODUCER GAS are used for motive power of engines and for heating purposes, whereas for general lighting CARBURETTED GAS alone or CARBURETTED WATER GAS mixed with Coal Gas is used.

PRODUCER GAS is made by passing air or a mixture of air and Steam through Incandescent Coke or Anthracite Coal in a furnace generator, as in the Dowson producer. Consists of Hydrogen, Nitrogen, Marsh Gas, and CO with CO₂ as its principal impurity.

WATER GAS is made similarly, except that steam only is passed through the Coke, and the product being chiefly Carbon Monoxide and Hydrogen. $C + H_2O = CO + H_2$.

CARBURETTED GAS differs from both the above. It is made by passing Water Gas made as above over heated refractory material charged with oils rich in hydrocarbons. The volatilised benzene and benzene congeners mix with the Water Gas.

Coal Gas contains	...	...	...	...	...	6-9% CO.
Producer or Water Gas	...	...	...	...	...	25-50% "
Carburetted Gas	...	...	...	...	...	30% "

—L. ii./06, 1578, 1649 (including treatment).

The following test will indicate one part of Carbon Monoxide in 10,000 parts of atmospheric air. Even $\frac{1}{4}$ to $\frac{3}{4}\%$ of the gas is most injurious, and if inhaled for some time may be fatal (Schmidt).

10 to 20 litres of air are aspirated for about 15 or 20 minutes through 10 Cc. blood (fresh) diluted, 1 to 10 with water. The blood is then heated to the boiling point in a flask, and a current of air is passed into it which has previously passed through a solution of Palladium Chloride.* The air, which passes out of the blood is then led into bottles containing Lead Acetate Solution, diluted Sulphuric Acid, and another quantity of diluted Palladium Chloride Solution, in this order.

The presence of Carbon Monoxide in the air under examination is proved by the deposition of reduced Palladium metal in the last mentioned Palladium Chloride solution. A quantitative method on this principle is based on the fact that 106 parts of Palladium deposited are equal to 28 parts of Carbon Monoxide.

NOTE.—The blood used for the absorption of the Carbon Monoxide, as above mentioned, is to be heated immediately after the aspiration with the air under examination, and the passing of the air is to be continued three or four hours.

The gas may also be detected by the aid of the spectroscope.

Death from Carbon Monoxide due to imperfect stove.—L. i./03,258. Due to fire.—L. ii./05,1894. Carbon Monoxide is by some considered the cause of the injurious effects of tobacco smoking.—L. i./04,394.

Detection of Carbon Monoxide in the Blood.

In addition to the spectroscopic method, Kimkel's Colour Test is valuable.

Necessary are a pipette, 2 small test tubes, and a 3% Tannin Solution.—For details of method see Dix and Mann's Forensic Medicine.—B.M.J. i./05,1382.

Increase of Carbonic Oxide in illuminating gas.—L. i./04,1427.

Carbon Dioxide.—Haldane's apparatus is used for estimation in the air.

Nickel Carbonyl, causing degeneration of certain parts of the nervous system, produced three deaths.—L. i./03,269,1842. Latest examination of the compound and effects of. Iron Carbonyl is less toxic.—L. ii./07,907. Symptomatic treatment and purgation cured a case of nickel poisoning in a metal worker caused by nickel dust being absorbed.—L. i./08,40.

The poisonous symptoms are occasioned by the absorption of the nickel set free. Nickel Carbonyl poisoning is a particular case of nickel poisoning. The nickel is deposited over the immense surface of the lungs in a condition especially favourable for its absorption.—L. i./09,487. Probably as a hydrated sub-carbonate.—B.M.J. i./09,52.

Antidote.—Oxygen.

For treatment of persons who have inhaled these noxious gases, fresh air, sulphur baths, good food with Quinine and Nux Vomica, Chloroform Liniment with friction for local neuralgia and commencing neuritis.—L. i./03,337; ii./03,117.

Chlorine inhalation and taken internally employed. Early and judicious use of this (by action of Hydrochloric Acid on Potassium Chlorate) should be successful. Oxygen was unavailable in this instance (a case of coal gas poisoning from a gas bracket).—L. i./07,1155.

Interesting Experiments at the London Hospital (June 1910), on 6 students showed that Carbon Dioxide (4%) is not poisonous but injurious effects due to stagnant condition of the air and moisture.—*Fanning* the air caused resuscitation.

PTOMAINES.

Under this name are classed a number of basic substances which are produced in meat, fish, and albuminoid food undergoing putrefaction by decomposition or by bacterial metabolism. They are akin to the alkaloids, several being dangerous poisons. Hence the occasional outbreaks of ptomaine poisoning from the consumption of meat pies, fish, and the like.

Symptoms are those of gastro-intestinal irritants, but they may resemble those of Atropine poisoning. Dryness of the tongue, thirst, dilated pupils, debility, with probably rigors, offensive diarrhoea, high temperature, sickness with convulsions.

Tyrotrotoxin occurs in stale cream, cheese, milk products; causes vomiting, purging, rapid pulse, dyspnoea, depressed temperature and prostration.

*[Palladium Chloride in 3% aqueous solution. Dose.—5 to 10 minims before meals. Has been advocated for use in treatment of tuberculosis of the lungs. Said to improve appetite, and diminish the fever and coughing. Contra-indicated in nervous and neurasthenic patients.]

Antidotes.—Give emetics and Castor Oil, then stimulants. Amyl Nitrite, Strychnine, Digitalis, Caffeine, Sal Volatile, Tannic Acid, and Atropine hypodermically.

For Fish Poisoning give Potassium Chlorate or Liquor Ammoniae Acetatis; also Tinctura Capsici and Spiritus Chloroformi.

Presumed Ptomaine poisoning from tinned fish.—L. ii./03, 755, 848.

Poisoning by bad bacon treated with Calomel, and later injections of Atropine and Strychnine.—B.M.J. i./06, 258.

II.—EXAMINATION OF STOMACH CONTENTS.

An Outfit is arranged containing the necessary Reagents and Apparatus. The Reagents include Blue Litmus * Paper, Congo Red (an anilin colour turned blue by acids and red by alkali, the reverse of Litmus, indicates absence of Hydrochloric Acid in the stomach in cases of cancer, as weak Lactic Acid does not interfere), Benzopurpurin Paper, Alizarin Solution, Dimethyl-amido-azobenzol Paper and Solution (an acid and alkali indicator which is not affected by Carbon Dioxide—a 1 in 500 Alcoholic Solution of the compound is used in ordinary chemical testing), Decinormal Soda Solution, Ether, Caustic Potash Solution, Phenolphthalein Solution (Off. 1 in Alcohol 90%, 300 with Distilled Water to 500, is reddened by alkali, but is not suitable for ammonia estimation), Cupric Sulphate Solution, Lugol's Solution, Methyl Green and Methyl Violet and other Test Solutions.

The **Stomach Tube** should have bevel-edged eyes, known as "velvet eye." Van Valsah's tube is recommended by Herschell.† In this the smaller eye of the two should be on a level with and opposite the upper border of the other; this arrangement prevents possible blocking of the tube and injuring the lining of the stomach.

Glycerin Jelly, Lubricant, Aseptic, is supplied in 'collapsibles' for assisting the passage of tubes. A Glyco-gelatin Pastil of Menthol, gr. $\frac{1}{2}$, with Cocaine Hydrochloride $\frac{1}{2}$ grain, also is useful to be sucked just before passing.

Inflation of the stomach for diagnostic purposes is best carried out by the double bellows of a spray apparatus attached to a stomach tube.

Other methods of inflation are by giving first Tartaric Acid, 30 to 90 grains in water, followed immediately by 40 to 120 grains of Sodium Bicarbonate, and Auto-inflation by means of Spivate's tube.

Portions of stomach contents are removed to examine for acidity, to ascertain the presence of food, mucus or gastric secretion, when it should normally be empty; to examine test meals and to search for pus, blood and bacteria.

Dunham's Tassel consists of a little tassel of thread soaked in Dimethyl-amido-azobenzol Solution. It is attached to a thread, the patient swallows it, it is removed after an interval, and the resulting colour gives the condition of the stomach as regards free Hydrochloric Acid.

Turek's Capsule consists of a Platan Capsule, No. 00, enclosing a small rubber tube attached to a thread for withdrawing, and provided with strips of

* LITMUS is a blue pigment from *Rocella tinctoria* (*Discomyces*). LITMUS SOLUTION (B.P. Appendix).—Boil litmus 2 with alcohol 90% 8 for 1 hour, pour off clear liquid, repeat with 6 and again with 6. Digest the litmus thus washed in distilled water 20, and filter.

For titration of alkaloids, etc., with this and other indicators, v. Allen, vol. ii., part 3, 07, 137, et seq.

All CO₂ must be removed by boiling before taking end reaction. Not suitable for weak bases. Quinine, Morphine and Strychnine are neutral to it and the acids in their salts can be titrated as if base were absent.—P.J. ii./08, 194.

LACMOID chiefly Diazo-Resorcin Solution 0.2% in Dilute Alcohol.—P.J. ii./08, 194.

† Manual of Intra-gastric Technique. G. Herschell, M.D.

Congo Red, Blue Litmus and Dimethyl-amido-azobenzol papers; after swallowing and withdrawing, the resulting colours will be:—

1. If stomach contents neutral, no change in colour of any of the Papers.
2. If no free acid, but only combined acid and acid salts, the Litmus will be red and the others unaltered.
3. If there be free organic acid, but no free Hydrochloric Acid, the Congo Red will be blackish blue, but the Dimethyl-amido-azobenzol Paper will be unchanged.
4. If free Hydrochloric Acid present, all the Papers will be changed—the Litmus red, the Congo Red blue, and the Dimethyl-amido-azobenzol Paper will be red.
5. If both Hydrochloric and Lactic Acid be present, the Congo Red Paper will have a blackish tinge.

The rubber tube will contain sufficient material for microscopic examination, e.g., for the Oppler Boas Bacillus or Sarcinæ.

By means of **Einhorn's (silver) Stomach Bucket** a small quantity, about 2 Cc., may be lifted up out of the stomach and examined. By **Salzer's** method a small quantity may be pipetted out of the stomach with a stomach tube. By **Turck's Aspirator Bottle**, which is exhausted by means of a bulb, the stomach contents flow into the bottle. This is one of the simplest methods of removing stomach contents.

The **Water Test** for myasthenia consists in introducing into the stomach 300 Cc. of water first thing in the morning, fasting, and 1½ hours afterwards another 100 Cc. containing 1% of glucose. In due course a small quantity of the stomach contents are removed and the sugar estimated (p. 876, *et seq.*), from which is determined the amount of the original 300 Cc. remaining in the stomach.

Ewald's Test Breakfast consists of two or three ounces of dry bread and 10 ounces of hot water, or weak tea without milk or sugar. The Lactic Acid in bread vitiates the results where the presence of this acid is of importance, as in the early stages of cancer.

Boas's Test Breakfast (given after lavage) consists of one full tablespoonful of oatmeal to a quart of water, reduced to a pint by boiling. There are a variety of other test (meat and bread) meals.

The following are abstracts from the works of Willcox, Herschell, Martin and others:—

Chemical Examination of the gastric contents after a test meal, containing little proteid and nitrogenous bases.—Willcox, L. ii./08, 220:—

The Hydrochloric Acid in this case will be present as far as possible in the free condition (which is the point of importance in diagnosis of gastric ulcer).

I. Total Acidity. Determine whether there is active Hydrochloric Acid or a mixture of this and organic acid. Usually in chronic gastritis acidity is low. In gastric ulcer it is high. In carcinoma it is usually low. (A normal acidity does not exclude gastric carcinoma).

Litmus Paper is affected by Hydrochloric, Lactic and Butyric Acids.

Congo Red Paper. As already stated—the colour caused by organic acids will disappear on warming over spirit lamp whilst that due to Hydrochloric acid remains.

II. Hydrochloric Acid. This, according to Willcox, is either (a) free (b) combined with proteid and organic bases (i.e. physiologically active. (c) Inorganically combined, i.e., physiologically inactive.

(a) **Günzburg's test for free Hydrochloric Acid:—**

Phloroglucin 2 Gm., Vanillin 1 Gm., Alcohol 90% 30 Gm. A rose red colour formed on warming a few drops with an equal amount of the specimen in a porcelain dish indicates presence of the Acid. May also be best kept in powder form—2 parts of Phloroglucin and 1 part of Vanillin. As much as will

lie on the point of a penknife, added to a few drops of alcohol, forms a perfectly reliable solution.

This is the most trustworthy.

Response to Dimethylamidoazobenzol may be given by organic acids if these are present in large amount. The latter may be used first, followed by Gunzburg's test as confirmatory. If the test meal has been such as to give the Hydrochloric Acid the opportunity of being present in the free condition, then in normal gastric contents it will usually be present.

In *gastric ulcer* and *hyperchlorhydria* always present; in *carcinoma* scarcely ever present.

Milk is, of course, unsuitable as a test meal.

(b) **Active Hydrochloric Acid**, i.e. *Free* and combined with proteid and organic bases (normally about 0.15%).

Willcox's Modified Volhard Method.

Two equal quantities of gastric contents are taken, one rendered alkaline with soda,—both are evaporated and ignited. In one case the *Total Hydrochloric Acid*, and in the other the *Hydrochloric Acid* combined with inorganic bases only is obtained. Difference gives *Active HCl*. In *gastric ulcer* and *hyperchlorhydria* the *Active HCl* is equal to or nearly equal to the total acidity, and is usually over 0.15%. In *gastric carcinoma* the *Active HCl*, as found by Willcox, is nearly always much reduced,—always under 0.1%. In *chronic gastritis* the *Active HCl* is often below normal.

III. Organic Acid, Lactic Acid. According to Willcox *great importance* should not be attached to presence or absence of this acid. Organic Acids in considerable amount are present in *carcinoma* of the stomach, and where much fermentation is going on. By others, again, the presence of *Lactic Acid* is considered of grave importance, especially if in considerable quantity, *v. infra*.

Uffelmann's Test for Lactic Acid (—not entirely satisfactory). Ferric Chloride Solution 1 drop, Phenol 0.4 Gm., water to 50 Cc. (Delicacy limit 1: 10,000—the violet colour changes to yellow.)

An approximate estimation may be conducted as follows:—

Distil off 30 Cc. from 40 Cc. of the filtered stomach contents the total acidity of which is known. The volatile acids go over; the residue contains the *Lactic* and *Hydrochloric Acids*. The acidity of the distillate (found by titration with $\frac{N}{10}$ Soda, using Phthalein as indicator) deducted from the total acidity "A" (found by titrating 10 Cc. of the filtered stomach contents in the same manner, the result being expressed in terms of *Hydrochloric Acid*) gives the amount of *Lactic* and *Hydrochloric Acids* together. If the amount of *HCl* "H" (found in the same way as "A," but using *Dimethyl-amido-azobenzol* as indicator) be deducted from this, the remainder is *Lactic Acid*.

IV. Mucin. Important. In *gastric ulcer* and *hyperchlorhydria* usually absent. In *gastric carcinoma* a definite precipitate occurs on adding 2% *Acetic Acid*. In *simple gastritis* often present in small amount.—Willcox.

Mucus normally is stained faintly, but that met with in *chronic gastritis* deeply with *Methyl Green*.

Blood is recognised microscopically.

Ferment Activity. Determination of *Pepsin* and *pepsinogen* present is of great importance. Willcox has devised a **NEW METHOD**:—

Action on Milk by determination of the activity of the gastric juice by *Rennin* contained (usually proportionate to *Pepsin*) by using a series of tubes containing 5 Cc. of milk, to which are added gradually increased quantities of the gastric juice, and the mixtures maintained at 40° C. for 30 minutes. About 0.2 Cc. of normal gastric juice (of the adult) is required in this test.

In *gastric carcinoma* much more.

In *gastric ulcer* and *hyperchlorhydria* usually less (0.05 or less).

In certain cases it may be necessary to estimate *Renninogen*,—consult the paper.

Rennin is tested for by adding a few drops of the filtered and neutralised stomach contents to two or three Cc. of milk, and maintaining the mixture at 98° F. for a quarter of an hour, resulting coagulation indicates presence.

For testing for *Rennin Zymogen*, a small quantity of *Calcium Chloride* is added prior to incubation. A pocket incubator may be used for these experiments.

Tables in which the analytical data had been obtained are provided of cases of (1) *gastric ulcer* and *hyperchlorhydria*, (2) *gastric carcinoma*, (3) *mucous colitis*, (4) *stomach normal*, (5) *chronic gastritis*, (6) *gastric ulcer*.—L. ii./08, 220.

Digestive activity of the stomach contents (i.e., amount of Pepsin secreted) increases or diminishes with the amount of Hydrochloric Acid secreted by the mucous membrane. A number of cases of gastric carcinoma compared with cases of ulcer and functional disease showed that on the whole the greater proportion of cases evidenced a great diminution of acid secreted, as well as diminution of digestive power.—S. Martin, L. i./09,398.

Simple methods of Diagnosis in Disease of the Stomach:—

This paper differs in some particulars from the views of the previous writer.

For practical purposes, as all that is required is *whether the free Hydrochloric Acid is normal, subnormal, or excessive*, the author has devised a special tube for estimating. To the point 'A' on it a filtrate of gastric contents is introduced. A drop of mixed Phenolphthalein and Dimethylamidoazobenzol is added, then drop by drop N/10 NaOH Solution till the red colour has disappeared. The marks on the tube show whether the amount corresponds to a normal, subnormal or excessive value for free HCl. N/10 NaOH is again added till the red colour of the Phenolphthalein appears,—this gives the Total Acidity.

When there is free Hydrochloric Acid it is no use testing for Lactic Acid.

When there is normal total acidity lactic acid is rarely present, but when no free Hydrochloric Acid and total acidity is low *Lactic Acid* must be tested for. Lactic Acid denotes subacidity combined with stasis due either to pyloric obstruction or fermentation due to an ulcerating growth. These two factors occur together in carcinoma and rarely in other diseases. A well marked reaction with Uffelmann's Test (q.v.) must be obtained to be any evidence.—L. i./09 526.

In gastric ulcer, results with test meals indicated in the majority of cases excess of free Hydrochloric Acid.—L. i./09,764.

Contrary to Prof. Moore, Copeman and Hake find the physiologically active Hydrochloric Acid in mice and rats with transplanted or spontaneous tumors, is not only not diminished, but for the most part is in slight excess above the normal.—L. i./09,755.

Cancer in stomach and liver found by exploratory operation after free Hydrochloric Acid had disappeared from the gastric contents.—B.M.J. i./09,650.

Free Hydrochloric Acid is diminished in many cases of carcinoma of the stomach. In 10% of cases it is increased.—L. i./09,915.

Considerable diminution helpful in diagnosis of ? gastric carcinoma.—B.M.J. i./09,829.

The estimation of little value in early cases.—B.M.J. i./09 833.

Topfer's method of estimating Free Hydrochloric Acid criticised. Results of this paper indicated that the presence of an ulcer in the jejunum was connected with the large percentage of Free Hydrochloric Acid present in the jejunal contents.—B.M.J. i./09,1232.

Test for the products of Starch Digestion. The presence of Erythroductrin in any quantity (giving a brown colour with Lugol's Solution) one hour after a test breakfast will point to hypochlorhydria.

Gunzberg's Capsule, for testing digestive power, consists of $\frac{1}{16}$ inch of thin rubber tubing, $\frac{1}{8}$ inch in diameter, containing $1\frac{1}{2}$ gr. Potassium Iodide plugged with pledgets of Fibrin at each end.

Fermentation is examined by means of an ordinary Doremus Ureometer.

Estimation of the digestive power of the gastric juice is effected with hard boiled egg by examining for peptone after two hours or so at body temperature.

Keratin Coated Planten's Capsules (largest size), filled with Bismuth Carbonate, and **Chain Cachets** (2 inches of fine silver chain in a cachet attached to a piece of silk), are used for X Ray examination of the stomach.

Large doses of Bismuth Oxychloride are employed, c.f. p. 186.

Microscopic Examination reveals starch, sarcinae and the Oppler Boas Bacillus, present in malignant disease—this is best stained with Methylene Blue.

For Lavage, a stomach tube, funnel, and graduated jug may be used; or a three-way tap or the Leube-Rosenthal apparatus with Y tube, especially for autolavage.

Faeces, Examination of, after test meals.—L. i./06,1683.

Gastroscope—Description of the instrument, uses and results obtained with.—B.M.J. ii./09,843.

Tropaeoline OO and Methyl Orange (Helianthin) Official Solution
Methyl Orange 0.4, Alcohol (80%) 50, Water to 200, are yellow colours used for testing for the presence of free acids. The former is changed to crimson by acids, the latter to pink, but no change is produced by Carbon Dioxide, Acid Carbonates or Metallic Salts. For further details as to use as indicator in titrating alkaloïds &c., v. Allen, vol. ii., part 3, '07, 136, *et seq.*

Not suitable for organic acids (except Oxalic). 1% solution; recommended.—P.J. ii./08, 194.

Rosolic Acid, Syn. AURIN, CORALLIN.

1% in 60% Alcohol. Rose red with alkalis and yellow with acid. Remove CO₂ and not suitable in presence of NH₃.—*Ibid.*

III.—BACTERIOLOGICAL NOTES.

[A cabinet has been arranged containing the Apparatus, Stains and Solutions necessary for taking and examining Diphtheritic Scrapings, for detecting the Gonococcus in discharge, for staining Sputum for B. tuberculosis, for collecting Blood for Widal's Typhoid Reaction, for the Gram separation of Organisms, and for all other general clinical diagnoses.—B.M.J. ii./00, 332; L. ii./00, 1282.]

Acne Vulgaris.—Fleming (B.M.J. ii./09, 533) describes the bacteriology of acne vulgaris. Gram staining organisms which, when seen in pus, are arranged very irregularly, frequently inside polynuclear cells. Occur alone or together with Streptococci. For further details see Acne Vaccine or consult original paper.

Actinomycosis.

A parasitic disease, due to the 'ray fungus,' first observed in cattle (wooden tongue), characterised by chronic inflammation, with or without suppuration, frequently resulting in formation of granulation tumours, especially about the jaws. *Vide* Potassium Iodide, p. 563 for treatment.

To identify the fungus. 1. Place specimen, pus or sputum, in a flat glass dish on a black surface. Remove the characteristic yellowish particles if found, and carefully tease out on a micro-slide or cover-glass. 2. Fix film over the flame, *s.q.*

Stain by the Gram-Eosin method, v. p. 917.

The violet stained mycelium of the fungus as tangled webs or scattered filaments will be seen on a pink ground (leucocytes, epithella, &c.), with a $\frac{1}{2}$ inch or even $\frac{3}{4}$ inch objective.

The "rays" (see Muir and Ritchie, etc.) may be observed without staining, but the stained specimens are confirmatory and valuable for reference.

Primary ovarian actinomycosis, a case of. Only six cases on record. In this instance the ovary was the primary seat of infection, and hence unique.—L.I. 0, 758.

A case of actinomycosis (streptotrichosis) of the lung and liver successfully treated with vaccine. The vaccine in this instance was standardised by weight, 1 Cc. = 1 mgr. "Antimycotin." B.M.J. i./08, 551.

Anthrax.—*Bacillus Anthracis* was probably the first bacterium to be recognised inasmuch as it was associated with splenic fever as long ago as 1849. It is responsible for 'malignant pustule' in man. If an animal die suspected of the disease the mode of examination is to cut off the ear and submit the blood from the same to bacteriological examination. The organism does not spore in the body of the animal, but if the air gain access, as in the case of an ordinary post-mortem investigation, the organism spores rapidly and hence becomes a grave source of danger.

Chemistry of the Toxin.—P.J. ii./05, 331.

The organism almost invariably occurs as long filaments, particularly in broth cultures (is non-motile). It grows on all the ordinary media both at room and body temperature, and produces in gelatin 'stab' cultures, typical 'inverted fir trees' appearance. By growing at 42°C. a non-sporing form can be produced, which is the mode of attenuation for the immunisation of animals, as introduced by Pasteur. The spores retain their vitality and pathogenicity for years in the dry condition

Martin has shown that the organism produces an alkaloid which is the fever producer and an albumose which induces the coma. The malignant diseases which the organism produces in man have been satisfactorily treated by Sclavo's Serum (see p. 758), or by excision. If not diagnosed in time the organism may invade the blood stream, causing death, with symptoms of splenic fever, but the spleen is not so enlarged nor the bacilli so numerous in the organs.

Staining of the blood may be conducted by Gram's method (counterstaining with Eosin), also by Alkaline Methylene Blue.

Appendicitis.—Common intestinal parasites seem to be associated with this disease, e.g., *Ascaris lumbricoides* and *Tricocephalus dispar*. Chauvel has pointed out that appendicitis appears to be the most prevalent among meat-eaters, and notably beef-eaters. It is, on the other hand, unknown amongst Arabs or the Chinese. In religious communities in Brittany where meat is never eaten, appendicitis is unknown.

Bacteriology of.—In 70% of cases *B. Coli* was found.—B.M.J. ii./05, 898. Full account.—L. i./05, 549.

Why and how to preserve the appendix.—Keetley.—L. i./09, 1.

Beri-Beri.—This disease infests the Federated Malay States and parts of China. Its cause is not determined *vide latest refs. infra*. A coccus has been isolated resembling *Staphylococcus pyogenes albus*, claimed to be motile. A bacillus also isolated from the blood in beri-beri is found in rice, and has been cultivated on rice water. It has also been suggested that the disease is due to arsenical poisoning. It has been found that the poorly nourished are more liable to contract it than those well fed. Europeans and Sikhs escape the disease entirely. The 'arsenical,' 'rice,' 'place,' and 'acute or subacute infectious disease' theories discussed.—B.M.J. ii./05, 1287. The bed bug is apparently not responsible for beri-beri.

As to treatment, Strychnine, Arsenic, and Silver Nitrate are in repute as soon as the muscular hyperæsthesia has subsided.—Sir P. Manson, 'Manual of Tropical Disease.'

A routine which has found some favour is the following:—

Magnesium Sulphate 60 grains, Dilute Hydrochloric Acid 20 minims, Tincture of Orange 1 drachm, Infusion of Calumba to 1 ounce. Thrice daily for a week, and repeat after a few days intermission.

If much oedema, the following may be of use:—

Solution of Ammonium Acetate 1 drachm, Potassium Nitrate 10 grains, Potassium Acetate 15 grains, Camphor Water to 1 ounce. Thrice daily.

If the heart shows signs of failure, a mixture of Digitalis, Ammonium Carbonate and Compound Spirit of Æther may be used with advantage.—Brooke, 141.

A fatal case with inoculations into animals of growths from material taken at necropsy.—B.M.J. i./06, 1095.

Beri-beri is in no stage a bacteriæmia. The bacillus usually associated has not been isolated nor found to fulfil Koch's laws.—B.M.J. ii./06, 1563.

An acute infectious disease with an incubation period of 10-12 days caused by a specific organism which contaminates food, water, &c., elaborating an extra-cellular neurotoxin in the gastro-duodenal region, setting up necroses. The organism and its toxin appear to operate for 2 weeks to a month. There is marked gastro-duodenal disturbance ending in recovery or a residual paralysis. Six cases described.—B.M.J. ii./06, 1563.

Kakke Coccus (a facultative anaërobe) is stated to be specific and is described.—B.M.J.E. i./07, 96.

Comparison between chronic oxalic acid poisoning and beri-beri.—B.M.J. i./07, 709.

Experiments on monkeys suggest an infective protozoon organism eliminated in the urine by which the infection may be conveyed. Description of appearance of kidneys obtained from acute cases.—B.M.J. ii./07, 202, 1281.

The weight of opinion seemed to favour rice theory. A paper on Beri-Beri.—L. i./09, 1526.

Etiology of, if not its origin, has at least an intimate relationship with the consumption of white rice. No case among 273 people on parboiled rice. No distinctive organisms found either in blood or urine. Ankylostomes were not found as associated with the disease.—L. i./09, 451, 561. B. M. J. i./09, 1007.

Leader on Beri-Beri.—Is the disease caused by rice? Are the symptoms the result of a nitrogen starvation or due to a toxin produced in the rice by some organism.—L. i./09,1333.

Bacillus Botulinus.—This organism is found in a certain kind of meat poisoning designated 'botulismus.' An obligate anærobie, motile,—produces gas which spits up the medium in glucose agar stab cultures. Stains by Gram's method. Has terminal spores.

Bacteria of Poisoned Meat.—B. M. J. i./05,1257.

Bacillus Coli Communis. A normal inhabitant of the intestines, but becomes virulent in certain conditions. It increases the virulence of typhoid. Dried faecal matter is the cause of widespread distribution in the intestinal tract. The *Bacillus Coli* is present in an infant a few hours after birth. For further characteristics see *B. typhosus* and *Bacteriological Examination of Water*. Savage divides types of *B. coli* into groups as indicators of excretal contamination.—L. i./05,284.

Seven cases of cystitis in children shown to be caused by invasion of this organism.—B. M. J. E. ii./04,65.

Could not be found in London air. Desiccation necessary for it to gain access to the air is generally fatal to this organism.—Hewlett, L. i./09,742.

BACILLURIA occurs with great frequency. 1. Associated with passage of pus: single abscess or more widespread infection of the urinary tract. 2. Milder stage—continuous passage of the bacilli but without pus or epithelial cells. 3. Intermittent passage of the bacilli. One often finds a history of constipation and a large proportion of cases are women.

In examining urine in which pus is absent one should note 1. Pale colour, paler than one would expect from the gravity. 2. Acid reaction; often very acid. 3. The urine is hazy, not clear. Filter a little, if still cloudy, examine under the microscope: ($\frac{1}{2}$ inch oil immersion). Round bodies or short rods (the former are the bacilli 'on end'). Note mobility. Stain centrifuged deposit by Gram's method and counterstain with Carbol Fuchsin (*B. Coli* is stained by the latter). The urine should be fresh and the parts cleansed before collecting sample. Inoculate an agar tube with a large loop full—note opaque white growth after 24 hours with crenated margin. *B. Coli* isolated from the urine used to prepare vaccine.—L. ii./09, 1269.

For *Distinction and Separation from B. Typhosus* vide *B. Typhosus*.

Bacillus Diphtheriæ (Klebs-Löffler Bacillus—The latest work leads to the opinion that this organism is of the nature of a *Streptothrix*). *Directions for collecting specimens.*—If a sterile swab is not at hand (with which is now supplied a convenient tongue depressor), a small piece of absorbent cotton wool (not medicated with an antiseptic) should be steamed, e.g., at the mouth of a kettle, allowed to cool and rubbed over the membrane on the fauces of the patient and removed in a test tube or bottle which has been similarly sterilised. If possible a small portion of membrane should be detached in addition. The organism may persist for many months in nasal and aural discharges.

The organism in dry condition and in the absence of light has been shown to persist for many months, an important point to recollect in disinfection of bed linen. Moist heat destroys the organism rapidly, e.g., a temperature of 60°C. Is also very sensitive to treatment by antiseptics. Nurses in charge of patients should be examined occasionally as the organism may be present without symptoms of illness and affection by such agency should be guarded against. An injection of Antitoxin is a safeguard.

Films are prepared from the swabbing. Stain with alkaline methylene-blue or by Gram's method. Dry and mount in xylol balsam.

Recognition.—*B. diphtheriæ* may be distinguished from the other organisms which will probably be seen in large numbers by the following characteristics:—Irregularity in size and outline, straight or slightly curved, more or less clubbed at one or both ends, sometimes spindle shaped, or as curved wedges, occasionally irregularly segmented, rarely or never regular in outline. Parallel grouping and 'Chinese alphabet' characteristic. Stain irregularly. Show polar staining with methylene blue—this is the best stain to demonstrate the metachromatic granules—and Gram's method, p.p. 917. Cultivate on blood-serum—fine cream-coloured growth in sixteen to twenty hours, film from

the same stain with methylene blue, Neisser's or Gram's method. Cultivations should in all cases be made on blood-serum or glycerin agar before the result of diagnosis can be positive. Further characteristics,—no spores, non-motile. Form differs with culture medium.

Neisser's original method of staining the organism:—

Stain $\frac{1}{2}$ minute each (washing between with water) with

A. Methylene blue, 0.5 Gm.

Alcohol absolute, 10 Cc.

Distilled water, 475 Cc.

Glacial acetic acid, 25 Cc.

B. Bismarck brown, 1 Gm.

Distilled water, 500 Cc.

but altered in the length of time [which was 3 seconds with A. and 10 seconds with B. (B.M.J. i./03,587) to 2 minutes each], advocated for examining direct from the swab.—B.M.J. ii./01,758.

The use of eosine solution instead of B. above gives good results, working as follows:—

1. Make film in usual manner. 2. Stain with A. three minutes, and without washing pour on Gram's iodine solution 1 minute. 3. Wash in water and counter-stain with eosin 5% aqueous solution 3 minutes, wash dry and mount. This method was claimed to be diagnostic, but other organisms, e.g., *B. proteus* Zenkeri, *B. cyanogenus*, and various organisms found in water, give similar results. The granules are stained blue, the rest of the bacillus is stained by the counterstain.

Pugh's Stain—Toluidin Blue 1, Alcohol 20, Distilled Water 1,000, Glacial Acetic Acid 50.—L. ii./05,80.

Loeffler - Neisser method advocated.—Stain with Loeffler's Alkaline Methylene Blue (c.p. 911) 3 to 4 seconds, afterwards with B. above. Good results direct from the swab.—L. i./03,92.

Two reputed pseudo-varieties; one described by Löffler, morphologically and in all respects similar to the Klebs-Löffler organism, but non-virulent, the other by Hofmann shortly after the latter—stains more regularly than the Klebs-Löffler bacillus, and usually showed no polar staining.

Muirhead's Diphtheroid Bacillus named *B. paralyticans* stated to be the specific etiological factor in producing general paralysis and tabes dorsalis, but conclusions negatived.—L. ii./07,90.

Morphology of the bacillus varies greatly. From different individuals one may obtain (a) uniformly cylindrical bacilli with deeply staining round or oval terminal granules and the rod varying in length, or (b) very irregular in size and staining, and may be slightly curved. Further there seems to be seasonal prevalence; thus the cylindrical form, while it may prevail throughout the year appears to predominate in winter and the irregular in summer.

Pathogenicity of true Diphtheria Bacillus compared with pseudo forms.

Five Cc. of a glucose-broth culture two days old with pseudo-diphtheria bacilli are not pathogenic to guinea-pigs, whereas $\frac{1}{2}$ Cc. of a similar culture of true diphtheria bacilli usually kills in two days.

Glucose Litmus Broth cultures of true diphtheria bacilli show marked acidity in 24 hours, while those of the pseudo forms are stated not to evince this alteration of reaction. This method is useful for confirmation where no license for inoculation of animals is held.

Hiss's Serum-water modified, gives good result:—

Coagulate blood serum in an equal quantity of water, filter, add to one half 1% glucose, and to the other 1% Saccharose. Add neutral red as indicator. After 24 hours a marked acid is produced in the glucose tube by *B. diphtheriæ* in both the glucose and the saccharose tubes by *B. sclerosus* (vide infra) and no change is produced in either tube by Hofmann's Bacillus.—B.M.J. ii./09,520.

B. Paralyticans longus and *B. paralyticans brevis* have been isolated and studied.—L. ii./08,1438.

B. Xerosis occurring in xerosis conjunctivæ differs in the fact that primary cultures from the eye on blood serum first appear in 36 hours. Sub-cultures do not show this difference. The organism is non-pathogenic to guinea-pigs.

Characters. Gram + and very similar to *B. diphtheriæ*; often occurs in the throat.

Koch-Weeks bacillus, a thin, non-motile organism decolourised by Gram's method, is found in a large number of cases of conjunctivitis. A diplo-bacillus

has also been found which causes an extremely dangerous form of conjunctivitis, but it is amenable to treatment.

B. Morax-Axenfeld.—Angular conjunctivitis is the only form of conjunctivitis in which the clinical appearance is characteristic of the organism at work,—the diplobacillus of Morax-Axenfeld. Boric lotion and Zinc Sulphate 0.5% rapidly effects cure.—B.M.J. i./09,1221. A serum is not worth the trouble of preparing.—Axenfeld, B.M.J. ii./08,738.

Sections of Membrane.—Stain for the diphtheria bacillus by Eosin-Gram-Weigert method:—

1. Stain 4 or 5 min. with eosin solution. 2. Wash well in water. 3. Pass through a little alcohol. 4. Stain with anilin-gentian-violet, 10 min. 5. Cover with Gram's iodine solution, 3 min. 6. Decolorise with anilin oil. 7. Clear with xylol and mount in xylol balsam.

Diphtheria organisms in throats of insane.—L.ii./05,465.

Diphtheroid organisms found in respiratory tracts in many cases of tabes dorsalis, but they cannot be proved to cause the tabetic toxin.—L. i./06,954.

Roux's Stain for Bacteria.—Dahlia or Gentian Violet 0.5 Gm., Methyl Green 1.5 Gm., Distilled Water 200 Gm.

Dysentery.—*Amœba coli communis* is sometimes to be found in the stools of mucus.

Amœbæ. Characters of: Granular cytoplasm and vacuolated nucleus. Stain with neutral red and Licht Grün.

Three chief kinds of Amœbæ: 1. A. Buccalis, occurs in mouth, dental caries &c. 2. A. Coli. 3. A. histolytica associated with tropical abscess and dysentery.

There are said to be two types of dysentery, namely, the amœbic and bacillary.

There is, however, the mixed infection, namely that of the amœbic and bacillary. This constitutes a third type, and this point has not received the recognition to which it is entitled. The bacillus is probably in a resting state in the human body and breaks out into activity on occasion.

Shiga's Bacillus has the characteristic of elaborating alkali in its growth, whereas Flexner's Bacillus is an acid-producing organism.

With the acid-producing organism the blood examination gives a positive Widal reaction, whereas the alkali-generating one does not. Agglutination took place in one recorded series of experiments in the first instance with a 1 in 10 dilution in two hours. The bacilli of Shiga and Flexner are non-motile, non-sporing, and do not stain by Gram's method and grow on all ordinary media. In cultural characters they resemble *B. coli communis*.

A modified Shiga's Bacillus, the same in fact, excepting the reaction on neutral milk.—I. Med. Gaz., 1904, p. 426.

Bacillus Dysenteriae may be divided into four main groups, represented by:—

1. *B. Dysenteriae* of Shiga and Kruse.

2. Bacillus "Y."

3. Strong's Philippine Culture.

4. Flexner's Manilla Cultures and Duval's "Baltimore" Culture.

B. typhi abdominalis ferments monosaccharides, mannite, maltose, and dextrin, and is distinguished from (4.) by not fermenting Saccharose, and also by its motility.—B.M.J.E. i./05,56.

Unity of the types of Dysentery Bacilli discussed.—B.M.J.E. i./06,36.

Shiga's Bacillus isolated in 26 cases of dysentery in S. Africa out of 55 examined.—B.M.J. i./06,680; L. i./06,904.

For Antitoxins, see Section on Antitoxins.

Report on the bacteriology of summer diarrhoea in infants. The various types of *B. dysenteriae* considered.—B.M.J. i./06,908.

Epidemic sporadic dysentery traced to Shiga's Bacillus.—B.M.J. i./06,1325.

The best method of demonstrating flagella of Dysentery Bacilli is Stephens' modification of Van Ermengem's method.—Ibid L. ii./06,1197.

Summer diarrhoea of infants. A number of Bacilli isolated from the stools. That known as 'No. 1' having distinctive features—probably the most important factor in the disease. It is pathogenic to animals. No true Flexner type of dysentery was found. American and English differ in this respect.—B.M.J. Apl. 21,06; B.M.J. ii./07,16.

Morgan's Bacillus No. 1 in the normal faeces of young children,—originally

found in epidemic of infantile diarrhoea. Procedure for its detection. Epidemic diarrhoea in this country caused by it.—B.M.J. i./09,1227.

Flies as carriers of micro-organisms resulting in infantile dysentery. Muslin to be kept stretched over the child's milk.—L. ii./08,715.

The two varieties of Shiga and Flexner certainly account for the dysentery of Japan, China, the Philippines and the West Indies. One or other occasionally appears in temperate countries. Hiss and Russell and a third type, which differs only in fermenting mannite. A fourth (by Wollstein) ferments saccharose, mannite and dextrin. A fifth, as added by Shiga. B. Dysenteriae is difficult to isolate.—B.M.J. i./09,768.

At least seven different dysenteries to deal with at El Tor among Mussulman pilgrims.—B.M.J. ii./09,862.

Bacillus Equi.—A new microbe, pathogenic for rodents. In horse blood.—Klein, L. i./06,782.

Filaria.—In *Filaria sanguinis hominis*, or elephantiasis, there are two kinds of worms, nocturnal and diurnal, which only appear in the blood immediately below the skin at night and day respectively, and the mosquitoes, in which the cycle of the parasite's existence is completed, only bite during these respective periods. An effective treatment, therefore, is to alter the patient's sleeping period—e.g., by keeping him awake at night.—Cantlie. The parasite is acquired by drinking infected and polluted water. In some countries a very large proportion of the population have the embryos of *Filaria nocturna* floating in their blood. Elephantiasis in all its phases is very marked in these localities. The worm is introduced under the skin in early stages by the proboscis of a type of *Culex*.

The female adult worm was discovered by Bancroft, the male by Arango, and the embryo by Demarquay and Lewis. The embryos inhabit the lymph channels of the lower extremities and the scrotum. They lead to dilatation of the lymphatics, to hyperplasia of the tissues, chyluria, hæmaturia, abscesses, &c. They are found in the blood at night.—Gould.

Eosinophilia in filarial disease. The eosinophile cells accumulate round the encapsuled fluke.—L. i./06,1623.

A tick, *Ornithodoros Moubata* (Murray) is probably the intermediate host of *Filaria*.—B.M.J. i./07,143.

Prospective cure for elephantiasis by introducing silk threads into the limbs to replace the trunk lymphatics, and thus remove fluid from the oedematous part.—L. i./09,31.

Pallative treatment by Thiosinamin, combined with constant pressure by bandaging. Without the latter Thiosinamin has no effect whatever.—B.M.J. ii./08,1361.

Micrococcus Gonorrhoeæ.—Stain specimen firstly by Gram's method afterwards with carbol-methylene blue or alkaline methylene blue 3 to 5 minutes, wash in water, dry and mount.

RECOGNITION:

A medium sized diplococcus; reniform in shape, intracellular character thought to be of no value in differential diagnosis, though previously stated to be so, but *vide* Muir and Ritchie, Edn. 4, p. 218. The organism is Gram negative.

Culture.—Blood agar only; difficult to grow; slow growth, small discrete "dew drops."

Nissl's Stain.—Methylene Blue 'B Patent' 375, Soft Soap 175, Water 1,000. Stain thin 'smears' (fixed in the air), without heating, 1 minute, wash, blot and examine.—L. i./08,63.

Jenner's Stain, *q.v.*, also gives excellent results. The organism can be grown on blood agar or on the new **Nasgar Medium** (*see* Abel and Gordon's Bacteriology).

Pappenheim's Stain.—Concentrated Aqueous Pyronin Solution 1, Concentrated Methyl Green Solution 3, is useful. Stain 5 minutes, wash and dry. Gonococci stain red, cells, etc., blue.

Leszczinsky's Stain, said to be almost specific, the contrast making the organisms very easy to diagnose. The film on a cover slip, dried, is stained 1 minute in the following:—Saturated Thionine Solution 5, Water 44, Liquid Phenol 1. Wash and place in following for one minute:—Saturated Aqueous Picric Solution, Caustic Potash Solution 0.1% equal parts. Then in absolute alcohol five seconds, dry and mount in Balsam. The intracellular cocci are deep brown, nucleus light violet, and protoplasm yellow.

A case should not be diagnosed as positive from the presence alone of extracellular diplococci, as the extracellular life of the gonococcus is short, and even in a Gram negative examination, one cannot be always sure as to whether they are gonococci or no. The intracellular life is peculiar to the gonococcus, as it increases in the cell, without any apparent detriment to that cell, instead of being eaten up by the cell, as is usual, in other words, it becomes a "saprophyte."—Pr. Apl. /09,534.

Schütz's Stain is recommended for diagnosis in the 'Treatment of Venereal Disease and Scabies in the Army'—Advisory Board for Army Medical Services publication, 1904, p. 39—i.e., staining with a saturated solution of Methylene Blue in 5% Phenol for 5 to 10 minutes, then washing in water, next dipping in a solution of 5 drops of 'Acetic Acid' (? strength) in 20 cc. water for 3 seconds, and finally washing. All organisms are stated to be decolorised except gonococci—we do not think this would be diagnostic—further confirmatory stain necessary, *v. above*.

Other Diplococci:—*D. albicans amplius* Bumm, found in mucus in the healthy vagina; *D. albicans tardissimus* morph. identical with the *Gonococcus*; *D. Coryze*, *D. intracellularis Meningitidis* (*v. Cerebro-spinal Fever*), *D. of orchitis* found in gonorrhoeal pus during the first two days—pathogenic), *D. pneumoniae*, *syn. pneumococcus* of Fränkel, *q.v.*, and *D. pyogenes ureæ*.

N.B.—*Pneumococcus* is the only Gram + Diplococcus. Capsule well marked in pus, but not in culture. Cocci, elongated or lanceolate, converts oxy- into methæmoglobin in the culture. Will not grow on Gelatin.

Bacillus Influenzæ, Pfeiffer's Bacillus. A very small bacillus, non-motile. Does not stain by Gram's method, nor grow on ordinary media unless albumen be present. Grows best on blood agar, but dies out rapidly unless subcultured every few days. Present in sputum in cases of influenza. Stained by methylene blue the bacilli are very numerous in masses, but never seen in chains. (Rapidly decolourised by Gram's method.)

The bacillus is thought to play an important part not only in acute exacerbations of middle-ear suppuration, but also in primary attacks, an association first demonstrated by Pfeiffer himself. Owing to its feeble staining reaction it is easily overlooked, but if specially stained it is readily seen in acute cases of aural diseases, especially those complicated by osteomyelitis.—Wingrave, M.P. Sept. 23 08,343.

Characters Diplococcus, Gram—, not encapsuled, often chestnut shape; often in chains. Is the only diplococcus which grows on gelatin.

Acid-production or failure to produce, in glucose, galactose, maltose, and saccharose media essential for diagnosis.

Post-Influenzal arthritis. Pyæmia due to this organism—L. ii./07,685.

A number of cases of broncho-pneumonia occurring in one family. The influenza bacillus, the only organism found—in the lung of one of the children—the apparent cause of death in all.—L. ii./09,1661.

In an epidemic in America of so-called influenza, the pneumococcus was always present, the influenza bacillus in very few cases. The pneumococcus is predominant in the acute stage. Though the influenza bacillus is often found in so-called influenza pneumonia it is not the primary cause. A mixed flora in the secretions in these cases is characteristic. Influenza bacilli are commonly found in the throat in pertussis, measles, pulmonary tuberculosis. Not found in any of 11 cases of acute articular rheumatism.—B.M.J.E. ii./08,81; *c.f.* pp. 777,906

Micrococcus Cutarrhalis, *Meningococcus* and *Gonococcus* compared in an epidemic simulating influenza.—B.M.J. ii./05,421.

M. Cutarrhalis grows well on all ordinary media both at room and body temperature.

See also Influenza Vaccine.

Kala Azar characterised by persistent fever of alternating and intermittent type—certainly caused by a minute organism, which has been shown to be a stage of a flagellated parasite.—L. i./07,486. Its differentiation and epidemiology.—L. i./07,643. This disease is transmitted by the bed bug.

In addition to the Irregular Fever there is progressive enlargement of the spleen, progressive wasting, swelling of feet and legs, diarrhoea simulating dysentery, and enlargement of the liver. It is almost invariably fatal.—I.M.G. Jan. 10/1907.

Is but a malicious type of malaria.—Ghosh.

Atoxyl 10% to 10 to 20 minim doses in a case of, without any improvement. Patient died—L. ii./08,444.

In Madras especially in regard to its connection with the dog and the bug.—L. ii./09,1495.

Oriental Sore.—Differences between this and Kala-Azar.—B.M.J. ii./09, 647, 1333.

Atoxyl used in a case with some improvement, but ultimately fatal ending.—B.M.J., ii./09,1614.

Ponos, a disease occurring in two Greek islands, is apparently the same as Kala-Azar. The finding of the Leishman-Donovan body in splenic or hepatic puncture remains wanting to establish the identity of the two.—B.M.J. ii./09,782.

Bacillus Lepreæ has morphology similar to *B. tuberculosis*, but usually occurs more in clumps and are said to be tapered at the ends. Stain irregularly, and are more readily decolourised than *B. tuberculosis* by inorganic acids. No conclusive evidence of having been cultivated on artificial media. The minus-salt method probably resulted in a growth of *B. tuberculosis*, c.f. Leprolin in Antitoxin Section.

Malarial Parasites.—The mosquito theory of this disease was established by Ronald Ross, the winner of the 1902 Nobel prize; after Manson, Golgi, and others had paved the way to a great extent. The *Culex pipiens* or common mosquito it is thought does not convey malaria. It is the Spot-wing or *Anopheles maculipennis*, also belonging to the *Culicidæ*, which carries infection.

(No fewer than 82 genera of the *Culicidæ* are now described.—Allbutt's System of Medicine.)

The female *Culex* has the palp much shorter than the proboscis, whereas that of the female *Anopheles* is almost the same length as the proboscis. The body of the *Anopheles* stands at an angle with the surface on which it is resting, whereas the body of *Culex* is almost always parallel with it.

The female is frequently found with its body 'blown out' with blood which it has imbibed. This *Anopheles* is common throughout the world. The males are harmless as far as blood sucking is concerned. The Midges (*Chironomidæ*) which 'dance' and swarm in the evenings are quite harmless. Important differences in venation and hairs on the wings enable one to distinguish between *Culicidæ* and *Chironomidæ* with certainty. The *Anopheles* goes through the stages of ovum, larva, and pupa; the mosquito lives in the water.

Laveran, the discoverer of the parasite which is known as *Hæmaphysa*, previously called *Plasmodium* or *Haematozoon malariae*, divided it into the following phases:—1, spherical bodies; 2, flagellated; 3, crescents; 4, rosette forms.

(Some observers, contrary to Laveran, have been of opinion that the different types of malaria are due to different species of the organism.)

The whole life history of the *Plasmodium* will be found illustrated by some excellent models at the Natural History Museum, South Kensington. Briefly, in the tertian form the spore, which is freely swimming in the blood plasma, enters the corpuscle. It develops amœboid movement and then shows pigmentation owing to changes in the hæmoglobin. A nucleus is developed. The rosette form is the next change owing to division of the Karyosomes. On breaking up, the spores are liberated into the blood, the spore emission being synchronous with the attacks of renewed fever.

There are two distinct cycles of existence, one in the human being (asexual) and the other (sexual) in the mosquito.

Furthermore there are at least three distinct species of the parasite infecting man:—

(i) **Quartan.**—This completes its cycle in about 72 hours—there is pyrexia every third day; double or triple infection may, however, occur. In the case of this species only the smaller forms show movement (which is not pronounced as in the Tertian). The pigment granules are coarse and almost black in colour. The rosette contains 6 to 12 spores, and the red corpuscles retain their colour and size.

(ii) **Mild or Benign Tertian.**—The parasite matures in 48 hours, though by double infection a quotidian form may be produced. The outline of the amœbulae is less refractive than in the Quartan. Movement is much more active. **Schüffner's Dots** may be observed on staining, in the infected corpuscles. The rosette is somewhat larger than in the Quartan, and gives 15 to 20 somewhat oval spores.

In addition there is the *Æstivo-Autumnal* or 'Malignant' or Tropical Malaria parasite. The cycle of change is difficult to follow, it probably occupies 48 hours; the young parasites are very small but active, which, however, change into the resting 'ring-forms.' Pigment granules are small and few in number. The fully developed sporocyte occupies less than $\frac{1}{2}$ the red corpuscle, and yields usually 6 to 12 spores—irregular and minute. Sporulation occurs internally, hence sporocytes not seen as with (i) and (ii) in the peripheral blood. "Crescent" forms are seen, but they do not appear in the blood until several days after the onset of the fever. They are extremely resistant to quinine. These crescents are the male and female gametes; it is possible to observe the male changing into spherical bodies, which will flagellate whilst the others will not. The gametes are not crescent-shaped in the other forms of malaria.

For quinine treatment, v. pp. 571, 576, 774.

Staining Methods.

Films of blood smeared evenly with a very small quantity *s.a.*, dried in the air, not by aid of a flame, and fixed by immersing in alcohol and ether, equal parts, 10 minutes, may be stained with aqueous methylene blue and eosin, or with methylene blue alone, 5 minutes, or with a Hæmatoxylin Stain, or by Leishman's Stain (*q.v.*). With Leishman's Stain fixing is not necessary. Muir says the structure of the parasites is well brought out by the following:—Soak film in Saturated Corrosive Sublimate Solution a few seconds. Wash well, stain with hæmalum 10 minutes, wash, stain again for about the same time with aqueous methylene blue. Wash in water, dehydrate clear in Xylol and mount in balsam. The chromatin of the parasites is violet blue, and the protoplasm pure blue. The Leishman method is, however, principally in use. Consult Allbutt's *System of Medicines*, or Muir & Ritchie.

LEISHMAN-DONOVAN PARASITES classified in a sub-order of the flagellata along with or near the genera *Herpetomonas* and *Crithidia*.—Consult Allbutt.

Two mosquitos *Pyretophorus costalis* and *Myzomyia funesta* responsible for the spread of, in Madagascar.—B.M.J. ii./06,1056.

Panama, the most difficult place to rid of the scourge, nevertheless *Anopheles* and *Stegomyia* practically abolished from the Canal zone.—B.M.J. i./07,401.

Unsolved problems and troublesome symptoms in malaria.—B.M.J. i./07,687.

Dispelling some old ideas.—B.M.J. ii./07,1119.

Steps to be taken in Malarial districts, treatment of watercourses, houses, &c.—B.M.J. ii./07,1044 *et seq.*

Sir P. Manson has prepared a table of tropical diseases, showing their germ causes and intermediaries. A lecture dealing with the subject, tropical temperature is necessary for the growth of the intermediary.—L. ii./08,891.

Peritonitis, Bacteriology of. Frequent presence of a *Staphylococcus albus*.—L. i./06,1250.

Bacillus Pestis (Bacillus of Bubonic Plague).

Idé also Vaccine chapter for recent work, p. 776.

Specimens from the buboes show coccus-like forms. They were first found by Kitasato in 1894.—L. ii./08,428.

Culture—Yersin first described the cultural properties.

Morphology.—Short fat bacillus. On staining with weak aniline dye shows marked polar staining. Spores have not been demonstrated. Non-motile. Does not retain the stain when treated by Gram's method; grows well on usual media (? potato) both at room and body temperature. Does not liquefy gelatin. Occurs in chains when grown in fluid media. Forms typical stalactite growths in bouillon and in presence of butter fat, but must be kept undisturbed (Haffkine). Man is inoculated through the broken skin.

Recent work on the Bacillus.—B.M.J. ii./05,735.—B.M.J. i./07,691.

The bacillus produces alkali in its growth, which ultimately causes stoppage of its growth (in broth). The amount of alkali produced is equivalent to 1.5 to 2.5% normal Sodium Hydroxide (solution presumably), and this amount, reached in 6 to 8 weeks, causes arrest of the growth, but not death of the bacillus.—L. ii./08,1620..

Pneumonia.

Fraenkel's *Pneumococcus*.—1. Prepare films from 'rusty' portion of sputum. 2. Stain by Gram's method and counterstain with eosin half to one

minute. Stain other films by carbol-fuchsin. Overstain (five minutes). Slightly decolourise with weak acetic acid. (For capsule.)

To obtain a pure culture, the blood of a mouse dead from inoculation of sputum is sown on blood agar or Nasagar medium. Will not grow below 37° C.

Recognition.—Diplococcus (free ends are often pointed—*Diplo. lanceolatus*) sometimes occurs in short chains of four to ten cocci. Has a capsule. Stains by Gram's method.

Pneumococcic Peritonitis in children, 15 cases reported.—*Li.*/o6,1591.

Macfadyen on the Pneumotoxin.—*B.M.J.* i./o6,776.

In an epidemic of influenza swabbings from the fauces frequently showed pneumococci in addition to Pfeiffer's Bacillus and Strepto and Staphylococci. In such cases (which invariably developed into pneumonia) it was considered that the influenza bacillus first weakened the resisting power of the lung and if pneumococci were present they invaded the weakened lung and produced pneumonia; where the pneumococci were associated with staphylo- and streptococci a mixed infection and much more severe case resulted.—*Pres.* July, /o8,131. *Vide* also pp. 777,903.

Friedländer's Pneumobacillus.—Present in only small proportion of cases of pneumonia. Not stained by Gram's method, but well by carbolfuchsin.

Recognition.—A bacillus varying considerably in length; usually short, with rounded ends. Has a capsule. Is easily cultivated on all ordinary media.

Characters.—Best examined by dark ground or parabolic illumination. Gram—. Stain by Gram's method but do not wash with alcohol, and omit any counter stain. Hot Carbol-Fuchsin gives good results.

Bacillus proteus vulgaris occurs frequently (50% of examinations) in chronic aurial discharges. Like the colon bacillus, it stains with difficulty unless previously treated with iodine or pot. permanganate. It is Gram— and about 3 μ in length, but may grow into long leptothricial threads. It is nearly always associated with fœtor, and has the reputation of being a powerful ptomaine producer.—*M.P.* Sept. 23,/o8.

Relapsing Fever is associated with the presence of **Spirochæta Obermeieri** in the blood. In cases of relapsing fever terminating fatally the blood is frequently found to be teeming with the organisms. The corpuscles with the $\frac{1}{2}$ inch oil immersion lens frequently appear to have slender spiral filaments attached to them, causing a rippling movement of the blood, which persists for several hours when examined in the fresh condition.

This Spirochete has, as yet, not been cultivated, but it is suggested as a stage in the life history of the trypanosoma, and hence does not belong to the vegetable kingdom. Trypanosomes have been successfully cultivated in a condensation fluid, which arises from a special medium prepared from defibrinated rabbit's blood and agar-agar; there may be hopes of growing Spirochæta on a similar medium.

Assumed spread of infection through mosquitoes.—*B.M.J.* i./o6,1400.

Spirochetes often occur in suppuration of middle ear (Wyatt Wingrave, Roy. Soc. Med. 1908) also in mouth and nose. Synonymus: *Sp. Refringens*, *Sp. dentium* *Sp. buccolis*, *Sp. foetida*, &c. They are generally associated with *B. fusiformis*. Variable in size and shape, strongly resemble *Sp. Obermeieri*. Attended by striking fœtor.—*M.P.*, Sept. 23,/o8, p. 342. *See also* Tick Fever, p. 909.

Ringworm Fungi. Rapid Clinical Method of Search:—

- (1) Soak the hairs in Potash Solution 10 minutes.
- (2) Wash in water to free from alkali.
- (3) Mount in Glycerin or Glycerin Jelly.
- (4) Ring with gold size.

For permanent stained sections:—

- (1) Soak the hair in Ether 5 to 10 minutes.
- (2) Stain with Anilin Gentian Violet (*q.v.*) for 1 hour. (Malcolm Morris formula: 5% Alcoholic Gentian Violet 1, Anilin Water 3).
- (3) Absorb excess of stain.
- (4) Treat with Gram's Iodine Solution 2 minutes, wash in water. Decolourise with acidified Anilin Oil (Anilin Oil 10, Nitric Acid 1) for 15 to 20 minutes. Treat with Anilin Oil 1 minute, clarify in Xylol, and mount in Balsam.

The organism of *Favus* is *Achorion Schönleini*, those of *Tinea tonsurans* (RINGWORM OF THE SCALP) and *T. circinata* (RINGWORM OF THE BODY),

i.e., non-hairy skin, are *Microsporon Audouini*, *Tricophyton Megalosporon ectothrix*, and *ectothrix* (according as the fungus lies outside or inside the hair), that of *Tinea (Pityriasis) versicolor* is *Microsporon Furfur*.

Ringworm of the Scalp is rare in the adult.

Tinea Barbe or *Hypohogenic Syccosis* (Ringworm of the beard) is a common affection of the beard. The common grey coccus inhabiting the upper layers of the epidermis may cause an infection and cause pustulation, but the fungus can be distinguished from this coccigenic variety. Syphilis may also sometimes simulate ringworm of the beard. *Eczema Marginatum* is a name for ringworm attacking the groins and axillæ. *Onychomycosis* or ringworm attacking the nails only—not common, but very troublesome.—For a useful clinical lecture on the subject r. M.P. Sept. 5, 1906.

Cultivation of Ringworm Fungi is possible on all ordinary media, but the addition of Glucose or Maltose is most favourable.

Nail ringworm and a case infected by washing of stockings, also one caused by mouse bite.—L. ii./08, 238.

270 Ringworm patches in school children treated by X-rays. With exception of 5 cases, all were due to *Macrosporon Audouini*, 3 were due to *Megalosporon ectothrix*, and the other 2 to *Tricophyton ectothrix*.—B.M.J. ii./09, 454.

Seborrhœa.—Sabouraud has isolated a microbacillus whose favourite habitat is the upper portion of the hair follicle,—this causes the output of increased amount of sebum.—M.P. June 8, 1904, p. 618.

Skin, Tropical Diseases of.—MacLeod, B.M.J. ii./05, 1266.

PINTA, a disease caused by a fungus, producing discolourations on uncovered parts of the skin.—B.M.J. ii./05, 1270.

PITYRIASIS VERSICOLOE, due to fungus growth under the skin, common in the tropics.—B.M.J. ii./05, 1271.

PELLAGRA.—One of the chief plagues in Italy. *Aspergillus fumigatus* and *A. niger* said to be the cause. Some say it is hereditary.—B.M.J. ii./05, 1273.

YAWS (Frambœsia Tropica) Treatment.—Sodium Bicarbonate in 1 drachm doses, together with Copper Sulphate locally.—B.M.J. ii./05, 1275. Potassium Iodide 10 to 20 grains for adults, 2 to 5 grains for children thrice daily. If anemic, Citrate or Syrup of Iron Chloride. Locally ung. hyd. nit. dil. (1 in 3 Vaseline).—B.M.J. ii./07, 868.

FRAMBŒSIA in Ceylon. Potassium Iodide in large doses best routine treatment; Atoxyl, Sodium Cacodylate, and Quinine Cacodylate also useful.—L. ii./07, 1458. Characters of the *Spirochæta*.—B.M.J. ii./07, 1511.

An exceedingly contagious disease. Potassium Iodide in.—B.M.J. ii./05, 1276.

DHOBIE ITCH.—Severe prurigo of the thighs is due to various Fungi.

TINEA CIRCINATA.—The Fungi of this are distinct from those of dhobie itch, though all belong to Trichophytons.—B.M.J. ii./05, 1278.

PARANGI.—(Allied to syphilis?) Spirochetes found.—B.M.J. ii./05, 1280.

Sprue and Hill Diarrhœa.—Features are sore tongue, stomatitis, peculiar form of diarrhœa, due to varieties of bacteria. Milk diet recommended.—B.M.J. ii./05, 1281. Trilactine (q.v.) should prove of value.

Staphylococci are easily recognised by their grouping. They are Grain +, and smaller than streptococci, but whether *S. aureus*, *albus*, and *citrus* cultivation gives growths, e.g., on a tube of Agar, of the colours in question. They are the most easily grown of all the pathogenic bacteria.—Wingrave on Aural discharges, M.P.—Sept. 23, '08, 343.

Streptococci in aural discharges of two types.

(1) *S. longus* (*S. pyogenes vel erysipelatus*) in long chains (2) *S. brevis* in short chains, the *S. longus* is held to be pathogenic, whilst *S. brevis*, which is common in the mouth and throat is said to be non-pathogenic. Marmorek, however, holds that the length of chain is variable, and Widal has shown that the non-pathogenic forms from the mouth when cultivated with *B. Coli* become pathogenic.—Wingrave.—M.P. Sept. 23, '08, p. 343, See also Septicæmia,—Vaccine Chapter.

Syphilis.—Spirochæta Pallida. *Syn.* *Treponema Pallidum.*—B.M.J. ii./07, 88.

Alive may well be seen by parabolic or dark ground illumination. Dead by mixing film with liquid Indian Ink.

Demonstration : as they chiefly infest the lymph stream, best obtained by "needling" base of ulcer or adjacent enlarged gland. Make film, fix in warm air, and stain 12 hours by Giemsa's Solution at 37° C.; obtained only with difficulty from surface of ulcer.

Demonstrated *in situ* by *Levaditi's* Silver Method, in lungs and liver of congenital syphilis.

Characters.—Gram negative. Smaller than *Sp. fatida*: regular and symmetrical corkscrew spirals, shorter than *Sp. buccalis*, greater number of turns.

GIEMSA'S STAIN.—Dissolve Azur II.-Eosin 3 Gm. and Azur II. 0.8 Gm. (previously well dried in exsiccator before weighing, and powdered as finely as possible) in 250 Gm. Glycerin (chem. pur.) without heat, add Methyl Alcohol 250 Gm. Shake well, allow to stand at room temperature 24 hours and filter. It is convenient to keep a little of the stain thus made in a drop-bottle and add from this 1 or 2 drops of the stain to every Cc. of water in the staining bath. Staining of films or 'smears,' previously fixed in alcohol 15 minutes, is allowed to proceed for 15 to 60 minutes (Giemsa) in a shallow dish (some workers favour much longer), wash in water, dry and mount. Over-stained preparations should be treated with water to remove excess.

The material called Azur II.-Eosin is composed of Methylene Azur and Methylene Blue in equal parts and Eosin chemically combined in a manner not stated by Giemsa in his papers.

B.M.J. ii./06,738 gives a more concise way of preparing Giemsa's Stain.

Long and diligent search necessary in looking for the *Spirochaete* stained by this method. Table of differences between this and other kinds of *Spirochaete*.—B.M.J. i./09,455.

This stain imparts to the spirochete a distinctly reddish violet tinge, similar to that of the neighbouring leucocyte nuclei (the Romanowsky chromatin stain), whilst the bacteria in the preparation come out blue.—B.M.J. i./05,1263.

The use of glycerin as solvent is an obvious advantage in the direction of keeping qualities.—D.M.W., June, 1905, No. 26, p. 1026.

Schaudinn and Hoffman's results confirmed,—the organism was found in several involution forms. Giemsa's stain employed.—L. ii./05,962.

Recent results in staining blood for the spirochete.—L. i./06,863,746. Staining tissues for.—B.M.J.E. i./06,38. Leishman's Stain used.—L. ii./05,522.

Spirochaeta pallida found in secondary syphilis.—B.M.J.E.ii./05,96.

Cytorrhcytes Luis (Siegel) may be one stage of the spirochaeta.—B.M.J. i./06, 258.

Syphilis transmitted to an ape. Spirochetes found on the 37th day after inoculation.—B.M.J.i./06,607.

Comparison with other Spirochetes and some Protozoa. Jackson Clarke.—B.M.J.i./06,1274.

Material obtained from ulcer on eye-lid stained by the *Proca-Vasilescu* method. Details of the composition are given.—Oph., Sept. 1, 1907,496.

The Spirochete can be demonstrated from an exposed surface; from an enlarged gland (remove fluid with hypodermic needle) from the blood (take 1 Cc. of blood from vein, mix with 10 Cc. of 0.3% Acetic Acid and centrifugalise) from tissues, from syphilitic eyes (examination of aqueous humour). Staining methods.—Oph., April 1907,189.

Notes on the examination of 'smears' of the *S. pallida*.—B.M.J. ii./07,1510.

Neisser defends Schaudinn's Spirochetes, which had been satirically called 'Silver Spirochetes.'

The development of the halteridium in the mosquito, as found by Schaudinn, is doubted—at any rate has never been followed by anyone else.—B.M.J. ii./07,88.

An atlas of 38 plates of Spirochetes has been issued as a memorial of the late Fritz Schaudinn.—B.M.J. i./08,278.

Yamamoto has worked out a modification of the Silver Nitrate method of staining in the tissues.—L. i./09 933.

Biochemistry of syphilis. 'Lipoids' and *Spirochaeta Pallida* described.—L. i./09,489.

Gland puncture and examination of exudate. *S. pallida* has always been found in same during the period between the first typical hardening of the gland and the first eruption (6 to 10 weeks).—B.M.J.E. i./09,25.

S. pallida in the body in congenital syphilis, study of. In greatest numbers in the liver, but also present in the lungs, spleen, suprarenal gland,

kidney and skin. In the skin, as in the liver it is in enormous numbers.—M.P., Feb. 24, '00, 202.

Noguchi's Method of Diagnosis of Syphilis.—Boil two parts of the cerebro-spinal fluid with 5 parts of a 10% solution of Butyric Acid in normal saline for a few seconds, then add one part of Normal Sodium Hydrate and again boil briefly. A flocculent or granular precipitate is obtained on standing (in parasyphilitic affections) due to presence of a globulin. The test distinguishes general paralysis from other forms of insanity not associated with meningo-encephalitis.—L. i./09, 1666; B.M.J. i./09, 1112, 1408.

Tick Fever. This is evidently relapsing fever (*vide* p. 906), and the spirochete is *S. Obermeieri* (not yet certain, however).—B.M.J. ii./04, 1453; i./06 680; M.A., 1906, 88.

The spirillum has not yet been cultivated, but it is suggested that it may be a stage in the life history of trypanosoma (?).—Jl. Trop. Med. 1904, 24.

Suggested to designate the spirochete of African Tick Fever *S. Duttoni*. Differs from that of New York.—L. i./06, 1690. The spirochete of this and relapsing fever (Leishman).—L. i./07, 806.

Sp. duttoni (associated with Tick Fever) can be maintained virulent for wild mice in artificial media for 40 days. It will multiply and can be successfully transferred in artificial media—, Egg Yolk in mouse decoction was the most successful medium.—L. i./00, 834.

Through the bite of ticks from Nyassaland, collected in the hut of a native in whose house cases had occurred, Leishmann was able to infect a monkey. The spirochetes appeared in the blood of the animal on the sixth day and it died on the thirteenth day. From the monkey, transmission had been possible to mice.—B.M.J. ii./08 1435.

Tropical Ailments as met with in Great Britain—malaria, hæmoglobinuria, dysentery and sprue, beri-beri, &c.—Cantlie, B.M.J. i./07, 1465.

GUINEA WORM, DRACUNCULUS MEDINENSIS.—Life history of, see Leiper. Rep. Advisory Comm. of the Tropical Disease Research Fund, 1906; also B.M.J. i./07, 129, 157.

Trypanosoma.—Morphologically, a long-shaped protozoon containing a large nucleus centrally and a vacuole or contractile vessel at the larger end.

The single flagellum proceeds from a small mass of chromatin at the anterior end. This flagellum forms the edge of undulating membrane which is observable from end to end of the organism, and continues in the same direction for some length as a free tail. It measures 18.26 m. by 2 to 2.5 m.

Analogy has been drawn with certain other flagellates—notably trichomonas, englena and herpetomonas. Trichomonas moves both backwards and forwards. Englena and herpetomonas move only forwards, and the trypanosoma backwards—by the aid of the membrane. At the spot slightly behind the vacuole there are some patches of pigment—the so-called eye spots centrosome or micronucleus.

Trypanosoma reproduces itself by longitudinal division or fission—in addition there is sometimes transverse fission—and formation of rosettes by multiple division. Before the fission there is a division of the centrosome, followed by division of the flagellum, nucleus and the protoplasm—these dividing forms are not easy to find in the blood.

The organism may be found in large numbers in the blood in every case of sleeping sickness, as also in the lymphatic glands and in the advanced disease in the cerebro-spinal fluid.

There is no great reduction in the number of red corpuscles. The hæmoglobin is also not decreased.—L. i./06, 227.

Staining is best conducted with Leishman's stain *q.v.*; some beautiful specimens can be made with this by first pouring on to the film and allowing to stain half a minute, then add twice the volume of distilled water and allow to stain further half an hour. Wash in distilled water and dry in customary manner.

Other methods of staining are with Thionin Blue, Methylene Blue, and Borrel's Blue, *q.v.*

Manson recommends the examination of the blood when the temperature is high; it is well to centrifugalise as the trypanosomes accumulate in the leucocyte layer above the red corpuscles.

Classification of some of the trypanosomes found up to the present:—*T. Evansi* (1890), causing "surra" in India. *T. Elmanstania* (1901), causing *mal de cadéran* in South America. *T. Brucei*, found in cases of tsetse fly disease or nagana, in

Zululand, Bruce, 1894. *T. Rougeti* (1896), the parasite of dourine or mal du coit, occurring in South Europe, North Africa, and other parts. *T. Lewisi*, non-pathogenic, found in rats. On injecting into other animals is removed by phagocytosis. *T. Neveu* (1890), found in man in Algeria. Was called *T. Gambiense* by Dutton, but this may be objected to as the parasite may not be confined to Gambia. Manson called it *T. Hominis*. This is the only one found in man. *T. Castellani* (November 1902), found in Uganda by Castellani, occurs in the cerebro-spinal fluid in cases of sleeping sickness. It is closely allied to *T. Gambiense*. The tsetse fly, *Glossina palpalis*, is common in the Upper Congo and Uganda; *Glossina morsitans*, as shown by Bruce in 1894, being responsible for nagana, or tsetse fly disease in animals.

Minchin, however, B.M.J. i./08,892, concludes as result of study in Uganda, that for *T. Gambiense* at least no cyclical phase in *Glossina palpalis* can be shown. The matter is still *sub-judice*. The Quarterly Jl. of Micros. Sci. vol. lii, Part 2, March 1908, should be consulted.

The anatomical changes effected by the parasite, or a poison produced by it are general emaciation, enlargement of the lymphatic glands throughout the body, particularly that of the central nervous system, and changes in the brain.

Bruce and Nabarro were sent out to Uganda by the British Government, and the experiments they conducted with the tsetse flies collected at Entebbe and allowed to bite monkeys after being fed on cases of sleeping sickness are stated to prove:— (1) That the trypanosomes of sleeping sickness are transmitted from the sick to the healthy by *Glossina palpalis*. (2) That the fly carries a parasite much in the same way as the vaccinating needle carries the infection of vaccine from child to child. Sambon, however, gives some searching criticisms on these results.

Trypanosoma has been cultivated in the condensed moisture which arises from a blood agar medium.

Recent views on Trypanosomes (Internat Medical Congress).—B.M.J. i./06, 1287.

New method of staining (fixing first with Fleming's Solution) with safranin, polychrome methylene blue and orange tannin, brings out details.—B.M.J. ii./07, 145.

Two trypanosomes, *T. Grayi* and *T. Tullochii*, bearing some resemblance with *T. Gambiense*, found in *Glossina palpalis*. These two new members probably pass their entire life cycle in the tsetse fly. Blood of goats is toxic to *T. Grayi* not to *T. Gambiense*.—Jl. Trop. Med. April 1, 1907, 125.

Ronald Ross' lecture on points of interest connected with tropical sanitation. States that a substance better than atoxyl was possibly "on the way."—M.P. i./07, 332.

Manson in a lecture on advances of science upholds the view of a sexual reproduction of the Trypanosome in its insect vector.—L. ii./08, 991.

Laveran's Method of Staining Trypanosoma.

Prepare thin blood films, and fix in absolute alcohol 5 to 10 minutes. The following are required:—

- (1) *Solution*.—Methylene Blue and Silver Oxide (Borrel's Blue). Prepare "some" Silver Oxide freshly by means of Silver Nitrate and Sodium Hydroxide. Wash the precipitate with distilled water thoroughly, and add to it a saturated solution of medicinal Methylene Blue. Allow to remain for a fortnight, occasionally shaking.
- (2) Aqueous Solution of Eosin 1 per 1,000.
- (3) Solution of Tannin 5%, or, better, a solution of 'Tannin Orange.'

Mix just before use: No. 1 Solution 1 Cc., No. 2 Solution 4 Cc., Distilled Water 6 Cc.

Stain in a flat dish, film downwards, for 5 to 20 minutes—5 to 10 minutes is enough in most cases. Wash in water and treat with tannin for a few minutes. Wash in water and then in distilled water. If precipitate found on the preparation wash in Clove Oil and brush off with Xylol.

Cultivation of Trypanosoma out of the Leishman-Donovan body.—L. i./05, 16.

For further details on Trypanosomiasis, v. pp. 149 et seq also 790 et seq.

Bacillus Tuberculosis. (Now viewed as probably one of the Streptothrix group.) Ziehl-Neelsen's method; Sputum and sections.—1. Prepare film from caseous particle of sputum or a section ready for staining, and fix by usual methods. 2. Boil filtered carbol-fuchsin in a test-tube and cover specimens with it entirely; stain films 5 mins., sections 10 mins. (Carbol-Fuchsin-

Solution, Neelsen's Solution, is prepared by mixing Concentrated Alcoholic Fuchsin Solution 1 with 5% Carbolic Acid Solution 9, slightly warmed.) 3. Wash well in water. 4. Decolourise almost completely by immersing in 25% sulphuric acid. 5. Wash well in water. 6. Counter-stain with Loeffler's alkaline methylene blue—sputum, 1 to 2 mins.; sections, 2 to 4 mins. This stain is prepared by mixing Concentrated Alcoholic Methylene blue solution 142 mins. with 1 ounce of a 1 in 10,000 solution of Caustic Potash. A few drops of 10% Tannin Solution added to every 100 Cc. of Loeffler's Solution is found to improve the stain (Pollard). Carbolic Methylene Blue (Kühne) is also employed.—Dissolve Methylene Blue 1, as much as possible in Alcohol 90% 7, and add Phenol Solution 5% 70, allow to settle and decant. 7. Wash, dry, and mount in Xylol Balsam (sputum). 8. If section, dehydrate with alcohol, clarify with xylol, and mount in xylol balsam. If dehydrated with anilin oil instead of alcohol a clearer preparation is produced.

Technique for staining *B. tuberculosis*.—L. ii./05,600.

Fuchsin-Anilin Green Method for staining *B. tuberculosis*.

Solution A. Fuchsin 10, Absolute Alcohol 100.

„ B. Strong Ammonia Solution 3, Water 100.

„ C. Alcohol 50, Water 30, Nitric Acid 20, Anilin Green *q.s.* to saturate.

Add one part of A to 10 of B. Warm until vapour arises, immerse 1 minute, wash with water, then immerse in C 40 seconds. Wash off thoroughly. Bacilli red on pale green ground.

RECOGNITION.—Delicate, straight, or more usually slightly curved rods. Gram. When stained, usually beaded in appearance. The length of the organism is commonly said to be about one-quarter to one-half the diameter of a red blood-corpuscle, but it varies considerably. Involution and branching forms occasionally met with.

Present in large numbers when the process is acute but are relatively scanty or absent in chronic forms of tuberculosis. *e.g.*, Caseous non-suppurating glands lupus, &c.

Tubercle Bacilli contained in sputum retain their vitality, even when the sputum dries up, for a considerable time.

Cultural Characters. Was first grown on blood serum by Koch, but will not grow without addition of glycerin to the ordinary media. Requires temperature of 37°C. Dry wrinkled growth somewhat like a lichen, on glycerin agar in three weeks. Cultures, especially in glycerinated broth, have fruity odour.

To obtain a pure culture of the organism from tubercular material it is necessary to inoculate guinea pigs with same, and after a lapse of four to six weeks cultures are made from enlarged glands direct on to blood serum or glycerin potato. Glycerin agar is not recommended for use direct *post mortem*, but the organism flourishes on this on sub-culture.

The original Ziehl-Neelsen method is stated to distinguish *B. tuberculosis* from *Smegma* and other acid-fast bacilli. It is conducted as follows:—

Stain with saturated Alcoholic Fuchsin Solution 10% in 5% Phenol Solution hot for 10 minutes, decolorise in 30% Nitric Acid 2 minutes, washing in water, decolorise in Alcohol 3–5 minutes. Counter-stain finally with Methylene blue.

POINTS OF DIFFERENCE BETWEEN HUMAN & BOVINE TUBERCLE BACILLI.

Human.	Bovine.
(a) Size	Somewhat larger
(b) Bending regular	Fewer and irregular
(c) Capsules faintly constricted	Constrictions well-marked
(d) Strongly Acid and Alcohol fast	Easily decolorized
(e) Fuchsin stain not diminished by Methylene Blue, i.e. colour fast.	Displaced partially by Methylene Blue.

—Wyatt Wingrave.

Antiformin contains about 7.5% free Sodium Hydrate and 5.3% combined Chlorine. A disinfectant. In 2 to 5% Solution kills most bacteria in 5 minutes. Anthrax Spores, however, require 10% for 12 hours. It does not, however, kill Tubercle bacilli (probably by reason of the fatty envelope which is believed to enclose them). It can be used to isolate the bacillus from the sputum—particles can be removed macerating 2 hours 20 to 30 Cc. of tuberculous sputum with 15 Cc. of the Antiformin and diluting with water to 100 Cc. These inoculated on blood serum are stated to produce a pure culture.—M. 08,130. B.M.J.E. ii./08,28; ii./09,8.

Combined cytological and bacteriological staining may be effected by employing the ordinary Ziehl-Neelsen method and following with Giemsa's, Jenner's and Leishman's stains.—L.i./09, 776.

A granular form of *B. tuberculosis* exists which does not stain by Ziehl-Neelsen method. Much's modified Gram method described.—B.M.J.E. ii./09, 44.

Gabbett's Stain.—(i.) *Fuchsin Solution.* Fuchsin 1, Absolute Alcohol 10, Phenol Solution (5%) 100. (ii.) *Methylene Blue Solution.* Methylene Blue 2, Pure Sulphuric Acid 25, Water 75. Stain 2 or 3 minutes with (i.) warm, then with (ii.) 1 or 2 mins. Wash, dry and mount in Xylol Balsam. The decolourising and contrast staining are done in one process.

Urine.—At least six films should be prepared. The specimen is centrifugalised, the supernatant liquor is poured off, and the sediment is washed two or three times by shaking up with sterile water, centrifugalising on each occasion. Stain as for sputum, but wash, after 5 above, in absolute alcohol. In taking sample wash glans penis, to ensure not getting any *Smegma* bacilli—the latter resist acids when decolourising, but differ from *Bacillus tuberculosis* as follows:—Easily decolourised by alcohol. The acid-fast character is but temporary, as it disappears in a few days after mounting in xylol balsam.

Russ has endeavoured to detect tubercle bacilli in urine, milk, &c., by aid of an electrical current. The movement of the organisms in an emulsion toward one of the poles is possibly due to chemical affinity, or to their being driven mechanically by the ions. To detect the bacilli in a pathological fluid by means of a current it is necessary to add to the fluid an electrolyte in which the organisms are known to migrate. Of a number of substances tried Ethylamine was found to be best for the purpose. This produced a fair accumulation of bacilli at the kathode. The aggregation is probably due to an affinity between the products of electrolysis and the bacteria. The method has great detective capacity. Various bacteria behave differently, suggesting the possible use of the method for diagnosis.—L.ii/09, 2; B.M.J.ii./09, 81.

In urinary tuberculosis (tuberculous disease of the kidney) Forsell's method modified gives best results.—Deutsch. Zeitsch. f. Chirurg.-Vol., 66, 266.—B.M.J. ii./08, 997.

The routine examination of urine of all patients suffering from albuminuria irrespective of whether blood or pus is present will reveal presence of tubercle in a surprisingly large number of totally unsuspected cases.—B.M.J. ii./09, 997. Tuberculous disease of the Kidney too often goes unrecognised until a comparatively late period.

Acid-Fast Bacteria. In addition to *B. tuberculosis*, *B. Lepree* (q.v.) and the *Smegma Bacillus* which resist acid by the Ziehl-Neelsen method the following organisms give identically similar reaction:—

1. *Timothy Grass Bacillus.* Syn. *Moeller's Grass Bacillus* producing lesions closely resembling tubercles. Another variety of this organism has been found in the dust of hay lofts, and a third variety is known as the 'Mist bacillus' (*Dung bacillus*).

2. The *Petri-Rabinowitch Butter Bacillus* producing lesions closely allied to tuberculosis when injected into the peritoneal cavity of guinea-pigs.

Only in the case of material where outside contamination has been possible do these Bacilli '1' and '2' become an element for consideration—i.e., the customary method of examination is practically of unvarying value.—Muir and Ritchie.

Acid-fast bacilli very common in chronic ear discharges (Wyatt Wingrave, Roy. Soc. Med. Otol. Sec., 1908). They have also occurred in carcinoma of stomach.—Rolleston and Higgs, B.M.J., 1907. Bacilli can be rendered acid-fast by action of fatty acids, e.g., *B. subtilis*, *B. butyricus*, *Clostridia*, and *Streptothrices*).

Blood.—The organism it is stated can be demonstrated in the blood of tuberculous patients by shaking, say 5 Cc. removed from a vein, with equal quantity of Normal Saline with 2% Sodium Citrate. Place in refrigerator 24 hours. Remove sediment with pipette and dry on slide with moderate heat. Place slide in distilled water until the blood is completely laked. Fix films thus made in Bunsen flame and stain. The organism has been demonstrated in all of 125 cases of tuberculosis examined.—L.i./09, 703.

Ten patients showing bacilli in the sputum also gave evidence of bacilli in the blood.—B.M.J.i./09, 1001.

The blood of 22 cases of pulmonary tuberculosis examined in all stages and two acid fast bacilli seen—considered accidental.—B.M.J.ii./09,1119.

Fæces, Tubercle bacilli in, examination of.—B.M.J.E.i./10, 36.

Ligroin method of Detection.—A homogenous emulsion of the material containing tubercle bacilli is made with Normal Sodium Hydrate Solution, and this is shaken up with Ligroin. The Ligroin causes the Tubercle Bacilli to rise to the surface of the meeting of the two liquids.—B.M.J.E.i./10, 8.

Milk.—The staining for *B. tuberculosis* is similar to that used for urine. Both the cream and the sediment must be carefully searched on centrifugalising. It is well to soak the slides at the outset after drying and fixing in ether for a minute or two to remove the fat. *Negative results in all instances are not necessarily conclusive of absence of infection.* Injection of susceptible animals is then necessary for confirmation.

The Jubilee of Koch's discovery (25 years ago) of the Tubercle Bacillus, including note on original method of staining.—B.M.J. i./07,775.

Bacillus Typhosus.—Typhoid Fever.

Zupink divides bacteria into groups—the organisms of one group will be clumped by the serum from an animal inoculated with any one of them, *e.g.*, all acid-resisting bacilli are agglutinated by serum resulting from injecting *B. tuberculosis*. The fact that the agglutinating power of a serum may be exhausted by additions of the bacilli on which it acts proves that the power is in reality due to a definite substance.—Bosanquet.

Widal's Reaction.—Collect sample of blood in a small capillary pipette, and seal the ends, that nearest the blood being closed first. By pricking the lobe of the ear or the finger the blood will run into the tube by capillarity. The serum is allowed to separate, or the tube is centrifugalised to cause as complete a separation as possible of corpuscles which may mask a reaction. The serum is blown out on to the corner of a slide and a platinum loopful is mixed with 9 loopfuls of normal saline solution, and one loopful of this 1 in 10 dilution is mixed with 2 loopfuls of typhoid broth, not more than 24 hours old, preferably filtered through ordinary filter paper. This 1 in 30 dilution is now examined as a hanging drop. A control experiment must be conducted in addition.

Positive Reaction.—Complete: Clumping of organisms and cessation of movement (as a rule in under 30 minutes, or may be instantaneous). Partial reaction: Sluggish movement, providing the control is actively motile. Negative reaction: No alteration in 1 hour. Dilutions 1 in 100 should give same results in 50 minutes; if the time exceeds this the diagnosis is doubtful.

The reaction may also be performed in similar dilutions in sealed capillary pipettes (Wright). This constitutes the macroscopic method of applying Widal's Reaction.

Wright's improvements in the technique.—L. ii./03,214.

The urine and other excretions of typhoid patients also possess agglutinative power. It is stated that if the serum be heated to 80° C. for one hour its agglutinative power is lost.

Notes of Caution in Applying.—The broth itself or a control with normal serum should first be examined to see that the organisms are freely motile and show no pseudo clumps, as clumps are sometimes present in the broth before the addition of the blood. The serum of persons having previously had typhoid may react even years after. This may cause confusion where a typhoid diagnosis had not been given. Again, if only slightly diluted, *e.g.*, 1 in 10, normal serum frequently 'clumps,' which is not the case on further dilution,—1 in 30 or 50 is safest. Too great a dilution may obscure. The blood of *all* cases does not react, case may be too early (generally obtained about end of first week). Cases recorded where reaction intermits, absent one day, present next, and again recurs, and also a few described where there was no reaction throughout the disease, but these are fortunately very rare.—Clinical Journal, May 2, 1900.

A special culture should always be at hand—one known to react, as occasionally laboratory cultures do not respond.

The reaction is not considered positive (at Guy's Hospital) unless clumping and immobility occur with a 1 in 200 dilution within half an hour.—L. i./03,363.

A pathogenic organism other than *B. typhi abdominalis* may give the reaction, *e.g.*, according to Durham, *Gartner's bacillus* when mixed with typhoid broth may react. If one drop of blood serum of a patient under infection with this organism (from eating unsound meat) be mixed with 9 of typhoid broth, a positive result may be obtained, but 1 in 100 dilution is negative.—B.M.J.i./98,1797.

Typhoid Carriers (by stools) prophylactic measures—isolation and disinfection of stools.—B.M.J. i./08,15; see also p. 816.

As to the nature and causes of the reaction, the bacilli produce in the spleen and elsewhere toxins which, by their action on the tissues, particularly on the blood, cause certain changes, apparently chemical in nature, giving to the blood and certain fluids this property of causing clumping and cessation of movement when mixed with the typhoid bacilli.—Clinical Journal, May 2, 1900.

Three positive Widal Reports resulted in a diagnosis of typhoid. One proved to be influenza with recovery in three days, the others influenza and lymphadenoma respectively—pointing to the necessity for reviewing other features of the case and the possibility that the patients had been unconsciously subjected to the influence of enteric poison in slight and merely immunising degree.—Douglas Powell L. ii./08,125.

Blood letting in patients was speedily followed by a rise in the specific agglutinating power of their serum.—B.M.J. i./10,101.

Typhoid Agglutometer for early diagnosis of typhoid fever consists of a permanent suspension of dead typhoid bacilli, with apparatus for making a Widal test directly from the blood of the patient without the aid of a microscope. No. 1 is for one test; No. 2 for 15 to 30.—L. i./05,1505.

Serum Papers are prepared for use in identification of this organism, as also of *B. coli*, *B. paratyphi* (A and B), *B. dysenteriae* (Shiga and Flexner).

Bordet-Gengou Reaction. This test is claimed to be specific for typhoid. "To conduct the test a susceptible animal is injected with a culture of the typhoid bacillus. This develops amongst other bodies a bacteriolysin *i.e.* the complement, naturally occurring combines with an amboceptor, produced by the liberation from certain cells of the inoculated animal of receptors having 2 affinities, one for the complement and one for the bacilli. The inoculated animal is bled and its serum is obtained after whipping the blood by centrifugalization. The serum is then heated for $\frac{1}{2}$ hour at 57° C. that is 'inactivated' or deprived of complement. The complement being destroyed, free amboceptors are present in the serum, a measured quantity of which is mixed with some of the original antigen used—*i.e.*, an emulsion of Typhoid bacilli and a measured quantity of the serum of a normal guinea-pig is added. The three constituents are heated about 1 hour at 37° C. By this procedure the amboceptor is enabled to link itself by its cytophile affinity to the bacteria and by its complementophile affinity with the complement contained in such abundance in the serum of a normal guinea-pig. The complement is thus 'anchored' to the amboceptor and is no longer free to combine with any other amboceptor. To this complement another amboceptor is offered, and the inability of the complement to become anchored to another is taken as an indication of the affinity of the first-named amboceptor for *B. typhosus*.

If the inactive serum of a normal animal not immunised against *B. Typhosus* be placed in contact with these bacilli and guinea pig complement, no anchoring of the latter body will take place, and it will be free to enter into any other alliance of suitable character available.

If a rabbit be immunised by injecting it, say with washed red sheep's corpuscles—a hæmolytic serum is produced, *i.e.*, in the rabbit's serum an amboceptor is developed, which by combining with rabbit's complement on the one hand and sheep's corpuscles on the other, produces such an effect that the latter are laked, the hæmoglobin being transfused into the normal saline solution, with which a suspension of the sheep's corpuscles is made. Before exposing the rabbit's serum to the suspension of sheep's corpuscles it is heated to 57° C. In this way the rabbit's complement is destroyed and hæmolytic amboceptors left free, which though capable of combining with sheep's corpuscles, do not in such combination lake the latter because no complement is available."—B.M.J. i./09,415.

The five elements entering into the reaction, which is analogous with Wassermann's Test, may be divided into two groups—by so doing the reaction is more comprehensive.—*Vide ibid.*

RECOGNITION OF *B. TYPHOSUS*.—Gram.—Stains slowly. Length 2 to 4 μ . Long and coccal forms, in cultures. Actively motile flagella well seen by dark ground illumination; they may be stained by McCrorie's, Van Ermengem's, or Pitfield's methods, are long and wavy, 12 to 16 in number, though films usually do not show more than 8 or 10, a large number of detached flagella being also visible. No indol production.

The flagella actively motile can be shown by Pollard's Method (*vide infra*).

A permanent slight acid production in litmus milk distinguishes from *Gärtner's Bacillus* which produces marked alkalinity in all cultures (milk is not coagulated by either). Neither this, *Gärtner's Bacillus* nor *B. coli*, liquefy gelatin.

Growth on potato translucent (that of *B. coli* and *Gärtner's Bacillus* is brown and moist); in glucose-gelatin no gas formation (differences from *B. coli*, of which at least 15 species have been described, and *Gärtner's Bacillus*). The Indol test is not always specific with strains of true *B. coli*. On violet media.—B.M.J. i./04,17.

Caffeine enrichment method for separating *B. typhosus* from *B. coli*.—L. ii./05, 464. *B. typhosus* is said not to grow in a medium containing 0.01% Arsenious Acid, whereas *B. coli* will grow in a medium containing 1.5% of same.

Methods of diagnosis in vogue discussed. Endo's medium favoured.—B.M.J. i./06,939.

Flagella Stains.

MCCORRIE'S STAINS.—Solution A. Night blue 1 in alcohol, absolute 20, alum 1 in water 20, Tannic acid 1 in water 20. Mix and filter at once. Solution B. Anilin Fuchsin. To 100 Cc. of saturated Anilin Water, add 10 Cc. of absolute alcohol and 1 Gm. of Fuchsin, or Carbol-Fuchsin diluted may be employed.

VAN ERMENGEM'S STAINS.—A. 1% Osmic Acid Solution 100, Tannin 18, water 45. B. Silver Nitrate Solution 0.25 to 0.5%. C. Gallic Acid 1, Tannin 0.6, Potassium Acetate fused 2, Water 70.

PITFIELD'S METHOD.—Solution A. Tannin 1 Gm., Water 10 Cc. Do not filter. Solution B. Saturated aqueous solution of alum 10 Cc., saturated alcoholic Gentian Violet Solution, 1 Cc. Filter and keep in a stoppered bottle. Fuchsin will answer the same purpose as Gentian Violet. Equal parts of A and B mixed, heated to nearly boiling and employed to stain 1 to 3 minutes, wash in water, dry and mount.

POLLARD'S METHOD.—Young agar cultures not more than 24 hours old of a motile micro-organism are employed. An emulsion is made in about 8 Cc. of tap (not distilled) water. Six drops of fresh 5% Tannin Solution are added. After $\frac{1}{2}$ hour a turbidity will be noticed. Shake gently and examine 'hanging-drop' with $\frac{1}{2}$ inch objective, this shows the organism with flagella attached, especially round the edge of the drop. Numerous active detached flagella are also visible.

These preparations may be dried and stained by (i.) Simple stain, e.g. Carbol fuchsin or methylene blue; (ii.) Gram's method; (iii.) Ziehl Neelsen's method. Good results can be obtained with cultures even a year old, in the later case, however, the organisms are generally non-motile.

Differentiation of B. Typhosus from B. Coli and other similar organisms:—

Gärtner's bacillus thought to be a modification of *B. coli*, and the above differences not always constant, and even the agglutination test between *B. typhi abdominalis* and *B. coli* not always reliable. Stab and shake cultures on agar containing 0.3% glucose, stained with neutral red safranine distinguish, *B. coli* discharging it, probably because it is a strong reducing agent, producing a saffron tint with fluorescence in 12 to 24 hours, but *B. typhi abdominalis* is without action on the red tint.—L. i./01,613; P.J. i./01,391.

B. coli communis is a normal and advantageous inhabitant of the intestine, but may become responsible for an attack of inflammation of the bowel or epidemics of food poisoning.—P.J. ii./03,740.

"Krystall Violet" and neutral red, advocated for distinguishing colonies of *B. coli* (coloured red) from those of *B. typhi abdominalis* (also *B. enteritidis* (*Gärtner*, and others), coloured blue to purple. Medium contains Sodium taurocholate to inhibit growth of nearly all but intestinal bacteria. Lactose is another essential component of the medium, as *B. coli* and congeners decompose it with gas formation.—B.M.J. i./02,1473.

Portions of suspicious tumours removed and sections of same cut by rapid histological method and examined. The sections from the microtome are fixed and stained by a drop of acetone solution of Krystall Violet.—B.M.J. i./09,1226.

Urotropin 0.1, 0.5 and 1% in broth, differentiates *B. typhosus* and *B. coli*.—Dudgeon, B.M.J. i./06,143.

Conradi has evolved a method of early diagnosis of typhoid fever. Researches demonstrated necessity of keeping the blood in a fluid condition, so as to avoid the disinfectant action of those substances which become active on coagulation. Bile is employed for this purpose; in addition, the medium contains 10% peptone and 10% glycerin. The blood from lobe of the ear is drawn into a pipette containing a little bile and mixed with two to three Cc. of the Peptone-glycerin-bile medium in the proportion: blood 1, medium 3. Incubate at 37°C. for 10 to 16 hours and make cultures on agar plates according to the Drigalski-Conradi formula. Diagnosis can be effected by this method in 26 to 32 hours, and it is applicable as soon as the patient exhibits a febrile temperature.—B.M.J. i./06,339.

Conradi's Medium (Brilliant Green Picric). Agar 30 Gm., Liebig's Extract 20-Gm., Peptone 10 Gm., Water 1,000 Cc. Normal Soda or Phosphoric Acid Solution added until the reaction is +30 Eyre's scale, Phenolphthalein being used as indicator. After sterilising, 1 Cc. of 1 in 1000 Solution Brilliant Green "extra pure," and 1 Cc. of 1% Picric Acid Solution are added to 150 Cc. of the medium. These dyes are stated to give the best results. The typhoid colonies (after inoculation with dejecta) after 20 hours at 37°C. appear smooth edged, round, almost flat. May be immediately identified by observing agglutininative effect of an anti-typhoid serum on them. Cultures on the medium.—B.M.J. ii./08,144.

China Green (WERBITZKI) i.e., 3% Agar neutralised to +13 on Eyre's scale with 1.4 to 1.5 Cc. of a 0.2% China Green Solution added to each 100 Cc., suppresses about 75% of *B. Coli* colonies, the typhoid colonies on the other hand grow luxuriantly.—L. ii./09,465, B.M.J. ii./09,329,866.

B. typhosus added to "raw water" is killed by protozoa. The organism lives much longer when added to distilled or sterile water.—L. i./06,693.

Simple storage of raw river water for a short time will cause an enormous reduction in the number of Typhoid organisms if present, e.g., water infected with 8,000,000 bacilli per Cc. after 1 week showed only 400 bacilli, i.e., 99.9% reduction.—Houston Report on Research Work Metropolitan Water Board.—L. ii./08,255

Persistence of typhoid bacilli in the kidney after apparent recovery from typhoid—and the Widal reaction also given.—B.M.J. ii./07,75.

The bacillus could be recovered from bottles intentionally infected with it, in course of an investigation on best mode of disinfecting water for military use, even after washing out 12 times with sterile water.—B.M.J. ii./07,518.

Sunlight (in India) reduced 240,000 typhoid organisms in $\frac{1}{2}$ hour to 1,000, in 1 hour to 5, and in 2 hours to nil.—L. i./09,742.

VITALITY OF *B. TYPHOSUS*.—There is considerable difference between the vitality of the organism when grown on artificial culture media and the capacity of the same bacillus for survival under natural conditions. The culture bacilli possesses much greater vitality than organisms obtained directly from excreta.—B.M.J. ii./09,482.

MAY GRÜNWARD'S SOLUTION is a Methylene Blue—Eosin Mixture similar to Jenner's Stain for typhoid diagnosis.—B.M.J. ii./06,1848; B.M.J.E. ii./06,77.

B. paratyphosus of Brian and Kayser. *Paratyphoid* in the tropics (Ceylon). The disease is indistinguishable from Typhoid, though generally running a milder course. Intestinal ulcers are identical with those of Typhoid. Cases of mixed infection are not rare.—L. i./07,284.

Importance of associating mild cases of typhoid with this.—L. i./07,1293.

Two cases of Para-typhoid.—L. i./07,1571.

***B. Enteritidis Sporogenes*.**—An anaërobic organism staining by Gram's method, spores only on blood serum (?), which it liquefies. Note on, found in the dejecta of the sufferers in the epidemic of diarrhoea at Bartholomew's Hospital in 1895. Detection of in water supplies.—P.J. i./02,25. *Vide* also p. 924.

Said to be the cause of infantile diarrhoea. Growth in milk produces characteristic separation of stringy curd and excessive whey. Extremely pathogenic to guinea pigs, from which pure cultures obtainable from the œdema fluid by growing on blood serum under anaërobic condition, *c.f.* Water Examination.

B. Enteritidis Gaertner the cause of outbreak of meat poisoning at Limerick, which produced 9 deaths. The outbreak indicates danger of private slaughter-houses and lack of supervision; secondly, the necessity of thorough boiling of economically 'left-over' pieces of meat, especially beef, if they have to be 'used up.'—B.M.J. i./09,1171.

Yellow Fever.—Infection of this disease is probably carried by *Stegomyia fasciata*. The specific germ of yellow fever, *Filaria Bancrofti*, has its permanent host in the mosquito, undergoing sexual reproduction in the human blood—the exact reverse of what takes place in malaria—in which man is the permanent host, the germ of yellow fever must, therefore, be searched for in the mosquito. A bacillus, designated the *Bacillus icteroides*, has been found in the disease, but this is not the important feature.

The infected insect lives a long time, and it can transfer the fever as long as it lives—59 days has been recorded. It hibernates in the United States; but, if the infected adult insects hibernate, either a very large proportion of them die or else the infecting parasite must generally die in the mosquito—the first seems probable.

The cycle of the yellow fever parasite in the mosquito before it is communicable to man is about 14 days. *Cf.* also B.M.J. i./05,502

Whooping Cough.—Bordet's Bacillus.—A cocco-bacillus, non-motile, Gram-negative, staining feebly, regarded as causative of whooping cough, has been isolated. Cultures of the organism were found to be specifically agglutinated by the serum of children suffering from. Agglutinating reaction of the serum is not strong. Vaccines prepared from and used with advantage. Dose administered varied from 2,500,000 to 20,000,000.—B.M.J. ii./09,323,1062 (complete paper); L. ii./09,471.

Gram's Method of differentiating Organisms in Film Preparations:—

1. Anilin-Gentian-Violet, 3—5 mins. 2. Without washing, Gram's solution $\frac{1}{2}$ to 1 min. 3. Pour off Gram's solution, wash in water, rinse with alcohol, until no further colour comes away. Counterstain with neutral red 0.5% $\frac{1}{2}$ minute. 4. Wash in water. Dry. Mount in xylol balsam. 4a. If pus, after washing in water (4), counter-stain with Eosin 1 min. Wash. Dry. Mount.

Gram-Eosin Method for Sections.—1. Place a little alcohol on section $\frac{1}{2}$ min. 2. Cover with filtered Anilin-Gentian-Violet 10 mins. 3. Gram's solution, 3 mins. 4. Decolourise in Alcohol. Wash in water. 5. Stain with Eosin 1—2 mins. Wash in water. 6. Dehydrate with Alcohol. 7. Clear with Xylol, mount in Xylol Balsam.

Eosin-Gram-Weigert-Method.—Eosin (5% aqueous) 5 to 10 minutes. Wash in water. Anilin-Gentian Violet 10 minutes without washing. Gram's iodine solution, 3 minutes. Wash in water. Blot, dehydrate, and decolourise in anilin oil until pink colour returns. Clarify in Xylol and mount in Xylol Balsam. This method is preferable to the Gram-Eosin method, as anilin oil is more gentle in decolorising action than the alcohol used in the latter.

A simple stain for sections is:—

Fleming's Triple Stain, Modified. (A true triple stain).—Fix sections in Acetic Alcohol (Glacial Acetic Acid 1, Alcohol Absolute 2), cut and mount, stain 1 hour in saturated Aqueous Safranin Solution, wash in water, stain $\frac{1}{2}$ -hour in saturated Aqueous Methyl Violet. Wash in water and wipe all but section dry, flood the slide with solution; to 20 Cc. of Acetone add drop by drop saturated Aqueous Solution of Orange G. until flocculent precipitate is just dissolved, filter. Flood again with the stain when faint brownish pink, pour off the Orange Acetone, wash in Acetone a few seconds and then repeatedly in Xylol. Finally mount in Xylol Balsam.—L. i./06,221.

Carbol-Thionin Blue.—Thionin Blue, 0.65 Gm.; Absolute Alcohol, 3.5 Cc.; Phenol Solution, 5% 39 Cc.

Gram's solution has the formula:—Iodine, 1 Gm.; Potassium Iodide, 2 Gm.; Water, 300 Cc.

NOTE.—Anilin-Gentian-Violet is prepared by adding 1 part of a concentrated alcoholic solution of the dye to 9 parts of a filtered saturated solution of anilin oil in water (solubility about 1 in 30). Carbol-Gentian-violet is the same with 5% phenol solution in place of anilin water.

List of some pathogenic and common non-pathogenic organisms stained and not stained by Gram's method:—

A. STAINED.

Staphylococcus, all varieties.
 Streptococcus pyogenes.
 Micrococcus tetragenes.
 Fraenkel's pneumococcus.
 Bacillus anthracis.
 " botulinus.
 " diphtheriæ (Klebs. Löffler).
 " enteritidis (Klein)
 " pseudo-diphtheriæ.
 " xerosis.
 " tuberculosis.
 " lepræ.
 " subtilis.
 " Welchii.
 " tetani.
 Aspergillus.
 Sarcinæ, all varieties.
 Yeasts (Blastomycetes)
 Ringworm Fungi.
 Streptothrix of Actinomycosis
 " of Madura diseases.

B. NOT STAINED.

Gonococcus.
 Diplococcus intracellularis meningi-
 tidis (Weichselbaum).
 Diplococcus Catarrhalis.
 Bacillus mallei.
 " typhi abdominalis.
 " coli communis.
 " dysenteriæ.
 " enteritidis (Gärtner).
 " pestis.
 " pyocyaneus.
 " influenzæ.
 " Friedländer's Pneumo-
 of Malignant oedema.
 " of Symptomatic anthrax
 (Charbon).
 " prodigiosus.
 " proteus vulgaris.
 " fluorescens liq. and non-liq.
 B. Smegmæ.
 Spirillum cholerae Asiatic.
 " Metchinikovi.
 " Finkler and Prior.
 Spirochæta Buccalis.

Nitrobacterin.—Nitrifying bacteria on the nodules of leguminous plants (peas, beans, clover, &c.) are cultivated under this name for enriching soil. The sequence of crops is turnips, barley, clover, wheat. Practice has been ahead of science. Some other valuable and concise information as to the bacteriology of fermentation, caseination, &c.—B.M.J. ii./07, 1764.

Semen Test.—The presence of semen may be detected by evaporating a drop of the liquid from the moistened stains, fixing it by a flame and staining with eosin and methyl green. At the base of the head of the spermatozoon is a hemispherical portion which stains green, while the anterior part and tail stain red. Some prefer the use of methyl green alone. Ehrlich's Hæmatoxylin (stain 5 minutes, wash in distilled water, then in tap water until blue, and counterstain with Eosin solution, 2 or 3 minutes), also gives good results.

Semen Stains may be identified by boiling (fabrics) 2 minutes in a watery solution containing Tannin $\frac{1}{2}\%$ and Sulphuric Acid 1 per 1,000, then wash with strong Ammonia Solution 1 in 400 for 2 minutes, immerse 5 minutes in a solution of potassium bichromate 1 in 10,000 with 1 in 1,000 Sulphuric Acid, transfer for 2 minutes to 2% Potassium Cyanide Solution; finally rapidly wash in distilled water. Scrape and tease up on a slide, dry, fix and stain.—B.M.J. ii./06, 1261, 1843.

Semen Stained by Eosin.—Cut a portion of the cloth $1 \times 1\frac{1}{4}$ inch, soak in Müller's Fluid 24 hours preferably at 37° C. in incubator (e.g. in covered watch glass). Wash in several changes of water to remove dirt as also fixing fluid. Place the cloth, one end held in forceps, for a moment on blotting paper to remove excess of moisture, then lay flat on centre of micro slide. Pass edge of scalpel or of another slide with a fair amount of pressure from the end of the cloth fixed by the forceps, to the other. Repeat on the other surface, turning the cloth over on the same portion of the slide. The end of the cloth is then placed, with the forceps between finger and thumb, the rest being pleated up by the same means and tucked in so that firm pressure of the tips of forefinger and thumb causes a drop of liquid to fall which add also to the slide. Dry in incubator and stain three minutes with 1% Eosin solution.—B.M.J. ii./08, 501.

Picric Acid Test for.—Mix the suspected semen, whether liquid or dry, with a little water, add a drop of Glycero-Solution of Picric Acid containing a little alcohol—if human semen, yellow needle crystals visible under the microscope.—M. 1906.

Preparation of Sections before Staining.

Rapid Paraffin Method.—Fix in Acid Alcohol (1-5 hours according to size and density of tissue). Acetone : Xylol at 37° C. : Paraffin each for 2 hours.

Rapid Gum-freezing.—Place tissue into boiling Müller's Fluid or Formol-Müller. Boil 3 minutes, wash in water : freeze in Gum.

An accessory for freezing microtomes.—L.i./05,1505.

Formol-Müller Fluid.—Müller's Fluid 100, Formalin 5.

Transparent Method for bony specimens.

Dehydrate in successive baths of Alcohol and Acetone, Xylol, and Liquid Paraffin.

Formalin Preservative Solution.—Formalin (40%) 78, Potassium Acetate 3, Potassium Nitrate 1, Glycerin 40, Water 140.

This has the advantage of retaining the colour of pathological specimens.

Method of cutting frozen sections of fresh tissues for immediate microscopic diagnosis during operations. Lockwood & Shaw.—B.M.J. i./07,127.

Farrant's Mounting Medium.—Gum Acacia, best small, 32 ozs., wash well with 6 ozs. of water in two or three lots and dissolve in 40 ozs. of boiling water with constant stirring. Strain through muslin and add Arsenious Acid 1 drachm in Glycerin 40 ozs., heat gently to clarify.

PREPARATION OF CULTURE-MEDIA.

Here may be mentioned the formulæ for preparing the commoner sterile bacteriological nutrient media.

Nutrient Broth.—The method preferable is:—Beef (or horse, &c., flesh) 450 Gm. freed from fat and minced, is extracted for twenty-four hours with cold water 1,000 Cc. The albumin is coagulated by heat and strained off. The resulting extract is boiled ten minutes with sodium chloride 5 Gm., and peptone (in powder) 10 Gm., with occasional shaking. Make faintly alkaline with dilute sodium carbonate solution, using litmus as indicator, and filter.

For filtering all media use a special tough thin French-grey paper. All media are used either neutral or faintly alkaline.

In place of above, a good meat extract may be used as the starting-point. Boil 5 Gm. of the extract, peptone 10 Gm., sodium chloride 5 Gm., water 1,000 Cc., and finish as above. The broth thus prepared may be run into specially cleaned test-tubes, about 5 Cc. into each. These are now plugged and sterilised at 100° C. for a quarter of an hour on three successive days, or the broth may be converted into other nutrient media.

Standardisation.—The broth and the gelatin and agar media made from it are acid to phenolphthalein, but are frequently neutral or even alkaline to litmus—this latter not being sensitive to many of the weak organic acids present in the meat extract. The medium is, therefore, standardised with $\frac{N}{10}$ soda in the presence of phenolphthalein. The re-action of a medium is usually expressed by the number of Cc. of normal alkali required to be added to 1 litre of medium to render it exactly neutral to phenolphthalein, e.g., '+ 10' indicates that 10 Cc. of $\frac{N}{10}$ soda have to be added to neutralise it. *This reaction has been found best for general bacterial growth, and is the standard employed.* The rule for standardising, therefore, is to subtract 10 from the number of Cc. of normal soda that must be added per litre; for example, if 10 Cc. of a medium require 1·2 Cc. of $\frac{N}{10}$ soda, then 1,000 Cc. = 12 Cc. $\frac{N}{10}$ soda. The medium is now neutral to phenolphthalein, but distinctly alkaline to litmus. Then subtracting 10 Cc. from 12 we have 2 Cc. of $\frac{N}{10}$ soda to be added to 1 litre of medium.

Glucose Broth consists of the above with the addition of 1 or 2% of pure anhydrous glucose added after final filtration, but prior to sterilisation.

A simple method of cultivating anaërobic organisms.—L. ii./03,1023.

Glycerin Broth.—Nutrient Broth containing 5 to 8 per cent. of Glycerin.

Litmus Broth consists of the addition of a sufficient quantity of Litmus solution to neutral broth to render it distinctly blue in colour.

Nutrient Gelatin.—Broth 1,000 Cc., gelatin 125 Gm. Melt in steamer, and clarify by adding the white of one egg, to which a little water may have been added, render faintly alkaline, place in steamer to make quite hot, and filter in the same, leaving the portion containing the coagulated albumin, which

will have subsided, carefully until the last. Run the medium into tubes, about 5 and 8 Cc. into each according as to whether 'slopes' or 'stab' preparations are required. Sterilise on three successive days.

Glucose Gelatin consists of nutrient gelatin to which 1 or 2% glucose has been added after filtration. For the cultivation of anaërobic organisms and to observe gas formation. Must not be sterilised in the autoclave.

Nutrient Agar.—For this medium the following gives satisfactory results:—Nutrient broth 1,000 Cc., powdered agar-agar 20 Gm. (passed through a drug-mill and made as fine as possible); melt in the steamer, or better in an autoclave, allow to cool slightly, or, if time is an object, cool by shaking under a stream of cold water from the tap; add white of two eggs, *make just alkaline*, boil in the steamer or autoclave twenty minutes, and then transfer to a tall beaker; allow to get quite cold, remove the solid mass from the beaker, and cut off the bottom of the block of jelly containing the coagulated albumin and sediment. The remainder is again thoroughly melted in the autoclave or steamer, and will then filter well (in the steamer). It may be poured into tubes, and sterilised in the autoclave for a quarter of an hour under a pressure of at least two atmospheres—or, in the steamer on three successive days. Instead of cutting off the sediment on setting, it may be kept out by straining the hot liquid through butter-cloth previous to filtration.

N.B.—The white of egg should be added when the medium has almost set—i.e., as cool as possible—as the albumen coagulates at 65° C. and it acts purely mechanically by carrying down with it the particles of suspended matter.

Blood Agar is prepared by streaking nutrient agar with blood drawn under the strictest aseptic precautions from the finger, or from a freshly-killed animal. It may be used in the 'slope' form or as plates. Neisser's gonococcus grows favourably on this medium.

Glucose Agar consists of nutrient agar to which 1 or 2% glucose has been added after filtration. In the upright form is used also for deep stab cultivations of anaërobic bacteria. Must not be sterilised in the autoclave.

Glycerin Agar is nutrient agar with the addition of 5 to 8% of glycerin. Is a satisfactory medium for the growth of *Bacillus diphtheriæ*, *B. tuberculosis* and *Streptothrix actinomycosis*.

Maltose Agar.—Maltose 12, Peptone (in powder) 3, Agar 3.9, Water 300. This is prepared in the customary manner, but the product is not neutralised. Blaxall's formula is Maltose 12, Peptone 1½, Agar 9, Water 300. For ringworm cultivation.

Peptone-water.—Peptone 5 Gm., sodium chloride 10 Gm., tap water 1,000 Cc.; boil in the steamer one hour, filter, and sterilise. Not necessary to render alkaline. Used for the production of the indol reaction as one of the aids, for example, to distinction (?) of *B. typhi abdominalis* and *B. coli*. It was originally utilised for cholera-diagnosis. It is Dunham's solution.

Potato.—Large specimens are thoroughly cleaned and cut into 'half-cylinders' with a potato-borer. The brown peel is removed and the pieces soaked overnight in water to wash off excess of starch. Wide test-tubes (1 inch by 6 inches) are plugged and sterilised, and a little distilled water is placed with each half-cylinder in the tubes. The water prevents drying up in sterilising, which is effected by heating on three successive days. Must not be sterilised in the autoclave.

Potatoes prepared as above may be soaked in 5% glycerin water for several hours previous to putting into tubes. These are very useful for the cultivation of the tubercle bacillus.

Milk.—The cream is skimmed from good cows' milk, and the resulting 'skimmed' milk sterilised in the steamer for ½ hour on three successive days.

May also be drawn direct by means of a catheter into sterile vessels with the strictest aseptic precautions. Organisms are said to grow better in this than in milk which has been heated.

Litmus Milk.—The above—with a small proportion of Litmus solution added. Used for detection of acid formation.

Blood-serum.—The serum is separated from fresh blood obtained from the jugular vein of the sheep. It is centrifugalised and filtered through a sterile Chamberland filter. (The candle is heated in a muffle-furnace, or in a bright fire, if it has been previously used for the same purpose.) The filtrate may then be poured into sterile test-tubes, plugged—and inspissated, first at 80° C., then at 60° C., and the latter temperature is maintained eight to twelve hours,

or more if necessary. The medium is finally tested after capping by incubating at 37° C. for twenty-four hours to ensure sterility.

Löffler's Blood Serum.—This consists of ordinary 'Serum' 3 parts mixed with neutral peptone bouillon 1 part with 1% grape sugar added to it. Tubes are filled and sterilised as under Blood Serum.

Urine, Whey, Wort, Hay Infusion, Artificial Lacto-Serum.—P.J. ii./05, 274, 518.

EMBALMING.

If it is impossible to make the autopsy at once, preservative may be injected into the body until such time as convenient; about 300 Cc. of 5% solution of **Formalin** suffice. It is introduced through the arteries (arterial embalming) or a coarse trocar and cannula may be driven deeply into the tissues and the cavities and organs injected (cavity embalming).

Perchloride Embalming.—The former method is usually practised by opening one of the large superficial arteries, as the femoral, and forcing the fluid through the vessels. Nauwerck uses the following—500 Cc. injection syringe; long cannulae of different calibres, with pear shaped ends and with stopcocks or, preferably, with double stopcocks; strong twine; scalpels, scissors, forceps, grooved director, hæmostats, an aneurism-needle, and ordinary needles; basins and buckets; several packages of absorbent cotton; cloths and sponges; and 10 litres of a 1% solution of mercuric chloride. His method of embalming is begun by exposing the lower part of the abdominal aorta and the two iliac arteries. Two ligatures are placed beneath the aorta, about two finger-breadths apart, and the aorta is obliquely incised to allow the entrance of the cannula, which is secured by tying the distal ligature over it. The injection into the upper part of the body is then begun carefully and slowly, pausing occasionally when the counter-pressure becomes too great. About 3 litres are injected or less, depending upon the appearance of swelling of the face, seen first about the eyes and chin. The cannula is removed, both proximal and distal ligatures are tied, and the aorta is cut through. In like manner a litre of the solution is injected into each leg through the common iliac artery. A cannula with a double stopcock can be used to inject both the upper and lower parts of the body at the same time. The mesentery is ligated, and the intestines, from the beginning of the jejunum to the end of the sigmoid flexure, are removed, opened, washed out, and put in a 1% solution of mercuric chloride, and later replaced in the abdominal cavity, wrapped in sublimate wool, or where practicable, disposed of by cremation. The stomach, duodenum, and rectum are cleaned out with sublimate solution and packed with sublimate wool. The bladder, vagina, external ear, and nose are similarly treated. The abdominal cavity is carefully wiped with a cloth wrung out of the perchloride solution and dried, and the abdominal incision is sewn up. The surface of the body, with the exception of the hair, is also wiped with the solution and dried. If this method fails, Nauwerck injects into the carotid and axillary arteries.

Formalised Arsenical Embalming Injection. Hewson recommends the following injection for embalming. Sodium arsenate 40. boiling water 157. Boil until dissolved and add glycerin 40, formalin 2 or 3. About two and one-half gallons are introduced into an artery—say the common carotid—by gravity, openings having previously been made in the toes or in several of the veins if they be distended with blood. After injection the body is thoroughly greased, covered with paper, bandaged, and placed in cold storage until wanted for dissection. *Caution.*—These solutions are caustic in action on the hands. —Cattell's Post-Mortem Pathology.

WATER.

Bacteriological Examination.

Collection of Sample.—Collect the specimen in a sterile Winchester quart glass bottle with strictest precautions.

If from a water-supply, the water should be allowed to run at least half an hour before collecting, if from a reservoir or stream, surface water must be avoided by holding the Winchester at least one foot below the surface.

For comparative purposes it is important to know whether the water, *e.g.*, a well, has been recently disturbed by cleaning out or pumping. Also to examine as quickly as possible after collection of the specimen, particularly in the hot weather. To prevent increase in number of bacteria it is customary to pack the bottle in ice for transmission by rail, &c., to inhibit multiplication of the organisms.

Enumeration of Bacteria.—Agar and gelatin plates are prepared with varying quantities of the specimen, *e.g.*, 1·0, 0·5, 0·25, 0·1 Cc. and incubated at their respective customary temperatures and the colonies counted. The easiest way to do this is to draw sector lines with a paraffin pencil through the petri dish, count one section, and multiply out to obtain the number of bacteria in the entire amount of water taken for examination. Pakes' Discs are employed in a similar manner. If the sample is known to be very polluted, it is a useful plan to dilute with sterile water ten times or more, and take an aliquot portion for inoculating the plate. To obtain accurate results it is important to add the melted gelatin or agar medium to the specimen of water, and not the water to the medium. This procedure ensures better mixing.

The plates are examined daily, and if liquefying organisms are numerous (which suggest sewage pollution) the examination has often to be concluded in a shorter time than would be necessary where such are not present; if possible a week should be devoted to growth.

Text books are in the habit of laying down hard and fast statements as to the purity of a water depending upon the number of organisms thus found,—they condemn, for example, as very suspicious a water showing 1,000 organisms per Cc. It is obvious that the pathogenicity or otherwise of the bacteria must determine the conclusion. The high temperature (as for Agar plates) favours the development of the non-saprophytic organisms, but there are saprophytic organisms which also prefer the higher temperature for their development, and hence a truer conclusion can be arrived at as to the number present by growing at both the high and the low temperatures. As glucose media are very favourable to the growth of many of the yeast and fungi it is advisable also to prepare a plate culture using this medium. Yeast and fungi are, therefore, often not included in the count with ordinary media owing to the non-favourable condition for their development. This fact has been demonstrated by us in working with ordinary laboratory tap-water and also with the atmospheric air.

The next step is to conduct individual search for various sewage polluting organisms, *e.g.*, *B. coli communis*, *B. typhi abdominalis*, *Vibrio cholerae*, *B. proteus*, *Klein's B. enteritidis sporogenes*, *Streptococcus*.

The search for *B. coli communis* is very important.

B. Coli Communis.—MacConkey's method is simplest. Fill ordinary test tubes into which Durham's tubes are introduced, with the following special broth (bile salt broth)—Sodium Taurocholate 0·5, Glucose 0·5, Peptone 2 Gm., Water 100 Cc., with 10 Cc. of 10% Sterile Litmus Solution. Add to several tubes of the broth varying amounts of the water from 0·1 up to 1·0 Cc. Incubate at 37° C. If *B. coli communis* be present there is gas production and acid production.

B. coli colonies are generally red on MacConkey's neutral red bile salt agar plates. A suspected colony is carefully marked off and is tested on (a) neutral red agar, (b) peptone water, (c) Lactose Litmus peptone water, (d) Litmus milk.

The word **Flaginac** is made up to show the reactions on these media and is applied to organisms *e.g.* this organism which will respond to all:—

fl : fluorescence in neutral red.

ag : acid and gas in Lactose Litmus.

in : indol in peptone water.

ac : acid and clot in Litmus milk (Flaginac).

Neutral Red (*Syn.* Toluylene Red) is chemically Dimethyldiamidotol henazine hydrochloride.

In searching for *B. typhosus*, which is a very difficult matter, and almost invariably attended with negative result, the enrichment method of Hoffman and Ficker is recommended side by side with some method of chemical precipitation.

Scheme of work to be done:—

- | | | |
|-----------|---|---|
| ISOLATION | { | 1. Filtration under pressure (not recommended). |
| | | 2. Chemical precipitation { Schüder's process.
Ficker's " "
Alum " " |
| | | 3. Serum agglutination. |
| | | 4. Enrichment process, using water itself as medium. |
| | | 5. Cambier's process. |
| 1 | { | 6. Solid Media { Gelatin (Elsner's, &c.).
Bile Salt Agar.
Glucose and Lactose Agars.
Drigalski-Conradi Medium, Crystal Violet.
Endo's medium. |
| | | 2. IDENTIFICATION. { Morphological and cultural characters, &c.
Specific Reactions: Pfeiffer's Agglutination Test. |

Schüder's precipitation method consists in adding to 2 litres of the water, 20 Cc. of 7.75% Solution of Sodium Hyposulphite, and 20 Cc. of 10% Lead Nitrate Solution. Plates are made from the precipitate containing the bacilli.

Ficker's precipitation method.—Render 2 litres faintly alkaline with Soda and add 7 Cc. of 10% Ferrous Sulphate Solution. The precipitate is dissolved in 25% neutral Potassium Tartrate, and plates are prepared.

Alum method.—Similar to the above by treating the sample with Aluminium Potassium Sulphate.

Serum Agglutination.—Add 1 Cc. of the sample to each of a number of broth tubes, and incubate at 37° C. three or four days. To those with sediment add a few drops of active anti-typhoid serum. Clumps are centrifuged, and the clear liquid drawn off. Emulsify deposit and prepare plates.

Enrichment process.—To the sample add Nutrose 1%, Caffeine 0.5%, Crystal Violet 0.001%. Incubate 12 hours at 37°C. Isolate typhoid bacilli on plates,—the colon bacilli will have been almost entirely restrained in their growth; the method is, however, not wholly reliable.

Cambier's process.—By filtration of an incubated inoculated alkaline peptone solution.

Of Solid Media,—Drigalski's is best. It consists of a nutrose-lactose-litmus agar with a trace (0.001%) of crystal violet. After incubation typhoid colonies are bluish white.

Endo's Medium.—An alkaline lactose agar containing fuchsin rendered colourless by sodium sulphite. Typhoid colonies colourless,—*B. coli* colonies are sufficiently acid to produce a bright red colour.—Jl. Hygiene, Oct., 1905, Vol. 5, No. 4.

Rapid method which may be utilised in search for *B. typhosus*.—"Concentrate" at least two litres of the water by filtration through Chamberland filter. Brush off the organisms from surface of candle into sterile vessel containing about 10 Cc. of sterile water. Brush plates with the emulsion and cultivate in the ordinary manner on gelatin and agar, or on a medium with the addition of Phenol (Parietti's for instance). After incubation suspicious colonies are picked out and cultivated on various media, concluding with the Serum diagnosis method of Pfeiffer.

It was found by the director of Water Examinations of the Metropolitan Water Board that as a result of simple storage, water to which cholera vibrios had been added lost them in a week to extent of 99.9%, and entirely in three weeks.—L. ii /69, 99.

Vibrio Cholerae.—To detect: inoculate peptone water, preferably in an Erlenmeyer flask with 100 Cc. of the water. Incubate and test for indol product and search for typical comma-shaped organisms, which are actively motile and decolourised by Gram's method. Test further with usual laboratory media, and also conduct serum agglutination test.

Results with six vibrios.—B.M.J. i./07, 735.

B. proteus.—The ordinary laboratory media and methods may be employed for the various types of *Proteus*.

Klein's Bacillus Enteritidis Sporogenes.—Add to a fresh milk tube 1 Cc. of the water or a small quantity of the 'concentrated' water. Heat to 80° C. for 20 minutes to kill off other organisms, excepting spores of the organism searched for (Kitasato's method); grow in Buchner's tube, i.e., in an atmosphere of nitrogen for 24 to 36 hours. If result be separation of milk, stringy curd, and excessive whey, test for pathogenicity on guinea pig. The animal succumbs within 36 to 48 hours (if very virulent in 24). Post-mortem signs: bloody œdema at seat of inoculation, offensive odour, hair of animal easily detached. Films stained by Gram's method from œdema fluid show typical non-sporing organisms. To further test, a blood serum tube is inoculated from the œdema fluid and incubated under anaerobic conditions. The medium is eventually liquefied by the organism and films prepared from this show the typical sporing organism of Klein.

Streptococcus.—Glycerin Agar is a good medium for, but this medium is not quite so favourable for some of the other cocci. Agar plates may be brushed or prepared in the ordinary way, incubated at blood heat, and all discrete colonies examined by films and ordinary sub-cultures made on various laboratory media.

Conclusions.—The presence of any of the above organisms would indicate sewage contamination.

If *B. coli communis* be accompanied by the *Streptococcus* this would be considered dangerous (Horrocks).

NOTE.—A bacteriological examination according to provisions of Royal Institute of Public Health, 1903-1904, should include:—

- (a.) Enumeration of the bacteria present on a medium incubated at room temperature (18 to 22°C).
- (b.) Search for *B. coli* and identification and enumeration of the organism if present.
- (c.) Enumeration of the bacteria present on a medium incubated at blood heat (36-38°C.).
- (d.) Search and enumeration of streptococci. May also be advisable to search for *B. enteritidis sporogenes*.

NEUTRALISATION TABLE.

		Citric Acid. grains.	Tartaric Acid. grains.
Ammonium Carbonate (if pure)	10 grains neutralise	13	14
Magnesium Carbonate		14	16
Potassium Bicarbonate		7	7½
Sodium Bicarbonate		8½	9
Sodium Carbonate (+10 H ₂ O)		5	5½

Lemon Juice (freshly expressed from *Citrus Medica* var. *β. Limonum*) contains from 30 to 40 grains Citric Acid per ounce. A good lemon yields on average an ounce of juice.

INTERNATIONAL, 1910, AND B.P. ATOMIC WEIGHTS.

In working out the Molecular Weights of Compounds, we have first indicated same in terms of the B.P. Values in the case of bodies containing elements mentioned in the table on p. 435 of that work; then follow in the text in brackets the weights calculated with the International Weights, 1910, marked "I. Wts." Many of the compounds Official in the U.S.P. have the U.S. Weights added in addition. All other bodies containing elements not in the B.P. are calculated in terms of the 1910 (O=16) International Equivalents.

		I. Wts.	B.P.			I. Wts.	B.P.
		1910.	1898.			1910.	1898.
		O=16.	(H=1)			O=16.	(H=1)
Aluminium	Al	27.1	26.90	Molybdenum	Mo	96.0	—
Antimony	Sb	120.2	119.00	Neodymium	Nd	144.3	—
Argon	A	39.9	—	Neon	Ne	20	—
Arsenic	As	74.93	74.5	Nickel	Ni	58.68	—
Barium	Ba	137.37	136.4	Nitrogen	N	14.01	13.94
Bismuth	Bi	208.0	207.3	Osmium	Os	190.9	—
Boron	B	11	10.83	Oxygen	O	16.00	15.88
Bromine	Br	79.92	79.35	Palladium	Pd	106.7	—
Cadmium	Cd	112.4	—	Phosphorus	P	31.0	30.80
Cæsium	Cs	132.81	—	Platinum	Pt	195.0	193.30
Calcium	Ca	40.09	39.71	Potassium	K	39.1	38.83
Carbon	C	12.00	11.91	Praseodymium	Pr	140.6	—
Cerium	Ce	140.25	139.2	Radium	Ra	226.4	—
Chlorine	Cl	35.46	35.19	Rhodium	Rh	102.9	—
Chromium	Cr	52.0	51.74	Rubidium	Rb	85.45	—
Cobalt	Co	58.97	—	Ruthenium	Ru	101.7	—
Columbium	Cb	93.5	—	Samarium	Sm	150.4	—
Copper	Cu	63.57	63.12	Scandium	Sc	44.1	—
Dysprosium	Dy	162.5	—	Selenium	Se	79.2	—
Erbium	E	167.4	—	Silicon	Si	28.3	—
Europium	Eu	152.0	—	Silver	Ag	107.88	107.11
Fluorine	F	19	—	Sodium	Na	23	22.88
Gadolinium	Gd	157.3	—	Strontium	Sr	87.62	—
Gallium	Ga	69.9	—	Sulphur	S	32.07	31.82
Germanium	Ge	72.5	—	Tantalum	Ta	181	—
Gluconium	Gl	9.1	—	Tellurium	Te	127.5	—
Gold	Au	197.2	195.70	Terbium	Tb	159.2	—
Helium	He	4	—	Thallium	Tl	204	—
Hydrogen	H	1.008	1.00	Thorium	Th	232.42	—
Indium	In	114.8	—	Thulium	Tm	168.5	—
Iodine	I	126.92	125.90	Tin	Sn	119.0	118.20
Iridium	Ir	193.1	—	Titanium	Ti	48.1	—
Iron	Fe	55.85	55.60	Tungsten	W	184.0	—
Krypton	Kr	83	—	Uranium	U	238.5	—
Lanthanum	La	139.0	—	Vanadium	V	51.2	—
Lead	Pb	207.1	206.35	Xenon	X	130.7	—
Lutecium	Lu	174	—	Ytterbium	Yb	172.0	—
Lithium	Li	7.0	6.97	Yttrium	Yt	89.0	—
Magnesium	Mg	24.32	24.18	Zinc	Zn	65.37	64.91
Manganese	Mn	54.93	54.52	Zirconium	Zr	90.6	—
Mercury	Hg	200.0	198.80				

The U.S.P. adopted International 1903 Standards throughout (H=1) with the exception of Radium, which is given as 223.0.

Periodic Table of Elements founded on that of Mendeléeff. (Principles of Chemistry 1905.)
Revised to 1910 Atomic Weights.

Zero Group.	Group I.	Group II.	Group III.	Group IV.	Group V.	Group VI.	Group VII.	Group VIII.
<i>x</i>								
<i>y</i>	H=1·008							
He=4	Li=7	Gl(Be)=9·1	B=11	C=12	N=14·01	O=16	F=19	
Ne=20	Na=23	Mg=24·32	Al=27·1	Si=28·3	P=31	S=32·07	Cl=35·46	
A=39·9	K=39·1	Ca=40·09	Sc=44·1	Ti=48·1	V=51·2	Cr=52	Mn=54·93	Fe=55·85 Co=58·97 Ni=58·68
	Cu=63·57	Zn=65·37	Ga=69·9	Ge=72·5	As=74·96	Se=79·2	Br=79·92	
Kr=83	Rb=85·45	Sr=87·62	Yt=89	Zr=90·6	Cb=93·5	Mo=96		Ru=101·7 Rh=102·9 Pd=106·7
	Ag=107·88	Cd=112·4	In=114·8	Sn=119	Sb=120·2	Te=127·5	I=126·92	
Xe=130·7	Cs=132·81	Ba=137·37	La=139	Ce=140·25				
			Yb=172		Ta=181	W=184		Os=190·9 Ir=193·1 Pt=195
	Au=197·2	Hg=200	Tl=204	Pb=207·1	Bi=203			
		Ra=226·4		Th=232·42		U=238·5		

In an Appendix to "The Principles of Chemistry 1905" Mendeléeff included the elements of the Argon group and Radium, and found places in addition for two hypothetical elements which he placed before Helium and designated *x* and *y*. *y* is supposed to be an analogue of Helium and may be identified hereafter with "Coronium" which has been recognised in the Sun's coronal atmosphere. This gas according to Mendeléeff would have density about 0·2 and therefore, molecular weight 0·4 or about $\frac{1}{10}$ that of Helium.

x is the 'Ether' which Mendeléeff supposes a molecular structure. It is assumed to be inert like the Argon group and to possess a low density and Atomic Weight estimated at 0·000,000,000,053. —Mendeléeff Memorial Lecture. —Tilden. "Nature" 31/10, p.416.

Approximate Melting Points and Consistence (*Atmospheric Temperature, 11°C.*) of some Fats and Waxes suitable for Suppositories, Pastes, Creams and Ointments.

	31-32°C.	87-8-89-9°F.	
Oleum Theobromatis	39	102-2	Yellowish white, hard, brittle, and melts with ease.
Serum Preparatum } partes aq.	33-34	91-4-93-2	{ Rather hard and brittle, but melts with ease. Stiff paste. Easily softened with the fingers. Suitable for thick creams.
Oleum Theobromatis } partes aq.	35-39	95-103-2	
Paraffinum Molle	36	96-8	White, soft base.
Paraffinum Molle	38	100-4	Soft, white, unctuous.
Unguentum Ceraei	50	122	Hard, tough, and tenacious, tallowy.
Adeps	40-44	104-111-2	Yellowish, stiff, tenacious, unctuous.
Adeps Lanae	39-40	102-2-104	{ Hard. Melts easily between the fingers. Not so brittle as Oleum Theobromatis.
Oleum Theobromatis } partes aq.	47	116-6	Soft and unctuous.
Cetaceum	46-50	114-8-122	Crystalline, scaly and slippery.
Serum Preparatum	47	116-6	Stiff unguent.
Cetaceum	52	125-8	Very hard white mass.
Unguentum Paraffini	51-52	123-8-125-6	Hard glossy mass. Easily melts between the fingers.
Cerosin } partes aq.	48-51	118-4-123-8	Hard, white and brittle.
Cera Albs 1, Oleum Theobromatis 6	52-53	125-6-127-4	Hard, like good paraffin.
Japan Wax, Hard Paraffin, equal parts	53-54	127-4-129-2	White, hard, crumbling substance.
Cerosin	54-57	129-2-134-6	Crystalline, hard and unctuous (slightly greasy).
Stearin	54	129-2	Stiff white pomade.
Paraffinum Durum	59	138-2	Very hard, white mass.
Unguentum Resine	53	136-4	Hard as last, but not so white in appearance.
Adeps 3 with Cera Albs 1	58-59	136-4-138-2	White, hard, tenacious.
Adeps, Cera Albs equal parts	62-64	143-6-147-2	Hard, yellowish, from leaf buds of <i>Copernicus cerifera</i> .
Cetaceum, Cera Albs equal parts	85	185	Stiff mass, melting easily.
Cera Albs	77-78	170-6-172-4	Stiff ointment of brownish colour.
Carnauba Wax	78-79	172-4-174-2	
Carnauba Wax 1, Oleum Amygdalæ 4	60-61	140-1 41-8	Hard and wax-like.
Carnauba Wax 1, Oleum Amygdalæ 3	54	129-2	Stiff ointment.
Cera Albs, Oleum Amygdalæ, equal parts	52-53	125-6-127-4	Stiff ointment base.
Cera Albs 1, Oleum Amygdalæ 9	48-49	118-4-120-2	{ Very soft creams.
Cera Albs 1, Oleum Amygdalæ 19	43	109-4	

THERMOMETRIC EQUIVALENTS.

For temperatures below the freezing point of water:—

C.	F.	C.	F.	C.	F.	C.	F.	C.	F.
—	—	—	—	—	—	—	+	—	+
	°	°	°	°	°	°	°	°	°
	40·0	31	23·8	22	7·6	16	3·2	7	19·4
39	38·2	30	22·0	21	5·8	15	5·0	6	21·2
38	36·4	29	20·2	20	4·0	14	6·8	5	23·0
37	34·6	28	18·4	19	2·2	13	8·6	4	24·8
36	32·8	27	16·6	18	0·4	12	10·4	3	26·6
35	31·0	26	14·8	17·778	0·0	11	12·2	2	28·4
34	29·2	25	13·0	—	+	10	14·0	1	30·2
33	27·4	24	11·2	°	°	9	15·8	0	32·0
32	25·6	23	9·4	17	1·4	8	17·6		

For temperatures above the freezing point of water:—

C.	F.	C.	F.	C.	F.	C.	F.	C.	F.
+	+	+	+	+	+	+	+	+	+
°	°	°	°	°	°	°	°	°	°
1	33·8	39	102·2	77	170·6	115	239·0	153	307·4
2	35·6	40	104·0	78	172·4	116	240·8	154	309·2
3	37·4	41	105·8	79	174·2	117	242·6	155	311·0
4	39·2	42	107·6	80	176·0	118	244·4	156	312·8
5	41·0	43	109·4	81	177·8	119	246·2	157	314·6
6	42·8	44	111·2	82	179·6	120	248·0	158	316·4
7	44·6	45	113·0	83	181·4	121	249·8	159	318·2
8	46·4	46	114·8	84	183·2	122	251·6	160	320·0
9	48·2	47	116·6	85	185·0	123	253·4	161	321·8
10	50·0	48	118·4	86	186·8	124	255·2	162	323·6
11	51·8	49	120·2	87	188·6	125	257·0	163	325·4
12	53·6	50	122·0	88	190·4	126	258·8	164	327·2
13	55·4	51	123·8	89	192·2	127	260·6	165	329·0
14	57·2	52	125·6	90	194·0	128	262·4	166	330·8
15	59·0	53	127·4	91	195·8	129	264·2	167	332·6
16	60·8	54	129·2	92	197·6	130	266·0	168	334·4
17	62·6	55	131·0	93	199·4	131	267·8	169	336·2
18	64·4	56	132·8	94	201·2	132	269·6	170	338·0
19	66·2	57	134·6	95	203·0	133	271·4	171	339·8
20	68·0	58	136·4	96	204·8	134	273·2	172	341·6
21	69·8	59	138·2	97	206·6	135	275·0	173	343·4
22	71·6	60	140·0	98	208·4	136	276·8	174	345·2
23	73·4	61	141·8	99	210·2	137	278·6	175	347·0
24	75·2	62	143·6	100	212·0	138	280·4	176	348·8
25	77·0	63	145·4	101	213·8	139	282·2	177	350·6
26	78·8	64	147·2	102	215·6	140	284·0	178	352·4
27	80·6	65	149·0	103	217·4	141	285·8	179	354·2
28	82·4	66	150·8	104	219·2	142	287·6	180	356·0
29	84·2	67	152·6	105	221·0	143	289·4	181	357·8
30	86·0	68	154·4	106	222·8	144	291·2	182	359·6
31	87·8	69	156·2	107	224·6	145	293·0	183	361·4
32	89·6	70	158·0	108	226·4	146	294·8	184	363·2
33	91·4	71	159·8	109	228·2	147	296·6	185	365·0
34	93·2	72	161·6	110	230·0	148	298·4	186	366·8
35	95·0	73	163·4	111	231·8	149	300·2	187	368·6
36	96·8	74	165·2	112	233·6	150	302·0	188	370·4
37	98·6	75	167·0	113	235·4	151	303·8	189	372·2
38	100·4	76	168·8	114	237·2	152	305·6	190	374·0

Thermometric Equivalents—continued.

C.	F.	C.	F.	C.	F.	C.	F.	C.	F.
+	+	+	+	+	+	+	+	+	+
191	375.8	213	415.4	235	455.0	257	494.6	279	534.2
192	377.6	214	417.2	236	456.8	258	496.4	280	536.0
193	379.4	215	419.0	237	458.6	259	498.2	281	537.8
194	381.2	216	420.8	238	460.4	260	500.0	282	539.6
195	383.0	217	422.6	239	462.2	261	501.8	283	541.4
196	384.8	218	424.4	240	464.0	262	503.6	284	543.2
197	386.6	219	426.2	241	465.8	263	505.4	285	545.0
198	388.4	220	428.0	242	467.6	264	507.2	286	546.8
199	390.2	221	429.8	243	469.4	265	509.0	287	548.6
200	392.0	222	431.6	244	471.2	266	510.8	288	550.4
201	393.8	223	433.4	245	473.0	267	512.6	289	552.2
202	395.6	224	435.2	246	474.8	268	514.4	290	554.0
203	397.4	225	437.0	247	476.6	269	516.2	291	555.8
204	399.2	226	438.8	248	478.4	270	518.0	292	557.6
205	401.0	227	440.6	249	480.2	271	519.8	293	559.4
206	402.8	228	442.4	250	482.0	272	521.6	294	561.2
207	404.6	229	444.2	251	483.8	273	523.4	295	563.0
208	406.4	230	446.0	252	485.6	274	525.2	296	564.8
209	408.2	231	447.8	253	487.4	275	527.0	297	566.6
210	410.0	232	449.6	254	489.2	276	528.8	298	568.4
211	411.8	233	451.4	255	491.0	277	530.6	299	570.2
212	413.6	234	453.2	256	492.8	278	532.4	300	572.0

The Reaumur scale (with zero at freezing point of water and the boiling point of water being 80°) is now little used.

To convert a temperature in Centigrade into Fahrenheit multiply by $\frac{9}{5}$ and add 32.

Conversely to transpose Fahrenheit into Centigrade subtract 32 and multiply by $\frac{5}{9}$.

To convert Centigrade into Reaumur multiply by $\frac{4}{5}$.

To convert Reaumur into Centigrade multiply by $\frac{5}{4}$.

To convert Fahrenheit into Reaumur subtract 32 and multiply by $\frac{4}{9}$.

To convert Reaumur into Fahrenheit multiply by $\frac{9}{4}$ and add 32.

FREEZING MIXTURES.

For cooling and setting suppositories, bougies, &c.

The following is a list of some freezing mixtures best prepared from commercial Crystalline Salts, and in a thick wooden vessel:—

	Temp. F. reached.
Ammonium Nitrate 1, Water 1	+ 1.4
Sodium Nitrate 3, Dilute Nitric Acid 2	— 3
Ice 2, Sodium Chloride 1	— 5
Ammonium Nitrate 1, Sodium Carbonate 1, Water 1	— 7
Ice 2½, Sodium Chloride 5, Ammonium Nitrate 5	— 18
Ice 3, Sulphuric Acid 2	— 23
Ice 8, Hydrochloric Acid 5	— 27
Ice 3, Dilute Nitric Acid 2.....	— 46
Sodium Phosphate 3, Ammonium Nitrate 2, Dilute Mixed Acids 4	— 50
Ice 8, Dilute Sulphuric Acid 10	— 91

PERCENTAGE AND GRAINS PER FLUID OUNCE EQUIVALENTS.

%	Grains per fluid ounce.	%	Grains per fluid ounce.	%	Grains per fluid ounce.
10·0	... 43·75	4·5	... 19·7	1·4	... 6·1
9·5	... 41·56	4·0	... 17·5	1·3	... 5·7
9·0	... 39·4	3·5	... 15·3	1·2	... 5·25
8·5	... 37·2	3·0	... 13·1	1·1	... 4·8
8·0	... 35·0	2·5	... 10·95	1·0	... 4·4
7·5	... 32·8	2·0	... 8·75	0·9	... 3·95
7·0	... 30·6	1·9	... 8·3	0·8	... 3·5
6·5	... 28·45	1·8	... 7·9	0·7	... 3·05
6·0	... 26·25	1·7	... 7·45	0·6	... 2·6
5·5	... 24·05	1·6	... 7·0	0·5	... 2·2
5·0	... 21·9	1·5	... 6·55	0·4	... 1·75

POISONS AND PHARMACY ACT, 1908.

The **Poisons and Pharmacy Act, 1908** (8 Edw. 7, Ch. 55) came into force April 1, 1909. It received the Royal Assent Dec. 21, 1908. Evolution of the Bill.—P.J. ii./08, 831, 842. *et seq.*

Complete wording of, also Scope and Application—P. J. Supp. Mar. 27/09.

Regulations made under Section 2 of the Poisons and Pharmacy Act, 1908, for the Sale of Poisonous Substances for use exclusively in Agriculture or in Horticulture—from the London Gazette, April 2, 1909, dealing with the granting of licenses under this section, duration, renewal etc. of such licenses, keeping, inspection and copying of registers of licencees, keeping, transporting, and selling of the substances in question. Forms of Licence and Renewal Forms, P.J. i./09, 501. Editorials on the Subject, P.J. i./09, 113, 385, 489. C.D. i./09, 558.

Poisons and Pharmacy (Ireland) Regulations, 1909, *i.e.*, Irish Regulations under Section 2 of the Poisons and Pharmacy Act—*vide* C.D. ii./09, 176. Provisional Rules.—C.D. i./09, p. 520.

Problems of the Poisons Schedule. Suggested that any *poisonous alkaloid* or derivative shall be one for which the max. adult dose does not exceed 2 grains. A *derivative* may be any substance which may be prepared from another, *e.g.*, by substitution or oxidation without altering molecular structure of the parent body. Various definitions for an alkaloid.—Gadd. P.J. ii./09, 154, C.D. ii./09, 223.

By this Act restrictions will be placed on the sale of Hydrochloric, Nitric, and Sulphuric Acid. Ammonia and Potassium Bichromate would have been useful additions.—B.M.J. i./09, 612.

It is to be hoped that the local authorities who will license persons other than legally qualified chemists, to sell "poisonous substances used exclusively in agriculture or horticulture," will realise the seriousness of the new duty entrusted to them. Facilities are, that is to say, granted for more easily obtaining arsenic and nicotine. Safeguards are provided in connexion with mineral acids and soluble salts of oxalic acid,—to be labelled "Poisonous." A useful summary of the 'Titles' question. Since 1880 over 1,000 companies had been formed carrying on the business of Chemists and Druggists—many of them by persons who had failed to qualify. According to the new Act a body corporate, or in Scotland a firm or partnership, may carry on the business of Chemist and Druggist if the business is under the control of a superintendent who is duly qualified. Certificate of qualification of bona-fide superintendent must be exhibited in the shop. In future the word Pharmacist can be used by Chemists and Druggists but not by companies.—L. i./09, 849, 937.

All PART I Poisons, are marked **(P)** preceding the name of the Poison in the body of the book—*i.e.* under the main heading—it is not repeated if the name recurs several times in any monograph. PART II Poisons are marked **(P)**.

SCHEDULE OF POISONS.

APPLICABLE TO GREAT BRITAIN.

(*Within the Meaning of the Poisons and Pharmacy Act, 1903.*)

PART I (marked **P** in our text.)

Not to be sold by retail unless the purchaser is known to, or introduced by some person known to, the seller who must be a registered Chemist and Druggist or registered medical practitioner; also entry to be made in poison-book of (1) date of sale, (2) name and address of purchaser, (3) name and quantity of article, (4) purpose for which it is wanted—attested by signature of buyer; and must be labelled with (1) name of article, (2) the word "Poison," (3) name and address of seller.

Arsenic, and its medicinal preparations. (See also Arsenic Act.)

Aconite, Aconitine and their preparations.

Alkaloids.—All poisonous vegetable alkaloids not specifically named in this schedule and their salts, and all poisonous derivatives of vegetable alkaloids.

Atropine, and its salts, and their preparations.

Belladonna, and all preparations or admixtures (except belladonna plasters), containing 0·1 or more per cent. of belladonna alkaloids.

Cantharides and its poisonous derivatives.

Coca, any preparation or admixture of, containing 1 or more per cent of coca alkaloids.

Corrosive Sublimate.

Cyanide of Potassium and all poisonous cyanides and their preparations.

Emetic Tartar, and all preparations or admixtures containing 1 or more per cent. of Emetic Tartar.

Ergot of Rye and preparations of ergots.

Nux Vomica, and all preparations or admixtures containing 0·2 or more per cent. of strychnine.

Oplum, and all preparations or admixtures, containing 1 or more per cent. of morphine.

Picrotoxin.

Prussic Acid and all preparations or admixtures containing 0·1 or more per cent. of Prussic Acid.

Savin and its oil, and all preparations or admixtures containing Savin or its oil.

PART II. (marked **D** in our text.)

Must be labelled with (1) name of article, (2) the word "Poison," (3) name and address of seller who must be a registered Chemist and Druggist.

Almonds, Essential Oil of (unless deprived of prussic acid).

Antimonial Wine.

Cantharides, tincture and all vesicating liquid preparations or admixtures of.

Carbolic Acid, and liquid preparations of, and its homologues containing more than 3% of those substances, *except* preparations for use as sheep-wash, or for any other purpose in connection with agriculture or horticulture, contained in a closed vessel distinctly labelled with the word "Poisonous," the name and address of the seller, and a notice of the agricultural or horticultural purposes for which the preparations are intended.

Chloral Hydrate.

Chloroform and all preparations or admixtures containing more than 20% of chloroform.

Coca, any preparation or admixture of, containing more than 1% but less than 1% of coca alkaloids.

Digitalis.

Mercuric Iodide.

Mercuric Sulpho-cyanide.

Oxalic Acid.

Poppies, all preparations of, excepting red poppy petals and syrup of red poppies (*Papaver rhæas*).

Precipitate, Red, and all oxides of Mercury.

Precipitate, White.

Strophanthus.

Sulphonah.

All preparations or admixtures which are not included in Part I. of this Schedule, and contain a poison within the meaning of the Pharmacy Acts, except preparations or admixtures the exclusion of which from this schedule is indicated by the words therein relating to carbolic acid, chloroform, and coca, and except such substances as come within the provisions of Section 5 of this Act, e.g., Sulphuric Acid, Nitric Acid, Hydrochloric Acid, and Soluble Salts of Oxalic Acid and such other substances as may for the time being be prescribed by Order in Council under this section.—*vide* pp. 79, 37, 37, 58.

Note.—The last paragraph brings into Part II, many preparations and admixtures not defined in the Schedule—in particular preparations and admixtures of vegetable drugs containing poisonous vegetable alkaloids should be borne in mind even though the drugs themselves are not in the Schedule. All such preparations are clearly indicated in our pages with the letter (P). Reference should be made to the body of the book in cases of doubt.

No Ferrocyanide or Sulphocyanide excepting Mercuric Sulphocyanide is a poison under the Act.—P.J. ii./07, 640.

Regulations for the Keeping, Dispensing, and Selling of Poisons in Great Britain.

(Prescribed by the Pharmaceutical Society with consent of the Privy Council.)

1. That in the keeping of poison each bottle, vessel, box, or package containing a poison be labelled with the name of the article, and also with some distinctive mark indicating that it contains poison.

2. Also that in the keeping of poisons each poison be kept on *one* or *other* of the following systems, viz. :—

(a) In a bottle or vessel tied over, capped, locked, or otherwise secured in a manner different from that in which bottles or vessels containing ordinary articles are secured in the same warehouse, shop or dispensary; or

(b) In a bottle or vessel rendered distinguishable by touch from the bottles or vessels in which ordinary articles are kept in the same warehouse, shop, or dispensary; or

(c) In a bottle, vessel, box, or package kept in a room or cupboard set apart for dangerous articles.

3.—That in the dispensing and selling of poisons all liniments, embrocations, lotions, and liquid disinfectants containing poison be sent out in bottles rendered distinguishable by touch from ordinary medicine bottles, and that there also be affixed to each bottle (in addition to the name of the article, and to any particular instructions for its use) a label giving notice that the contents of the bottle are not to be taken internally.

THE SALE OF ARSENIC.

On every sale of Arsenic, in addition to the requirements of the Pharmacy Act 1868, the following provisions of the Arsenic Act (1851) are to be observed. Particulars of sale to be entered in a book by the seller as follows :—

Day of Sale.	Name and Surname of Purchaser.	Purchaser's place of abode.	Condition or Occupation.	Quantity of Arsenic sold.	Purpose for which required.
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(Purchaser's signature.) (Witness.) (Seller's Signature.)

Or if purchaser cannot write, seller to put the words "cannot write."

No person shall sell Arsenic to any person who is unknown to the person selling such Arsenic, unless the sale be made in the presence of a witness who is known to the person selling the Arsenic, and to whom the purchaser is known, and who signs his name, together with his place of abode, to such entries before the delivery of the Arsenic to the purchaser, and no person shall sell Arsenic to anyone under full age.

The Arsenic if colorless must be coloured with at least $\frac{1}{8}$ of its weight of Indigo or Soot, unless sold in a quantity of not less than 10 lbs. and for a purpose (not for use in agriculture) for which such admixture would render it unfit.

The penalty for offending against the Act is a fine of not exceeding £20.

The Act is not to prevent sale of Arsenic in medicine under a medical prescription.

"Arsenic" to include Arsenious and Arsenic Compounds, and all other colorless preparations of same.

APPLICABLE TO IRELAND,

[In accordance with the Sale of Poisons (Ireland) Act, 1870 and additions since the passing of that Act.]

Conditions of sale as under Parts I. and II. above.

PART I.

Arsenic and its preparations.

Prussic Acid.

Cyanides of Potassium and all metallic cyanides.

Strychnine and all poisonous vegetable alkaloids and their salts.

Aconite and its preparations.

Emetic Tartar.

Corrosive Sublimate.

Cantharides.

Savin and its oils.

Ergot of Rye and its preparations.

PART II.

Oxalic Acid and all oxalates.

Chloroform.

Belladonna and its preparations.

Essential Oil of Almonds, unless deprived of its prussic acid.

Opium and all preparations of opium or poppies.

Preparations of Corrosive Sublimate.

Preparations of Morphine.

Preparations of Strychnine.

Red Oxide of Mercury.

Ammoniated Mercury.

Biniodide of Mercury.

Every Compound containing any of the poisons mentioned in this schedule, when prepared or sold for the destruction of vermin.

Cantharides, the tincture and all vesicating liquid preparations of.

Phosphorus and all preparations containing it in a free state.

Chloral Hydrate and all its preparations.

Nux Vomica and its preparations.

Sulphuric Ether.

Phenol, commonly called carbolic acid.

This Irish Schedule remains unaltered by the Poisons and Pharmacy Act 1908 except as regards the Sale of Agricultural and Horticultural Poisons and Soluble Oxalates—*vide* Arsenic p. 141, and Acid Hydrochloric p. 37 and Acid Oxalic p. 65.

DROP MEASURE TABLE.

Showing the number of drops per gramme from various medicaments delivered (at 15°C.) by a standard pipette 3 mm. in external diameter (see 'Weights and Measures,' p. xxiv.). Adapted from F.E.

	No. of drops in 1 Gm.
Acetum Opii Compositum	54
Acidum Hydrochloricum (1·171)	21
" Hydrocyanicum Dilutum (2%)	22
" Nitricum, Sp. Gr. 1·321	25
" Phosphoricum, Sp. Gr. 1·35 (50% H ₃ PO ₄)	19
" Sulphuricum, Sp. Gr. 1·843	26
" Sulphuricum Alcoholisatum (Aqua Rabeliana) (Sulphuric Acid 1, Alcohol 3 cautiously mixed)	55
" Sulphuricum Dilutum 10%	21
Æther	91
" Aceticus, Sp. Gr. 0·915	60
" Sulphuricus Alcoholisatus (Hoffman's Anodyne) (Ether 4 and Alcohol 1, mixed)	73
Aqua Distillata	20
Chloroformum, Sp. Gr. 1·48	60
Creosotum, Sp. Gr. 1·08	42
Liquor Ammoniae, Sp. Gr. 0·923	24
Oleum Crotonis Tiglii (Acete de Croton Tiglio)	44
" Menthae Piperitæ, Sp. Gr. 0·89 to 0·92	52
" Terebinthinæ	56
Solutum Chloruri Ferrici, Sp. Gr. 1·26 (Liquor Ferri Perchloridi)	18
Tinctura Alcoholica Aconiti (1 of Root in 10)	58
" " Belladonnæ, 1 in 10	59
" " Cantharidis, 1 in 10 (with Cochineal 1·5 in 100)	58
" " Castorei, 1 in 20	57
" " Colchici, 1 in 10	59
" " Corticis Aurantii (Naranja) Composita (Tinctura Roborans ex Whytt)	63
" " Digitalis, 1 in 10	58
" " Fabæ Sancti (Haba de San Ignacio) (Ignatii Com- posita) Guttae Amaræ ex Baumé 1 in 2	53
" " Hamamelidis (bark and leaves of each 1 in 20)	58
" " Hydrastis, 1 in 10	58
" " Iodi (1 in 10, Alcohol 95%) (Solucion Alcohólica de Yodo)	62
" " Lobeliæ, 1 in 10	58
" " Moschi (Almizcle) 1 in 25	55
" " Nucis Vomicae, 1 in 10, 0·25% Alkaloids approximately	57
" " Opii (Extract 1 in 20)	58
" " Scillæ (escila) 1 in 5	58
" " Strophanthi (Estrofanto) 1 in 10	58
" " Viburni, 1 in 10	58
(All the above tinctures are made with Alcohol 70%.)	
Opii Compositum (Laudanum ex Sydenham)	40

GLOSSARIES

OF WORDS AND PHRASES LIKELY TO OCCUR AS DIRECTIONS IN
FOREIGN PRESCRIPTIONS.

DANISH GLOSSARY.

Baderand, lotion (lit. bath water).

Blandes, to be mixed.

Brækmiddel, emetic.

Daglig, daily.

Dessertskefuld, dessertspoonful.

Draaber, drops.

Døgnet, the space of 24 hours.

Efter Aftale, as directed.

Efter Maaltid, after meals.

Flaske, bottle.

Forkølelse, cold.

Fortyndes, to be diluted.

For Maaltid, before meals.

Glas, glass.

Godt, well.

Gurglevand, gargle.

Haarvand, hair-lotion.

Hjerte, heart.

Høstemixtur, cough-mixture.

Hovedpine, head-ache.

Hver anden, every two.

Hver tredje, every three.

Igle, leech.

Ikke, not.

Indaanding, inhalation.

Indgnides, to be rubbed.

Indsprøites, to be injected.

Kop, cup.

Krukke, pot.

Lige Dele, equal parts.

Ligtorn, corn.

Mave, stomach.

Mellem, between.

Mundvand, mouth-wash.

Nat, night.

Næse, nose.

Næsebor, nostril.

Omrystes, shake (the bottle).

Omslag, poultice.

Opløse, dissolve.

Pensle, paint (lit. pencil).

Pulver, powder.

Rystes, shake (the bottle).

Salve, ointment.

Signatur, label (medical label).

Skefuld, spoonful.

Smærte, pain.

Spiseskefuld, tablespoonful.

Straks, at once.

Tages, to be taken.

Teskefuld, teaspoonful.

To Gange, twice.

Tre Gange, three times.

Ved Sengetid, just before retiring to
rest (lit. at bed-time).

Vægt, weight.

Æske, box.

Øjendraaber, eye-drops.

Øjelaag, eye-lids.

Øjenvand, eye-wash.

Ørepine, ear-ache.

DUTCH GLOSSARY.

Braking, vomiting.

Dagelijks, from day to day.

Dicht by, near to.

Den volgende morgen, early to-morrow
morning.

Droppels or *Druppels*, drops.

Gebruik, apply.

Gedurende het bruisen, during efferves-
cence.

Gelijke deelen, equal parts.

Hoest, de, the cough.

Indien het hoesten lastig is, when the
cough is troublesome.

Kokend, boiling.

Kopje, cup.

Laten liggen, lying down.

Met mate, by degrees.

Mondspoeling, mouth-wash.

Na den maaltijd, after meals.

Niet te gebruiken, not to be taken.

Omschudden (the bottle) to be well
shaken.

Onmiddellijk, immediately.

Oogwassing, eye-wash.

Ook, also.

Op de gebruikelijke wijze, in the usual
manner.

Plaatselijk aan te wenden, for local use
only.

Verdeeld in gelijke deelen, let it be
divided in equal parts.

Voor het naar bed gaan, just before
retiring to rest.

Voor uitwendig gebruik, for outward
application only.

Voor inwendig gebruik, for internal use.

Zonder, without.

Zoo noodig, if necessary.

FRENCH GLOSSARY.

- A moins que*, unless.
Après les repas, after meals.
Au dessus, above.
Aussi, also.
Bien, well.
Bien agiter le flacon, the bottle to be well shaken.
Boire, drink.
Bouillant, boiling.
Chaque jour, daily.
Charpie, lint.
Chauffé, warmed.
Collyre, eye-wash.
Coton hydrophile, absorbent wool.
Cuillerée, spoonful.
Cuillerée à dessert, dessert-spoonful (10 gm.).
Cuillerée à thé, teaspoonful (*ou à café* — 5 gm.).
Cuillerée ordinaire, tablespoonful (15 gm.).
Cuir, leather.
De bonne heure demain, early to-morrow.
De jour en jour, from day to day.
De la façon habituelle, in the usual manner.
De la façon prescrite, in the manner directed.
Demain matin, to-morrow morning.
Demain soir, to-morrow night.
De temps en temps, occasionally.
Dissoudre, dissolve.
Douleur, pain.
Droite (à), to the right.
En se couchant, lying down.
Ensemble, together.
Entre, between.
Etiquette, slip-label.
Flacon (le) ayant été agité, the bottle having been shaken.
Friction, rub.
Hier, yesterday.
Jusqu'à ce que, up to.
Juste avant d'aller se coucher, just before retiring to rest.
La hanche, the hip.
La main, the hand.
Le cœur, the heart.
Le (ou la) même, the same.
Ne pas avaler, not to be taken.
Nuit, night.
Par degrés, by degrees.
Pendant l'effervescence, during effervescence.
Pendant que la douleur dure, while the pain lasts.
Poignée, handful.
Poudre, powder.
Pour être administré, to be administered.
Pour l'usage partiel seulement, for local use only.
Pour placer dans l'œil, to be placed in the eye.
Près de, near to.
Quand la toux est gênante, when the cough is troublesome.
Quantité suffisante, sufficiency.
Rince-bouche, mouth-wash.
Sangue, leech.
Sans, without.
Semaine, a week.
Seul, e, alone.
Si nécessaire, if necessary.
Tasse, cup.
Tous les deux jours, every other day.
Tous les matins (soirs), every morning (night).
Tous les quarts d'heure, every quarter-hour.
Tous les trois jours, every third day.
Toutes les deux heures, every two hours, or every other hour.
Toux (la), the cough.
Un blanc d'œuf, white of an egg.
Une fois, once.
Un jaune d'œuf, yolk of an egg.
Verre à madère, wineglass.
Verrée (une), wineglass (8 cuillerées ordinaires—120 gm.).
Versez, pour off.

GERMAN GLOSSARY.

- Abend*, evening.
Abkochung, decoction.
Alle—Stunden—Tropfen zu nehmen, so many drops every—hours.
Alle, viertel Stunden, every quarter-hour.
Alle zwei Stunden, every other hour.
Allmählich, by degrees.
Anwenden, apply.
Anzugeben, administer.
Auflösen, dissolve.
Augenwasser, eye-wash.
Ausgenommen wenn, unless.
Ausgießen, pour off.
Becher a cup.
Beim zu Bett gehen, at bedtime.
Bis auf, up to.
Blutegel, leech.
Dasselbe, the same.
Dessertlöffel, dessertspoonful.
Diese Arznei darf nicht eingenommen werden, not to be taken.
Diese Arznei darf ohne erneute schriftliche Verordnung des Arztes nicht repetirt werden, this medicine may not be repeated without written order of the physician.
Drei mal täglich, thrice daily.
Ebenfalls, also.
Eigelt, yolk of an egg.

German Glossary—continued.

Eine Stunde, an hour.
Eine Woche, a week.
Eingeben, administer.
Eiweiss, white of an egg.
Erbrechen, vomiting.
Erwärmt, warmed.
Esslöffel, tablespoon.
Für innerlichen Gebrauch, for internal use.
Gelegentlich, occasionally.
Genau, accurately.
Genügend, sufficiency.
Gestern, yesterday.
Gleiche Teile, equal parts.
Gurgelwasser, gargle.
Gut, well.
Herz, heart.
Hüfte, hip.
Husten, cough.
In das Auge zu bringen, to be placed in the eye.
In der angegebenen Weise, in the manner directed.
In der gewohnten Weise, in the usual manner.
In gleiche Teile zu teilen, let it be divided into equal parts.
Jeden Abend, every evening.
Jeden Morgen, every morning.
Jeden zweiten Tag, every other day.
Kochend, boiling.
Kurz vor dem Schlafen gehen, just before retiring to rest.
Leder, leather.
Löffel, spoon.
Macerieren, macerate.
Morgen früh, to-morrow morning.
Mundwasser, mouth-wash.
Nach Bedarf, if necessary.
Nach Bericht, as directed.
Nach dem Essen, after meals.

Nachdem man die Flasche umgeschüttelt hat, the bottle having been first shaken.
Nach einer Stunde, at the expiration of an hour.
Nahe, near.
Niederliegend, lying down.
Nur auf ärztliche Anweisung abzugeben, to be given only on the medical man's direction.
Nur für äusserlichen Gebrauch, for external use only.
Nur für örtlichen Gebrauch, for local use only.
Ohne, without.
Plätzchen, lozenge.
Pulver, powder.
Recht, right.
Reiben, rub.
Schmerz, pain.
Sofort, immediately.
Spritze, Syringe.
So lange der Schmerz anhält, while the pain lasts.
Stets kühl zu stellen, to be kept cool.
Streichen, spread.
Täglich, daily.
Trunk, draught.
Ueber, above.
Umschlag, poultice.
Umschütteln, shake (the bottle).
Verbandwatte, absorbent wool.
Von Tag zu Tag, from day to day.
Vor dem Gebrauch umzuschütteln, to be well shaken before use.
Vorsicht, with care.
Vorsichtig, cautiously.
Während des Aufbrausens, during effervescence.
Wenn der Husten belästigt, when the cough is troublesome.
Zubereitet, prepared.
Zwischen, between.

ITALIAN GLOSSARY.

A caldo, warmed.
Aggiungere un cucchiaino ad un ½ litro di acqua bollente, e fare inalazioni colla evaporazione, one teaspoonful to a "pint" of boiling water and the steam inhaled.
Agitare la bottiglia prima di usarla, the bottle having been first shaken.
A gradi, by degrees.
A meno che, unless.
Al di sopra, above.
Appicare, apply.
Appicare la filaccia sulla ferita, frequentemente, e quando sia asciutta ripetere di nuovo l'applicazione; apply lint to the wound frequently; as soon as dry repeat application again.

Applicate gentilmente sulla parte del dolore apply gently to the seat of pain.
Bagnarsi gli occhi, eye-wash.
Bollire, boiling.
Comè fu detto, as previously directed.
Cucchiaino da Caffè, dessertspoon (very few people take 'tea' in Italy).
Cucchiao, spoonful.
Cucchiaino da tavola, tablespoonful.
Cuoio, leather.
Da applicarsi dietro l'orecchio destro, apply behind the right ear.
Da applicarsi leggermente prima di coricarsi, to be applied lightly at bedtime.
Da applicarsi sulla eruzione cutanea, to be applied to the eczematous rash.

Italian Glossary—continued.

Da bere, drink.
Da giorno in giorno, from day to day.
Da sciogliersi, dissolve.
Da somministrarsi, to be administered.
Da strofinare con un panno il cuoio capelluto sera e mattina, to be rubbed into the bare patches on the scalp night and morning.
Da usarsi localmente, for local use only.
Da vicino, near to.
Dolore, pain.
Domani sera, to-morrow night.
Domattina, to-morrow morning.
Domattina presto, early to-morrow.
Dopo i pasti, after meals.
Dopo un' ora, at the expiration of an hour.
Esattamente, accurately.
Etichetta, slip label.
Filaccia, lint.
Filtro, strain.
Fino a, up to.
Fino a che dura il dolore, while the pain lasts.
Fra mezzo, between.
Fuori, without.
Giacere, lying down.
Giornalmente, daily.
Giusto, right.
Gocce, drops (of liquid).
Idrofilo, absorbent.
Ieri, yesterday.
Il bianco d' un uovo, white of an egg.
Il cuore, the heart.
Insieme, together.
L' anca, the hip.
La mano, the hand.
La tosse, the cough.
Lo stesso, the same.
Non più di 4 volte al giorno, not more than four times a day.
Ogni due ore, *Un' ora sì, e l' altra no*, every other hour.

Ogni quarto d' ora, every quarter of an hour.
Ogni sera, every night.
Ogni 2 ore, every two hours.
Ogni 3 giorni, every third day.
Pastiglie, lozenges.
Pennellare la gola ogni giorno mezz' ora dopo colazione, paint the throat every day about half an hour after breakfast.
Per pennellature alle narici due volte al giorno, apply to the nostrils with a camel's hair brush twice a day.
Per sciacquare la bocca, mouth-wash.
Prima di coricarsi, just before retiring to rest.
Pure, also.
Quando la tosse arreca disturbo, when the cough is troublesome.
Sera, night.
Se sarà necessario, if necessary.
Settimanalmente, weekly.
Sorso, draught.
Tazza, cup.
Tre volte al giorno, three times a day.
Tutte le mattine, every morning.
Una goccia dentro la pupilla degli occhi una volta al giorno, a drop into the lower lid of each eye once a day.
Una manciata, handful.
Una settimana, a week.
Una volta, once.
Un bicchiere da vino, wine-glass.
Un giorno sì ed un giorno no, every other day.
Un torlo d' uovo, yolk of an egg.
Un'uovo, an egg.
Versare, pour off.
Vicino, near.

PORTUGUESE GLOSSARY.

A, the (feminine).
Acima, above.
Almoço, breakfast (lunch).
Amanhã á noite, to-morrow night.
Amanhã pela manhan, to-morrow morning.
A menos que, unless.
Applica-se suavemente na séde da dôr, it is applied gently to the painful part.
Aproximadamente, about (more or less). *Perto (de)*, *junto (a)* near (to).
Aquecido, warmed.
Atraz, behind.
Beber, to drink.
Bem, well.
Cabelludo, hairy. *Scalp*, *a pelle do cráneo*.
Calvo, bald.

Cautamente, cautiously.
Chavena, cup.
Chicara, cup.
Coár, to strain.
Colhér cheia, spoonful.
Colhér de chá cheia, teaspoonful.
Colhér de doce cheia, dessertspoonful.
Colhér de sopa cheia, tablespoonful (soup-spoon).
Com cuidado, cautiously.
Com precisão, accurately.
Coração, o, the heart.
Couro, leather.
Cuidadosamente, carefully.
De deitar-se, á hora, at bedtime.
De dia a dia, from day to day.
Deitado, poured, or lying down.
Depois, after.
De tresem 3 dias, every third day.

Portuguese Glossary—continued.

De vez em quando, occasionally.
Direito, lado, right side.
Dór, pain.
Enquanto dura a dór, while pain lasts.
Entre, between.
Erupção, the rash.
Esfregar, to rub.
Estender, to stretch, extend.
Exactamente antes de retirar se para descansar, just before retiring.
Fios de linho or *lichino*, lint.
Garganta, the throat.
Garrafa bem agitada, the bottle well shaken.
Gema d'um ovo, yolk of egg.
Gotas, drops.
Hontem, yesterday.
Hostia, cachet or wafer.
Já, immediately.
Lavagem de boca, mouthwash.
Lavagem para os olhos, eye-wash.
Mais, more.
Mão cheia, handful.
Mão, hand.
Mesmo, same.
Não, not.
Noite, night.
No meio de, in the middle of.

SPANISH GLOSSARY.

Agua para lavar la boca, mouth-wash.
Agua para lavar los ojos, eye-wash.
A la hora de acostarse, at bed-time.
Almuerzo, breakfast (lunch).
A no ser que, unless.
Apliquese suavemente al sitio del dolor, apply gently to the painful parts.
Aproximativamente, about (more or less).
Atrás, behind.
Ayer, yesterday.
Beber, to drink.
Bien, well.
Botella bien agitada, bottle well shaken.
Cabeludo, hairy. Scalp (hair) *el cabello del cráneo*.
Cabritilla, kid leather.
Cadera, hip.
Calentado, warmed.
Calvo, bald.
Cerca, near; near to.
Colar, to strain.
Comidas, meals.
Con cuidado, with care.
Con precision, accurately.
Corazon, el, the heart.
Cucharada, spoonful.
Cucharada de postre, dessertspoonful.
Cucharada de sopa, soup- or table-spoonful.
Cucharadita de té, teaspoonful.
Cuero, leather.

O, the (masculine).
Orelha, ear.
Para ser, to be.
Pela manhã, in the morning.
Pellica, kid leather.
Perto, near.
Pó, powder.
Quadril, hip.
Refeições, meals.
Sunguesuga, a leech.
Semana, uma, a week.
Sítio, place.
Sem, without.
Sim, yes.
Taça, large cup (goblet bowl).
Tambem, also.
Todos os dias, daily.
Tosse, cough.
Uma gota na palpebra inferior de cada olho, uma vez por dia, a drop into the lower lid of each eye once daily.
Uma hora sim, uma não, every other hour (one hour yes, one no).
Uma vez, once.
Um dia sim outro não, every other day.
Vasar, to pour off.
Venta, nostril.
Vez, cada, each time.

Cuidadosamente, carefully, accurately & cautiously.
De dia en dia, from day to day.
De tres en tres dias, every third day.
Derecha, right (hand).
Despues, after.
De vez em quando, occasionally.
Dolor, pain.
Echado, poured or lying down.
El, the (masculine).
En medio de, in the middle of.
Encima, above.
Entre, between.
Erupción, rash.
Exactamente antes de retirarse para dormir, just before retiring.
Estender, to spread.
Garganta, the throat.
Giro, draft.
Gotas, drops.
Hilas de lino, lint.
Inmediatamente, immediately.
La, the (feminine).
Llegado, arrived.
Mano, hand; *Mañana por la mañana*, to-morrow morning.
Mano llena, handful; *Mañana por la noche*, to-morrow night.
Mis, more.
Mientras dura el dolor, while the pain lasts.
Mismo, same.
Nariz, nostril.

Spanish Glossary—continued.*No*, not.*Noche*, night.*Orden* (or *Pedido*), order.*Oreja*, ear.*Ostia*, *Oblea*, wafer.*Para ser*, to be.*Polvo*, powder.*Por la mañana*, in the morning.*Restregar*, to rub.*Sanguijuela*, leech.*Semana*, *una*, a week.*Sin*, without*Sitio* (or *lugar*) place.*Tambien*, also.*Taza*, cup (drinking), or tea cup.*Todos los dias*, daily.*Tos*, cough.*Una hora si y la otra no*, every other hour.*Una gota en el párpado inferior de cada ojo, una vez al día*, a drop into the lower lid of each eye once daily*Una vez*, once.*Un día si y el otro no*, every other day*Vaciar*, to pour off.*Vez una*, once (one time).*Yema de huevo*, yolk of egg.

INDEX & POSOLOGICAL TABLE.

THIS index supplies the name *in Latin* as far as possible and adult dose (if used internally) of most of the drugs and preparations described in the foregoing pages. The doses are based on personal experience, or are culled from the best authorities.

Official names are printed in italics. Many of these, not elsewhere mentioned are included in appropriate doses. Lists of Formulæ for Antrophores, Aurinaria, Bougies, Capsules, 'Collapsubes,' Effervescent Preparations, Hypodermic Injections and Tablets, Lamels, (Ophthalmic), Lozenges (Trochisci), Ovules, Pessaries, Pills, 'Solubes,' 'Sterules,' Suppositories, Tabellæ (Chocolate), Tablets (Compressed) and 'Vescettes' are supplied.

Note: As many substances can be compressed into Tablets it would be unnecessary to repeat same under the Heading 'Tablets.' The tablet list is *representative* but the enquirer is referred to the body of the book in other instances *per* the medicament in question.

For all Acids look under the word Acid, for Salts *vide* Latin name of the base.

For Capsules, both gelatin and glass, *vide* Capsules.

For Pastilli Glyco-gelatin, *v.p.* 342.

For Effervescent Preparations, see list under the word Effervescent.

For Mineral Waters, consult pp. 836-845.

Patent Medicines are now included as a rule in this Index.

Where several pages are given the chief reference is in bold type, thus—500.

Some items, *e.g.*, some official Medicamenta and Pilulæ have purposely no page—*i.e.*, they are not further described in the book.

Customary contractions have been found necessary in this Index. The following may be cited:—

Acid. or Ac. = Acidus, -a, -um, etc.

Alc. = Alcoholic.

Alz. = Alkalinus, etc.

Av. = Average (Dose).

Caps. = Capsula, etc.

C = cum (with).

Co. = Compositus, etc. (or compound).

Conc. = Concentratus, etc.

Eff. = Effervescens, etc.

Emplast. = Empiastrum, etc.

Emuls. = Emulsi, etc.

Expt. = Expectorant.

Extr. = Extractum, etc.

Glycerin = Glycerinum, etc.

Fluidextr. = Fluidextractum

Glyceroph. = Glycerophosphas, etc.

HBr. = Hydrobromidum, etc.

HCl. = Hydrochloridum, etc.

Hy. = Hydrargyrum, etc.

Hyp. = Hypodermicus, etc.

Inf. = Infusum, etc.

Inj. = Injectio, etc.

Incr. = Increased.

Linim. = Linimentum, etc.

Liq. = Liquor or Liquidus, etc.

Mag. = Magnesium, etc.

Mang. = Manganesium, etc.

Mist. = Mistura, etc.

Potass. = Potassium, etc.

Quin. = Quinina, etc.

Rad. = Radix, etc.

Rep. = Repeated.

Salicyl. = Salicylas, etc.

Sol. = Solutio, etc.

Spirit. = Spiritus, etc.

Strych. = Strychnina, etc.

Syr. = Syrupus, etc.

Tinct. = Tinctura, etc.

Ung. = Unguentum, etc. (or Ointment).

Vin. = Vinum, etc.

'85 = B. P. 1885.

Vide also List of Abbreviations pp. xx.

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Abbey's Salt	...	740	Acid. <i>Acetic Glaciale</i> , 99%, 2 to 5 m.	...	1
Abbreviations	...	xx. <i>et seq.</i>	" <i>Aceto-Salicyl.</i> , 10 to 15 gr.	...	71
A. B. C. Liniment	...	86	" <i>Acetyl - p. - aminophenyl-</i>	...	160
Abdominal Dressings	...	353	<i>arsonic</i> ...	...	160
Abies Balsamea 728; Canadensis	...	719	" <i>Acetyl-o-Coumaric</i> , 5 to 10	...	32
Abrastol, 10 to 30 gr.	...	461	<i>gr.</i> ...	...	32
Abrus Precatorius; Abrin	...	687	" <i>Aethyl - Sulphuric.</i> , 2 to	...	79
<i>Acacia Cortex</i>	732	<i>8 m.</i> ...	...	690
" <i>Gummi</i> , ad lib.	...	672	" <i>Agaric.</i> , $\frac{1}{2}$ to $\frac{1}{2}$ gr.	...	690
<i>Acalypha</i>	732	" <i>Alginic.</i> ...	...	500
A.C.E.	233	" <i>Allophanic</i> ...	...	2, 472
Aceite (Oil) de Beleño, F.E.=	...	393	" <i>Amido acetic</i> ...	...	472
<i>Oleum Hyoscyami</i> , 1 in 15	...	500	" <i>caproic</i> ...	...	472
Aceite de Palo(Ph.Notes)=Copaiba	...	105	" <i>ethane sulphonic</i>...	...	472
Acetaldehyde	242	" <i>formic</i> ...	...	472
<i>Acetanilide</i> . 1 to 3 gr.	...	121	" <i>glutaric</i> ...	...	472
Acetate d'Ammonium Dissous	...	427	" <i>propionic</i> ...	...	472
Acetextracts	2	" <i>succinic</i> ...	...	472
Acetic Anhydride	93	" <i>Amido - Succinic - Amide</i> ,	...	693
<i>Acetic Ether</i> , 60-90 m.; 20-40	...	104;	1-2 gr. ...	...	34
<i>m. rep.</i>	...	858	" <i>Aminic.</i> , 2 to 10 m,	...	153
Acetone, 60-90 m. daily, 104;	...	214	" <i>Aminophenylarsonic</i> ...	...	162
<i>in Urine</i> ,	...	230	" <i>Amino - phenyl - arsnic</i>	...	162
" <i>Canth. Collod.</i>	281	<i>(bis)</i> ...	...	162
" <i>Chloroform</i> , 1 to 5 m.	...	244	" <i>Amino - phenyl - stibinic</i>	...	162
" <i>Collodion</i>	253	<i>(p.)</i> ...	...	153
Aceto-phenone, $1\frac{1}{2}$ -5m.	...	245	" <i>Anilin-arsenic</i> ...	...	149, 153
Acetopyrin, $7\frac{1}{2}$ to 15 gr.	...	251	" <i>Arsanilic.</i> ...	...	147, 851
Acetozone	1	" <i>Arsenic</i> , 1-60 to 1-12 gr.	...	141
Acet-phenetidin, 5-10 gr.	...	302	" <i>Arsenios</i> , 1-60 to 1-15 gr.	...	149
Acetum and A. Aromatic.	...	213, 214	" <i>Arsinic</i> ...	...	149
" <i>Digitalis</i> , Ned.	681	" <i>Arsonic</i> ...	...	472
" <i>Cantharidis</i> , 1 in 10	...	427	" <i>Aspartic</i> ...	...	175
" <i>Cevadilla</i>	735	" <i>Auro-chloric</i> ...	...	675-677
" <i>Ipecac.</i> , 5-30 m.	...	504	" <i>Barbituric & Comps.</i>...	...	5
" <i>Mylabridis</i>	721	" <i>Benz-amido-Acetic.</i> ...	...	3
" <i>Opii</i> , U.S., 8 m.	...	724	" <i>Benzoicum</i> (and detection,	...	860
" <i>Rhinacanthi</i>	738	4), 5 to 15 gr. ...	...	6, 435
" <i>Scilla</i> , 10-30 m.	...	160	" <i>Betanaphthalene sulphonic</i>	...	859
" <i>Urginea</i> , 10-30 m.	...	87	" <i>Boric.</i> , 5 to 15 gr. ...	...	7
Acetyl-atoxyl, $\frac{3}{4}$ to 3 gr.	...	89	" <i>Detection of, in Milk</i>	...	41, 859
" <i>benzoyl-aconine</i>	3, 866	" <i>Boro-Salicyl.</i> ...	...	150
" <i>benzoyl-benzaconine</i>	459	" <i>Butyric.</i> ...	...	210
" <i>choline</i>	76	" <i>Cacodylic.</i> , $\frac{1}{2}$ to 2 gr.	...	472
" <i>Morphine HCl</i> , $\frac{1}{4}$ to $\frac{1}{4}$...	74	" <i>Camphoric</i> , 10-20 gr....	...	64
<i>gr.</i> , 458; base, $\frac{1}{4}$ to $\frac{1}{4}$...	880	" <i>Carbamic</i> ...	...	11, 849
<i>gr.</i>	73	" <i>Carbazotic</i> , $\frac{1}{4}$ -2 gr....	...	12
" <i>p.-amido-salol</i> , 10 to 15 gr.	...	88	" <i>Carbolic.</i> , 1 to 3 gr....	...	22
" <i>-Methyl-Salicyl</i> , 10 to 30 gr.	...	88	" <i>Carbolic. Liq.</i> , 1 to 3 m.	...	27
" <i>phenylhydrazin</i> , $\frac{1}{2}$ to 3 gr.	...	697	" <i>Carbolic. Liq. et Iodum</i> ...	...	697
" <i>-Salol</i> 15 gr....	...	632	" <i>Carbonic.</i> ...	...	28
" <i>veratryl-pseud-aconine</i>	644	" <i>Carminic.</i> ...	...	622
Acetylation process for oils	...	71	" <i>Cathartic.</i> , 4 to 8 gr....	...	29
<i>(P. Off.)</i>	133	" <i>Chloracetic. (mono- di- tri)</i>	...	235, 622
Acetysal	906	" <i>Cholalic.</i> ...	...	29
Ache des Marais	112	" <i>Chromic. (test, 864)</i> ...	...	29
Achorion Schönleinii	...	691	" <i>Chrysophanic.</i> , $\frac{1}{2}$ - $\frac{1}{2}$ gr.	...	29
Acibar (F.E. = Aloes, Socotrine)	...	911	" <i>Cinnamic</i> , 1-20- $\frac{1}{2}$ gr....	...	33
Acid Anacardic	3	" <i>Citricum</i> , 5 to 20 gr....	...	501
Acid-fast Bacteria	873	" <i>Copaibic.</i> ...	...	31
Acidol, 1 to 8 gr.	...	1	" <i>Coumaric.</i> ...	...	77
Acidophilous Mixture	1	" <i>Cresotinicum</i> ...	...	13
Acid. <i>Acetic.</i> , 33%, 5-15 m....	...	1	" <i>Cresylic.</i> ...	...	295
" <i>Acetic. Dil.</i> , 4-27%, $\frac{1}{2}$ to 2 dr.	...	1	" <i>Cubebic</i> , up to 15 gr....	...	295

NAME.	DOSE.	PAGE
Acid. Dicumphorylarsonic	...	162
" Diethylarsinic	...	152
" Diethylbarbituric	...	675
" Di-iodomethylarsonic	...	152
" Di-iodo-p-phenol-sulphonic	...	403
" Dimeth.-arsinic, $\frac{1}{2}$ to 2 gr.	...	150
" Di-oxyphenylacetic	...	880
" Dipropylbarbituric	...	677
" Eugenic	...	705
" Filicic, 6 to 15 gr.	...	334
" Fluoric	...	39
" Formic, 2-10 m.	...	34
" Gallic, 5 to 15 gr.	...	687
" Glutaric	...	83
" Glycerophosph., 5 to 10 m.	...	60
" Glycuronic	...	877
" Gynocardic, $\frac{1}{2}$ -3 gr.	...	491
" Hippuric, 5-20 gr.	...	5, 881
" Hydriodic	...	412
" Hydrobrom. Conc.	...	36
" " Dil. 15 to 60 m.	...	36
" Hydrochlor., 31.79 %, 2-6 m.	...	37, 849
" " As. free	...	37
" " Dil., 10-58 %, 5 to 20 m.	...	37
" Hydrocyanic. Dil., 2 %, 2-6 m.	...	38
" (Scheele), 1 to 3 m.	...	38
" Hydrofluoric. Dil., 5-15 m.	...	39
" et Conc.	...	39
" Hydroxy-cinnamic	...	31
" " succinic, 1 to 5 gr.	...	688
" Hyperosmic, $\frac{1}{4}$ gr.	...	688
" Hypophosphorus	...	531
" " Dil., av. 8 m.	...	531
" Iodic, 1 to 5 gr.	...	40
" Iodo-behenic	...	412
" 'Iodo-formic'	...	35
" Kinic, 4 to 8 gr.	...	569
" Lactic, 75%, 5 to 20 m.	...	41, 895
" Lactic. Dil., 30 to 120 m.	...	41
" Lactic Bacilli	...	44
" " Curdled Milk	...	47
" Lacticic, 1-6 to $\frac{1}{2}$ gr.	...	690
" Malic, 1 to 5 gr.	...	688
" Malonic. Comps.	...	83
" Meconic	...	688
" Meta-amido-p-oxybenzoic	...	271
" Metaphosph.	...	59, 861
" Methylene-Citryl-Salicyl,	...	73
" 10 to 15 gr.	...	73
" Monochloracetic	...	28
" Mowrie	...	694
" Nitric, 70%, 1-4 m	...	57
" " Dil., 17-44%, 5 to 20 m.	...	57
" " Fumans	...	58
" Nitro-hydrochlor. Dil. and	...	58
" Fort	...	58
" Nucleinic. (Sol.), 15 m.	...	225
" Oleic. (Caps., $7\frac{1}{2}$ m. 487)	...	486
" Osmic, sol. 1%, 2 to 10 m.	...	688
" Oxalic	...	58
" Oxy-benzoic, 5 to 10 gr.	...	66
" Oxybenzylidine - arsanilic	...	161
" (p.)	...	161

NAME.	DOSE.	PAGE
Acid. Oxybutyric	...	859
" Perboric	...	10
" Phenol-sulphonic	...	24
" Phenyl-acrylic, $\frac{1}{10}$ to $\frac{1}{2}$ gr.	...	29
" Phosphor. Conc., 68.30%, 1-4 m	...	59
" " Dil., 13.8%, 5-20 m.	...	59
" " Glacial	...	59, 861
" Picric, $\frac{1}{4}$ to 2 gr.	...	64, 860
" Picrolonic	...	253, 369
" Picro-Sulphuric	...	874
" Propylarsonic	...	153
" Propylbarbituric	...	677
" Prussic. Dil., 2-6 m.	...	38
" Pyrogallie, $\frac{1}{2}$ to $1\frac{1}{2}$ gr.	...	65
" " Oxydat.	...	65
" Pyrologneous, P.G. 4.5, Aust.,	...	
" Ned. 6%	...	
" Pyrotartaric	...	83
" Quillaic	...	721
" Quinic, 4 to 8 gr.	...	569
" Ricinoleic	...	496
" Rosolic	...	897
" Salicylic, 5 to 20 gr.	...	66, 850
" Salicyl-sulphonic	...	862
" Sclerotic, $\frac{1}{2}$ - $\frac{3}{4}$ gr.	...	314
" Sebacic	...	412
" Sozolic	...	24
" Sphacelinic	...	312
" Stearic	...	77, 541
" Succinic, 5 to 10 gr.	...	78
" Succinyl - Salicylicum,	...	
" 15 gr.	...	74
" Sulphanilic, 5 to 10 gr.	...	244, 864
" Sulphocarbolic	...	24
" Sulphuric, 98%, 1 to 2 m.	...	79
" " Alcoholisat.	...	79
" " Aromat., 5 to 20 m.	...	79
" " Dil., 5-20 m.	...	80
" " Fumans	...	80
" Sulphuros., 30-60 m.	...	80, 850
" Tannic, 2 to 5 gr.	...	81
" Tar	...	13
" Tartaric, 5-20 gr.	...	82
" Tetraiodocacodylic	...	153
" Thyminic, 5 to 10 gr.	...	831
" Toluic	...	77
" Tollylarsonic (p.)	...	153
" Trichloracetic	...	28, 862
" Trichlorphenic	...	26
" Trimethyluric, 1 to 5 gr.	...	261
" Trinitrophenic	...	64
" Tropic	...	166
" Uricum, Estimation	...	834
" Valerianic, 1-5 m.	...	678
" Vanadic, meta.	...	729
" Vanillic	...	729
Acids. Iontophoresis of	...	419
Aene Lotion	...	721
" Bacteriology	...	897
" Vaccine	...	757
Acocanthara	...	84
Acoïn, 248; Oil	...	268
Aconite Leaves and Root	...	85
Aconitina, 1/400-1/200 gr.	...	87

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Aconitum Anthora		86	Agar, 689; 1 dr., 920; Blood, 920;		
Aconitina HBr., HCl., Nit. 1-640			„ Glucose, Glyc., Maltose ...		920
„ gr. hyp.		88	„ China Green		916
„ Oleat., 1 in 50		88	Agarius Albus, 10 to 30 gr., 689;		
Aconitum Chasmanth., 88; Ferrox,			Agaricin, 1-6 to 1 gr., 690;		
688; Fischeri, 688; Heteroph.,			Surgeon's		691
5 to 20 gr., 688; Japonic. Ly-			Agave Mexic.		720
coctonum, 688; <i>Napellus</i> , 85;			Agricultural Poisons		932
Spicat.		88	Agrimony 690; <i>Agropyrum</i> ...		732
Acrinyl isothiocyanate		824	Agurin, $\frac{7}{8}$ to 15 gr.		664
<i>Actæa Racemosa</i>		701	Air, Liquid, and Apparatus ...		511
Actinium		598, 599	Airol, Airoform, Airogen		189
Actinomycosis		837	Ajenjo, F.E. = Absinthe		
Actol (Argenti Lactas) $\frac{1}{2}$ gr. ...		136	Alabastrine, 462; Albargin ...		141
Addendum, I. and O.		732	Alacet 85; Alanine		472
<i>Adeps and Adeps Benz.</i>		688	Albalyalde o' Cerusa, F.E. =		
„ Induratus		688, 739	Plumbi Carbonas		556
„ <i>Lana and Hydros.</i>		88, 89	Albo-carbon		462
Adeps Lotus, P. Dan. = Adeps		688	Albulactin		480
Adenin 883; <i>Adhatoda</i>		732	Albukola		741
Adnephryn		826	Albumin Ovi siccum		475
Adonis Vernalis (Adonidin $\frac{1}{4}$ to $\frac{1}{2}$			„ e Sanguine		475
gr.), 3 to 6 gr.		688	„ Tannicum, P. Jap.		82
Adormidera, F.E. = Papaver ...			„ Water		475
Adrelaline		826	Albuminuria, 860, 863; caused by		
Adrenalin 826, with Eucaine 269,		829	poisons		864
„ Chlor. Sol. 5 to 20 m.,			Albumoses		471, 860
827; Gauze, 829; Inha-			„ Bence Jones'		860
lant, 828; Ointment, 829;			<i>Alchemilla Arvensis</i>		690
Sterules, 829; Styptic			<i>Alcohol, Absolute</i> , 97; <i>Allyl</i> , 104;		
Gelatin, 829; Suppos.			<i>Ammoniatum</i> , 122; <i>Amylic</i> , 104;		
829; Tablets, 828.			<i>Diluted</i> , 98 et seq.; <i>Mastichi</i> ,		
Adrenalin Catheter Lubricant ...		829	714; <i>Methylic</i> , 30 to 60 m., 104;		
„ Iontophoresis of		419	<i>Sandarachi</i>		539
Adrenaline, Solution de		826	<i>Alcohol, Industrial</i>		103
Adrenol Solution		828	<i>Alcoolat Mélisse Comp.</i> 20 to 25		
Adrenaine, 8 m. 270; Adrovaine		829	drops		715
<i>Agile Marmelos</i>		733	„ de Fioraventi		549
Aerugo 296; <i>Æsculin</i>		588	<i>Alcoolature d'aconit</i> , 1 Gm. to		
<i>Æsculus</i>		689	3 Gm.		85
<i>Æther</i> 40-60 m., or 10-30 m. rep.		90	<i>Aldehydum Absol. et Dil.</i>		105
„ <i>Aceticus</i> 60-90 m., or 20-			„ <i>Formicum</i>		106
40 m. rep.		93	<i>Alder (Black)</i>		706
„ <i>Camphoratus</i>		209	„ common, 691; <i>Aldol</i>		109
„ <i>Copal</i>		714	<i>Alembroth</i> preps.		376, 377
„ <i>Methylat.</i>		92	<i>Aletris Cordial</i> , $\frac{1}{2}$ to 1 dr. ...		690
„ <i>Officinale</i>		92	<i>Aletris Farinosa</i> 690; " <i>Alexine</i> ," 1		
„ <i>Petrolei</i>		523	dr. 60; <i>Alexine</i>		784
„ pro narcosi		92	<i>Alformant Lamp</i>		111
„ <i>Purificatus</i> 10 to 30m.		91	<i>Algaroth, Powder of</i>		129
„ <i>Purissimus</i>		92	<i>Alginoïd Iron</i> , 2 to 15 gr. (<i>Algiron</i>)		690
„ <i>Rectif.</i>		92	<i>Algodon</i> , F.E. = <i>Gossypium</i> ...		351
„ <i>Spirit Camph.</i>		283	<i>Alhazin Monosulphate</i>		893
„ <i>Sulphuricus</i>		90	<i>Alkaloids, Detection of.</i>		
<i>Æthoi</i>		700	See Fröhde's, Dragendorff's,		
<i>Æthyl Bromidum</i>		94	Mayer's Reagents, also Organic		
„ <i>Chloridum</i>		94	Analysis Chart, an addendum to		
„ <i>Iodidum</i>		96	this Edition.		
„ <i>Nitris</i>		93	<i>Alkaloidal Oils</i>		497
<i>Æthylen Bromid.</i> 1 to 2 m.		94	<i>Alkanet</i> 691; <i>Alkaptonuria</i> 880;		
<i>Æthylic Alcohol</i>		97	<i>Alkarsin</i>		150
<i>Æthylis Carbamas</i>		677	<i>Allen's Antifat</i>		741
<i>Æthusa Cynapium</i>		689	<i>Allen's Fehling Test</i>		877
<i>Æthylum Chloratum</i> ,		94	<i>Allium</i> , $\frac{1}{2}$ to 2 dr.		690

NAME.	DOSSE.	PAGE
Allium Porrum	690
Allmatein 109; Allosan, 15 gr.	...	500
Allspice	719
Allyl Alcohol	104
" Isosulphocyanide	624
" Sulphide, ½ to 2 m.	690
" Sulphocarbamide	625
" Thio-urea	625
Almen's Test for Glucose	879
Almizele, F.E. = Moschus..	...	715
Almond, Bitter	122
Alnus Glutinos-a	691
Aloe Barbado. and Socot., 2 to 5 gr.	...	112, 113
" Cape	112
" Hepatic, 2 to 5 gr., 112; Purificata,	113
" Natal	112
Aloin, ½ to 2 gr. (¼ gr. = 1 gr. ext.)	114
Alpha Naphthol, 3 to 5 gr.	461
Alphogen, Alpozone, 2 gr.	78
Alphol, 8 to 30 gr.	461
Alsol (and Alsol Liq.)	116
Alstonia Constricta et Scholar. 691, 732	...	691, 732
Althæa 691; Althein, 1 to 2 gr.	693
Alum, Ammon. vel Potass, 5 to 10 gr. Alumen, U.S. = Pot.	...	697, 873
" Carmine	333
" Iron, 3 to 10 gr.	333
" Wool, Abs. 40%	116
Aluminii Acetas	116
" Aceto-tart.	116
" Chlor., 2 to 4 incr. to 10 gr.	117
" Formas.	117
" Hydroxidum	117
" Naphthol-sulphonas	117
" Silicas	434
" Sulphas	115
Aluminium Glyc. Paste 115, 116; soldering of	117
Alumnol 117; Alum Points 115, 696	...	115, 696
Alvander	262
Alypin and Nitras, ½-½ gr	270, 271
Amadou 691; Amoeba	901
Amoeba Coli Communis	899
Amalgam, Mercury	361
Amanita Phalloides. See Fungi. Antidote Chapter.	...	639
Amanita Muscaria	639
Amapala, F.E. = Flos Papaveris	...	727
Amber, Amber Oil	727
Amboceptors	754, 784
American Indian Hemp	133
Amido - acet-p - phenetidn HCl, 7 to 15 gr.	235
Amido - acet-p - phenetidn acet-salicyl, 8 to 15 gr.	252
Amido-acids	472
Amido-Succinic Acid Amide	693
Amidol (Diamidophenol HCl.) is a Developer. Tests for, P. J. I. /07, 429	...	

NAME.	DOSSE.	PAGE
Amino - benzine - azo - betanaph-thol	251
Aminoform, 5 to 15 gr.	551
Amino phenylarsonic toluene sulphonate	162
Amino (tri), phenylarsine	162
Ammonia in Water, Estimation of	...	836
Ammonia, Cloudy, Household	120
Ammoniated Quinine, ¼ to 1 dr.	...	577
Ammonia Liquida	120, 851
Ammoniacum, 5 to 15 gr.	...	
Ammon. Acetas, 10-30 gr.	121
" Benzoas, 5-15 gr.	5
" Bicarb., 3-10 gr.	118
" Bromid., 5-30 gr.	117, 191
" Carb., 3 to 10 gr.	118
" Chlorid., 5-20 gr.	118
" Citras, 30-60 gr.	121
" Cyanas	675
" Embelas, 3-5 gr.	734
" Fluorid., 1/24 to 1/6 gr.	39
" Hippuras, 5 to 10 gr.	6
" Hypophosph., 1 to 6 gr.	531
" Iodidum, Av. 4 gr.	119
" Nitras	119
" Persulphas	640, 773
" Phosphas, 5 to 20 gr.	70
" Salicylas, 5-30 gr.	78
" Succinas, 2 to 5 gr.	395
" Sulpho-ichthyolas, 10 to 30 gr. daily	122
" Tart.	120
" Valer., 1 to 8 gr.	376
" Mercuric-Chloride	419
Ammonium, Iontophoresis of	243
Ammonol and Salicy., 5 gr.	691
Ampère 417; Amphicome Emodi	...	726
Amrataku	122
Amygdala Amara; Dulcis	123
Amygdalin	128
Amyl Acetate	128
" Alcohol, Tertiary	93
" Butyrate	282
" Colloid	523
" Hydride	128
" Nitrate	124
" Nitris { 1-5 m. Hyp. ½-1 m. by mouth, 2-5 m. inhaled }	125
" Nitrite Capsules, 1, 2, 3, 4, 5, 6, 10 m.	128
" and Pilocarpine Hair Lotion	67
" Salicyl.	679
" Valerianate, 2-5 m.	128
Amylene-Chloral, 5 to 50 m.	128
Amyleni Hydras (Caps. 10 m.), 30 to 80 m.	513, 517
Amylopsin and Injection	691
Amylum. 691; Amysal	720
Anacardium Occ. and Off.	869
Anacyclus Pyreth.	119
Anæmia, Pernicious, Blood in	
Anæsthesia by Cocaine Ionisation	...	

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Anæsthesia by Cocaine Infiltration		266	Antidotum Arsenici, $\frac{1}{2}$ oz. every 5		
Anæsthesia by Cocaine Lumbar puncture		266	or 10 minutes		144
Anæsthesia, Dental... ..		260	Antifat		741
Anæsthesia by Eucaine Infiltration		269	Antifebrin, 1 to 3 gr.		242
Anæsthesia by Magnesium Sulphate Infiltration		442	Antiformin, 911; Antigen		784
Anæsthesia by Novocain-Suprarenin Infiltration		272	Antileprol, $\frac{1}{2}$ to 1 Gm.		491
Anæsthesia Intraspinal by Tropacocaine		267	Antitytic Serum		800, 818
Anæsthesia, Spinal, Discussion on		276	Antimellin		710
Anæsthesia by Stovaine		273	Antimonii Arsenas, $\frac{1}{100}$ to $\frac{1}{30}$ gr.		129
Anæsthesine, 5 to 10 gr.		273	Chloridum		129
Anæsthetic, Dental, 10 to 25 m.		260	Oxidum, 1 to 2 gr.		130
Anæsthetics, General, Local.—v. Therap. Index			Antimon. Nig. Purif.		129
Anæsthetics, Iontophoresis of		419	Penta sulphid.		129
Analgesine, 5 to 20 gr.		252	Sodii Tart.		131
Analysis of Patent Medicines		740	Sulphuratum, 1 to 2 gr.		129
Analytical Memoranda		858	Tartarat.		130
Anamirta Paniculata		537	{ Diaphoret. 1-24 to 1-8gr.		130
Anarcotine, 1 to 3 gr., 463; Anchusa		691	{ Emetic 1 to 2 gr.		129
Anderson's Ointment		186	Trisulphid.		129
Andira Araroba		236	Antimonial Cream		131
Andrographis, 732; Andropogon ..		736	Antimony, Butter of 129; Crocus		132
Anestile, 95; Anethol		692	Antinervin		244
Angina 125; Anhalonium Lewinii		692	Antineurasthin		741
Anhydroglycochloral		229	Anti-opium Plant, 508; Antipon... ..		741
Anilin (Anilin Oil), 244; Arsenate,			Antiphlogistine		343
153; Blue, 4; Cocaine, 244; Gentian Violet, 917; Iodoform,			Antipyrine, 5 to 20 gr.		252
244; Iontophoresis of, 419; Red, 248; Sulphate, $\frac{1}{2}$ -3 gr.		244	Antipyrin Aceto-Salicyl., $7\frac{1}{2}$ to 15 gr.		253
Animal Organotherapy		818	Coffeino-cit., 8 to 15 gr.		200
Membrane		818	Salicyl., 15-30 gr.		254
Anions		414	Antirrhinum		690
Anise Fruit and Preps.		692	Antisclerosin Tablets		630
Camphor=Anethol		692	Antiseptic Crêdê		139
Mouth Wash		75	Antiseptics, Chapter on		847
Aniso-Theobromine, 5 to 15 gr. (?)		665	Iontophoresis of		419
Anisyl-mono-phenethylgeanidine, di-p. HCl		268	Antiseptol		240
Ankylostomiasis	318, 334,	669	Antisera, 754; Anti-smoking Gum		721
Annatto		695	Antistrepto. Serum... ..		779
Anode		414	Antithermoline		343
Anodyne Colloid		282	Antithyreodin Moebius		834
Tincture, 5-30m... ..		507	Antitoxins		752
Anopheles... ..		774, 904	Antitoxin, Anthrax, 757; Colon Bacillus, 767; Diphtheria, 769; Intraven. 770; (Oral and Rectal use, 771); Dysentery, 771; Glanders, 775; Gonococcus, 772; Leprosy, 773; Meningococcic, 768; Plague, 776; Pneumonia, 777; Rheumatism, 779; Scarlatina, 780 also 779; Staphylococcus, 780; Streptococcus 779; Tetanus, 789; Tubercle, 793 et. seq.; Typhoid		816
Antennaria dioica		707	Antitryptic Index		517, 762
Antexema 741; Anthelmintics		335	Antityphoid Tabs, 640; Antivenene		783
Anthemidis Flores, 692; Anthion		640	Antrophores		255
Anthoxanthum Odorat.		692	Acid Tannic, 5%		
Anthrágucosa radin		220	Argenti Lactas, 0.5 to 2%		
Anthraquinone bodies	220, 223,	622	Nitras, 0.5 to 3%		
Anthraxobin, 245; Anthrasol		242	Chinacal, 5%		
Anthrax Antitoxin 757; Bacillus		897	Cocaine Hydrochloride, 5%		
Antiarthrin		689	Eucaine, 5%		
Antibacterial sera		755	Hamamelis Extract, 10%		
Anticatarth Salts		23	Ichthyol, 20%		
Anticomplementary body		754			
Antidipso		741			
Antidotes, see the Poison in question and chapter at end,					

NAME.	Dose.	PAGE	NAME.	Dose.	PAGE
Antrophores (<i>continued</i>)—			Aq. <i>Sambuci</i> ...	...	723
Iodoform, 5, 10 and 20%			" <i>Saturnina</i> = Liq. Plumbi		
Protargol, 0.5, 1, 1½, and 2%			" <i>Subac.</i> Dil. ...	...
Resorcin and Tannin, 5:5			" <i>Sedativa</i>...	...	209
Thallin, 2½, 5 and 10%			<i>Arachis</i> , 692, 736; <i>Araroba</i>, ...	...	236
Zinc Sulphate, 0.5%			<i>Arbor Vitæ</i> , 728; <i>Arbutin</i> , 5 to		
Anusol ...	...	185	16 gr. ...	...	692
Aperient Solutions ...	...	642	<i>Arbutin-Benzoin-Ether</i> ...	...	692
Aperitol, 1½ to 6 gr. ...	...	25	<i>Arctium Lappa</i> ...	...	712
Aphrodine ...	...	731	<i>Arctostaphylos Uva Ursi</i> ...	...	692
Apiol Liq. (and Cryst.), 3 to 6 m.,			<i>Areca</i> , <i>Arecoline</i> and <i>H Br</i> ...	...	693
132; and Ergotin Caps., 133;			<i>Argemone Mexicana</i> , 508; <i>Argen-</i>		
White, 132; <i>Apioline</i> Capsules	132		tamin ...	...	138
<i>Apis Mellifica</i> 692; <i>Aplopappus</i> ...	709		<i>Argentio Hair Dye</i> ...	...	137
<i>Apium Graveolens</i> ...	...	133	<i>Argentio Quinaseptol</i> ...	...	138
" <i>Petroselinum</i> ...	...	132	<i>Argenti Acetas</i> ...	...	135
<i>Apocodein HCl</i> , 1-10 to 1 gr. ...	...	135	" <i>Citras</i> (Itrol) ...	...	135
<i>Apocynum</i> ...	...	133	" <i>Cyanidum</i> , ½ to 1 gr. ...	...	135
<i>Apomor-</i> { ½ to ¼ gr. by mouth } <i>phine</i> { 1-20 to 1-10 gr. hypo- } <i>HCl</i> { derm. } ...	133		" <i>Fluoridum</i> ...	...	135
<i>Appendicitis</i> ...	889, 898		" <i>Ichthyolas</i> ...	...	140
<i>Apple Essence</i> ...	...	679	" <i>Iodid. Recent.</i> ...	...	136
Aq. Ammon. Fortior, U.S. ...	...	120	" <i>Lactas</i> (Actol), ½ gr. ...	...	136
" <i>Ammon.</i> , U.S., 15 m. ...	...	120	" <i>Nitras</i> , ¼-½ gr. ...	136, 851	
" <i>Amygdalæ Amaræ</i> ...	...	123	" <i>Nitras</i> , <i>Fusus</i> ...	...	137
" <i>Anethi</i> , ½ to 2 oz. (No dose			" <i>Indurat. et Mitigat.</i> ...	...	137
given B.P.) ...	...	739	" <i>Nucleinas</i> ...	...	226
" <i>Anisi</i> , ½ to 1 oz. (No dose			" <i>Oxidum</i> , ½-2 gr. ...	...	138
given B.P.) ...	692, 739		" <i>Thio-hydrocarburosul-</i>		
" <i>Aperiens mit. atque Fort.</i> ...	642		phonas ...	...	140
" <i>Aurant. Flor.</i> ½-2 dr. ...	...	173	<i>Argentol</i> ...	...	138
" <i>Bromoformi</i> , 1-4 oz. ...	...	193	<i>Argentum Colloidale</i> , 3.8 to 2		
" <i>Camphoræ</i> (Conc. 209), ½ to			gr. ...	...	139
2 oz. ...	...	209	" <i>Crédé</i> ...	...	139
" <i>Carbolisata</i> ...	...	19	" <i>Proteinic</i> ...	...	140
" <i>Curui</i> , ½ to 2 oz. (No dose			<i>Argonin</i> , 138; <i>Argyrol</i> ...	...	139
given) ...	...	739	<i>Argyresein</i> ...	...	689
" <i>Chlori</i> ...	...	633	<i>Arhéol</i> , 3 m., 499; <i>Arhovine</i>		
" <i>Chlorof.</i> , ½ to 2 oz. ...	...	293	(Caps.), 4 m. ...	...	58
" <i>Cinnamomi</i> (Conc., 241), 2 dr.			<i>Ari Succus</i> , 1 dr., 729; <i>Aristochin</i> ,		
to 1 oz. ...	241, 739		8 to 15 gr. ...	...	579
" <i>Coloniensis v. Eau de Cologne.</i>			<i>Aristol</i> , 402; <i>Aristolochia var.</i> 702, 733		
" <i>Cresoti</i> , U.S., 2 dr. ...	...	290	<i>Armbricht's Coca Wine</i> ...	...	741
" <i>Cresolica</i> , 14; de Rabel ...	...	79	<i>Armenian Bole</i> , 326; <i>Arnica</i>		
" <i>Fluoroformi</i> , 1 to 4 dr. ...	...	40	<i>Flores</i> ...	...	733
" <i>Feniculi</i> , ½ to 2 oz. ...	705, 739		<i>Armoracæ Radix</i> ...	...	702
" <i>Formalinata</i> ...	...	106	<i>Aromadendral</i> ...	...	316
" <i>Hæmostatica</i> , P. Belg. ...	...	5	<i>Aromatic Conf.</i> ...	...	506
" <i>Hamamelidis</i> , U.S., 2 dr. ...	...	357	" <i>Elixir</i> , ¼ to 2 dr. ...	...	307
" <i>Hydrogenii Dioxid</i> , ½ to 2 dr. ...	...	335	<i>Arrhéol</i> , ½ to 3 gr. ...	...	152
" <i>Kresolica</i> ...	...	14	<i>Arsacetin</i> , ¼ to 3 gr. ...	160, 164	
" <i>Laurocerasi</i> , ½-2 dr. ...	...	123	<i>Arsamin</i> , ¼ to 3 gr. ...	153, 164	
" <i>Mellia</i> ...	...	104	<i>Arsan Tablets</i> ...	...	483
" <i>Mentha Piperita</i> (Conc., 450),			<i>Arsen-Hæmol</i> , 1½ gr. ...	...	708
½ to 2 oz. ...	450, 739		<i>Arsen triferrol</i> , ½ ounce ...	...	327
" <i>Mentha Viridis</i> , ½ to 2 oz. ...	739		<i>Arsenic Compounds, organic</i> ...	...	149
" <i>Menthol</i> , 451; <i>Naphæ</i> ...	...	173	" <i>Table of</i> 163, 164		
" <i>Pagliari</i> , = Aq. <i>Hæmostat.</i> ...	...	5	" <i>Tests for</i> , 152, 160		
" <i>Phenolata</i> , 2% ...	...	19	" <i>Estimation</i> ...	...	162
" <i>Picis</i> , 5 to 10 oz. ...	242, 554		<i>Arsenic Act.</i> ...	...	932
" <i>Pimenta</i> , ½-2 oz. ...	719, 739		" <i>Anilide</i> ...	...	154
" <i>Rabeliana</i> , 79; <i>Regia</i>...	...	58	" <i>Detection</i> , 142; <i>Cigarettes</i> ,		
" <i>Rosa</i> , 1 to 2 oz. ...	...	498	149; <i>Eating</i> , 142; <i>Horti-</i>		
			cultural Use ...	...	142
			<i>Arsenic, White</i> 1.00 to 1.15 gr. ...	...	141

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
<i>Bacillus</i> Tuberculosis, human and bovine, Differences		911	<i>Barthelemy's</i> Syringe	...	358
" " Ligroin Method for		913	<i>Basbam's</i> Mixture, av. 4 dr.	...	323
" Typhi Abdom. and para-		913	<i>Bassia longifolia</i>	...	694
" Welchii	...	51	<i>Bassorin</i> Paste & Comps	...	673
" Whooping Cough	...	917	<i>Battiste</i> (Mosetig's)...	...	351
" Xerosis	...	900	<i>Battley's</i> Liq. Opii...	...	505
<i>Bacteria</i> , Acid-fast...	...	912	<i>Baume</i> Analgesique	...	68
<i>Bactericides</i>	...	847	" de Fioraventi	...	519
<i>Bacteriological</i> Notes	...	897	" de Vie	...	113
<i>Bactox</i> , Sanitas	17, 548		" Tranquille	...	393
<i>Baculum</i> Acidi Salicyl.	...	70	<i>Bayberry</i> , 712; Bay Rum...	...	103
" Chrysarobini	...	236	<i>Bézin's</i> Ointment	...	380
" Resorcini	...	611	<i>Bearberry</i> Leaves	...	692
<i>Bael</i> Fruit, 733; Bakuchi	...	123	<i>Bebeeru</i> Bark	...	695
<i>Baillie's</i> Pill	...	741	<i>Beberine</i> HCl. and Sulph. 1 to 10 gr.	...	695
<i>Bain dit de Vichy</i> 632; Bakkola	...	237	<i>Beck's</i> Bismuth Paste	...	189
<i>Balanites</i>	...	693	<i>Beckmann's</i> Apparatus	...	871
<i>Baldock's</i> Arsenical Paste	...	146	<i>Beccarel</i> Rays, 590; Bed Sheets	...	216
<i>Balm</i>	...	715	<i>Bee</i> Vaccinator	...	34
<i>Balneum</i> =about 25 gallons.			<i>Beech</i> Tar	...	555
" Alk., St. M.'s, Sodii Carb. 6 ozs.- 50 gals.			<i>Beecham's</i> Pills, 741; Cough Pills	...	741
" Amyli, St. M.'s, 1 lb.- 50 gals.			<i>Beechwood</i> Cresote	...	289
" Boracis, St. M.'s, 4ozs.- 50 gals.			<i>Beef</i> and Iron Wine	...	327
" Picis Carb.	...	241	<i>Beef</i> and Malt Wine	...	474
" Potassæ Sulphuratæ	...	558	" Tea Conc	...	473
" Salinum	...	631	" Essences, Peptonised...	473, 515	
" Sulphuris	...	659	" Peptone with Malt, 2 to 4 dr.	...	528
" Sulphuris Alk.	...	643	" Peptonised Jelly of	...	515
<i>Balsam</i> Aniseed	...	741	<i>Behring's</i> Tulase	...	811
" Canadense	...	723	<i>Bela Fructus</i>...	...	733
" Copalbe	...	500	<i>Beleno</i> , F.E. = Hyoseyamus (leaves, seeds)	...	
" Fioraventi	...	549	<i>Belladonna</i> Assay	...	176
" Gurjunæ ½ to 2 dr.	...	693	" Fruit	...	177
" Lanolinatum	...	694	" Leaves, 1 to 5 gr.	...	177
" Locatelli	...	549	" Plaster	...	178
" Peruæ 5 to 15 m	...	694	" Root, 1 to 5 gr.	...	177
" Toluf. 5 to 15 gr.	...	694	<i>Bell's</i> Caldmeter	...	203
" Vitæ Hoffmanni 1 to 4 dr.	...	670	<i>Bell's</i> Fairy Cure	...	741
<i>Bandages</i> (Plaster Paris) 207, 216, 351, 353			<i>Bence Jones'</i> Albumose	...	840
" Crinolin	...	207	<i>Bendel's</i> Meat Port Nutrient	...	741
<i>Bandi's</i> Serum	...	771	<i>Bengal</i> Kino	...	733
<i>Bandon's</i> Wine, 741; Bang's Test	...	879	<i>Benger's</i> Food	...	483
<i>Baptisia</i> (Baptisin 1to6gr.)	...	694	<i>Benzaldehyde</i> , ½ m....	...	122
<i>Barbaloin</i> ... ½ to 2 gr....	...	114	<i>Benzaldehyde-hydrocyanic</i> Acid...	...	123
<i>Barberry</i>	...	696	<i>Benzene</i> , 5 to 10 m.	...	246
<i>Barclay's</i> Pills	...	742	<i>Benzidine</i> , 866; Benzin	...	246, 522
<i>Barclay's</i> Arctium Lappa	...	712	<i>Benzine</i>	...	246, 522
<i>Barfoed's</i> Glucose Test	...	878	<i>Benzinum</i> Purif., U.S.	...	522
<i>Baril</i> Acetas	...	694	<i>Benzoic</i> Sulphimide...	...	613
" Chloridum ½ to 1½ gr.	...	694	<i>Benzoïn</i> , Siam, Sumatra	...	4
" Hypophosph., ½ to 1 gr.	...	681	<i>Benzol</i> , 5 to 10 m	...	246
" Nitras	...	694	<i>Benzoline</i>	...	246, 522
" Sulphid. ½ to 1 gr.	...	176	<i>Benzonaphthol</i> , 4 to 10 gr....	...	461
" Depilatory	...	176	" Varnish	...	540
<i>Baring</i> Gould's Antirheumatic Pearls	...	741	<i>Benzo-Piperaz.</i> , 2 to 5 gr.	...	551
<i>Barium</i> Platino Cyanide Screens	...	579	<i>Benzosalin</i> , 8 to 15 gr.	...	73
<i>Barium</i> Water	...	694	<i>Benzosol</i> , 4 to 12 gr.	...	293
<i>Barker's</i> Stovaine Inj.	...	273	<i>Benzosulphimide</i>...	...	613
<i>Barlow</i> . Radium as cause of cancer	...	007	<i>Benzoyl</i> -Acetyl Peroxide...	...	245
			" -Arbutin	...	692
			" -Ethyl - dimethyl - amino propinol, HCl.	...	273

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Benzoyl-Glycocoll	5	Bismuth Oxide, hydrated ...	...	185
" -Hydrate, 5 to 15 gr.	3	" Oxidum, 5 to 20 gr. ...	...	186
" -Naphthol, 4 to 10 gr.	461	" Oxybenzoas ... ..	...	182
" -Peroxide	245	" Oxybrom, 5 to 7 gr. ...	...	186
" -Pseudo-Tropeine...	267	" Oxycarb, 5 to 20 gr. ...	...	182
" -Salicin	720	" Oxychlor, 5 to 20 gr. ...	...	186
" -Sulphonic-Imide	613	" Oxyiodid, 5 to 10 gr. ...	...	187
" -Super oxide	245	" Oxyiodogall. ... ..	...	189
" -Tetrameth.-di-amine-eth.-	" Oxynitras 5 to 20 gr. ...	...	186
di-meth.-carbinol, HCl.	270	" Oxyalicyl 5 to 20 gr. ...	...	187
" -vinyl-diaceton-alkamine	...	268	" Phenas 10 to 30 gr. ...	...	190
Berberinæ Carb., HCl., Phosph.,	" Pyrogallas 2 to 8 gr. ...	...	190
Sulph., 2 to 6 gr.	695	" Salicylas, 5 to 20 gr. ...	...	187
Berberis, 695, 733; Aquif.	695	" " Basic ... ..	...	188
Bergamot, 713; Beri Beri	898	" Subcarb, 5 to 20 gr. ...	...	182
Bernsteinsäure	78	" Subgallas, 4 gr... ..	...	190
Berros, F.E.=Nasturtium...	" Subiodas ... ..	...	41
Betaine, 2 Betaine HCl., 1 to 8 gr.	...	3	" Subnitras, 5 to 20 gr... ..	...	188
Beta Vulgaris...	2	" Subsaliyl 5 to 20 gr. ...	...	188
" -Eucaine, HCl., 263; Lact.	" Sulphocarb, 4 to 8 gr. ...	...	188
1-10 to 1 gr.	269	" Tannas, 10 to 30 gr. ...	...	190
Beta-Naphthol, 3 to 10 gr...	460	" Test Meals ... ..	...	187
" Naphthol Benzeas 4 to 10 gr.	...	461	" Tribromphenas 5 to	...	...
" Salicyl.	462	20 gr. ... ..	...	26
Betel Nut 733; Betol, 3 to 8 gr.	462	" Tri-iodophenas ... ..	...	26
Bettendorf's Reagent	143	Bismutose, 15 to 30 gr. ...	...	190
Betula lenta, 66, 736; Betulol	68	Bitter Apple, 2 to 8 gr., 283; Sweet	...	726
Bial's Test, 880; Bhang	211	Biuret Reaction ... ..	...	471, 863
Bier's Stovaine Inj.	273	Bivo 1 dr., 327; Bixæ Folia ...	...	695
Bikh; Bikhacontine	88, 688	Black Alder ... ..	...	706
Bilberry	717	" Draught, 1 to 2 oz... ..	...	623
Bile Beans 741; Bile Salts	864	" Haw ... ..	...	385, 738
Bile Tests, 864; Bilharzia...	376	" Sampson ... ..	...	704
and Therap. Ind.	" Wash ... ..	...	379
Billroth's Cambrio	351	Blackberry, Norwegian... ..	...	722
Biniodide Lotion, Soap, Solubes,	Black-water Fever ... ..	...	758
and other preps.	367-369	Bladder Irrigators ... ..	...	216
Bio-lactyl 57; Biondi Stain	873	" Wrack ... ..	...	706
Birch Tar 555; Birch Sweet	66	Blair's Gout Pills ... ..	...	741
Bird Lime (Japanese)	730	Blanc de Baleine ... ..	...	700
Birley's, Anticatarrrh 741;	Blanc de Perle ... ..	...	186
Bisedia, 1 dr., 184; Bish	688	Blastoinvertin ... ..	...	50
Bisciniod, 1 to 1 gr.	185	Blaud's Pill and Estimation ...	...	322
Bismuth Agaricinas...	690	Blepharis Capensis ... ..	...	695
" Benzoas, 5 to 20 gr.	182	Bliss' Cure ... ..	...	565
" b-naphtholas	190	Blistering Liquid ... ..	...	213, 215
" Carbolas	190	Blood, Acidity of (Joulie)... ..	...	638
" Carb., 5 to 20 gr.	182	" Albumin Test ... ..	...	865
" Cerium Potassium	" Calcium Salts in, Deter-	...	...
" Nitrite	628	mination of ... ..	...	203
" Cinchonidin Iodidum 1	" Capsules of ... ..	...	474
to 1 gr.	185	" Coagulability of ... ..	...	202, 872
" Citras, 2 to 5 gr...	185	" Counting ... ..	...	867
" et Ammon. Citr., 2 to 5 gr. 184	" Corpuscles for Syph. Test	...	785
" et Cerii Salicyl., 5 to	" " for Opsonic Test	...	802
20 gr.	188	" " for Color Index	...	868
" Gallas 4 gr.	190	" Electrical Conductivity ...	...	872
" Hydroxydatum 5 to 20 gr	...	185	" Freezing Point of... ..	...	871
" Iodophenas 5 to 20 gr.	26	" Hæmoglobin, Estim. ... ..	...	866
" Iodo-resorcin-sulphonas	...	185	" in Stains ... ..	...	865
" Meals	187	" Opsonic Index of ... ..	...	802
" Mucilago	186, 582	" Precipitin Test ... ..	...	865
" Nitras Cryst., 5 to 10 gr. 186	" Pressure ... ..	...	468, 566, 872
" Nucleinas 20 to 40 gr.	225	" Purifiers, 438; Root ...	...	723

NAME.	DOSE.	PAGE
Blood Serum (Loeffler's, 921) ...		920
" Staining		869
" Testing	865 <i>et seq.</i>	
" Tubercle B. in		912
" Viscosity of		872
" Volume of		869
Blue Anilin, 4; Gum Tree		316
" Methylene, 1 to 4 gr.		249
" Nicholson's, 4; Opal, 4; Spirit, 4; Water Soluble		4
" Uction, 363; Pill		362
" Wool		377
Blumea (? laciniosa)		508
Boas' Breakfast 894; Bogbean		715
Bohadschia Aphrodisiaca		298
Boils (See also Therap. Ind.)		731
Boldoa Fragrans, Boldin		695
Boletus Laricis, 10-30 gr.		689
Bolus Alba, 434; Armen		326
Bonduc Nut		695
Bone Marrow Extract, Red		818
Bon Voyage, $\frac{1}{2}$ oz.		37
Boracite, 60 gr., 9; Borage		393
Borated Hydrogen Peroxide		387
Borax, 6 to 20 gr.		9
" Carmine		873
Bordet Bacillus		917
Bordet-Gengou Reaction		914
Boric Acid and Starch Powder and with zinc, 435; Gauze, 7; Lint, 7; Vaseline, 9; Wool		7
Borneal Salicyl.		67
Borneol-isovalerianate		679
Bornyval		679
Boroglyceride and Pessary		7
Borovertin, 15 to 60 gr.		553
Borrel's Blue, 910; Borsyl		700
Botany Bay Kino, 5 to 20 gr., 705, 735		
Bougies, 190, 217; Aural		174
" Nasal, see Bugnaria		191
" Urethral, Gelatin, $2\frac{1}{2}$ and 4 in. (dip in warm water)		190
Bellad., Alc. Ext., $1\frac{1}{2}$ gr.		
Cotarnine HCl, $\frac{1}{2}$ gr.		464
Ext. Kramerie, 1 gr.		
Opium, 1 and 2 gr.		
Silver Nitrate, $\frac{1}{4}$ gr.		
Stypticin, $\frac{1}{2}$ gr. to $\frac{3}{4}$ gr.		
Thalline, 1 gr. and 2 gr.		
Zinc Acet., Chlor. and Sulph., $\frac{1}{4}$, $\frac{1}{2}$, & 1 gr. etc. Bellad Ext. $1\frac{1}{2}$ gr. etc. Ext. Opil. 1 gr.		
Zinc Sulphocarbonate, $\frac{1}{2}$ gr.		
Bougies, Urethral, with Cacao Butter (dip in Catheter Oil)		130
Bellad., Ext. Rad., $\frac{1}{4}$ gr.		
Betol, 20%		462
Bismuth Oxychlor, 5, 10 gr. and c. Lead Acet., 1 gr.		
Cocaina, $\frac{1}{2}$ gr.		258
Copper Oleate, 5 gr.		487
Cotarnine, HCl., $\frac{1}{2}$ gr.		464
Eucalyptus Oil, 10 m.		
Iodoform, 3 and 5 gr.		

NAME.	DOSE.	PAGE
Bougies, Urethral with Cacao Butter—continued.		
{ Eucalyptus Oil, 10m }		401
{ Iodoform, 5 grs. }		
Lead Acetate, $\frac{1}{2}$ gr., $\frac{3}{4}$ gr., and 1 gr.		
Opium, 1 and 2 gr.		
Silver Nitrate, $\frac{1}{4}$ gr.		
Stypticin, $\frac{1}{2}$ gr.		464
Tannic Acid, 1 gr., and with Opium, 1 gr.		
Thalline Sulphate, 1 to 2 gr.		255
Zinc Chlor. and Sulph., $\frac{1}{4}$ to 1 gr.		
Bourache		398
Bovine Tubercle Bacilli Emulsion		811
" Tuberculin, New		793
Bovril and Comps.		473, 741
Bow's Liniment, 741; Brain Extract		819
Brandy and Sterules		102
Brassica var., 623; Braun's Test		880
Brea, F.E. = Pix		
Brilliant-Green		249
Bromalbacid, 15 to 30 gr.		191
Bromal Hydrate, 2 to 5 gr.		191
Bromalin, Br.-ethylformine, 10 to 30 gr.		192
Brometone, 5 gr., 193; Bromides		191
Bromidia, $\frac{1}{2}$ to 1 dr.		228, 741
Bromine, Capsules of		191
" Iontophoresis of		419
Brominol (10%) $\frac{1}{2}$ oz. = 20 gr. Pot. Brom.		192
" (33%), 10-60 gr.		192
" Mixture, $\frac{1}{2}$ oz.		192
Bromipin (33%), 10-60 gr.		192
" Tabs. = 9 gr. Pot.-Brom.		192
Bromocarpin, 1 dr.-1 oz. acc. to age		433
Bromocoll		192
" Resorbin, 8 gr. or more		193
Bromo-diethyl-acetamide, 15 gr.		245
Bromoform, $\frac{1}{2}$ to 2 m.		193
Bromoglidine Tabs., 8 gr.		194
Bromo-Hæmol, 30 gr.		708
" - Methyl-furfural Test		880
Brom-iso-valerianyl-urea		677
Bromol, $\frac{1}{2}$ to 2 gr.		26
Bromovalidol Tabs., 1 to 2		452
Brompton Blacks		848
Brompton Consumption Cough Specific		741
Bromum		191
Bromural, 5 to 10 gr.		677
" Tablets, 5 gr.		677
Bronchial Glands		835
Bronchitis		777
(See also Therap. Ind.)		
Brooke's Ointment, 439; Broom		645
Broth, Nutrient		919 <i>et seq.</i>
Brown's Bronch. Troches		295
Brucine and Salts, 1-12 to $\frac{1}{2}$ gr.		652, 695
Brunfelsia		711
Brusco, F.E. = Rhizoma Rusci		
Bryonia (var.) 695; Black		727
Buchner's Tube		924

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
<i>Buchu</i> , 194; Buckbean	715	Caffeinæ Hydriodid., $\frac{1}{2}$ to 5 gr. ...	...	199
Buckthorn	706	„ Salicyl., 1 to 5 gr. ...	...	199
„ Common = <i>Rhamnus</i>	706	„ Sodii Iodid., 2 to 10 gr. ...	...	200
„ Catharticus	706	„ Sodio - Benz., max. 45	...	199
Budde Process	481	„ gr. p.d. ...	...	199
Buer's Mul' la Piles Cure	741	„ Sodio-Salicyl., 1 to 4 gr. ...	...	199
Buginaria.—Nasal Bongies, Elastic	„ Tri-Iodid., 2-4 gr. ...	...	200
Gelatin, $3\frac{1}{8}$ in. long.	191	„ Valer. $\frac{1}{2}$ to 3 gr. ...	...	200
Buginarium Ac. Borici, 5 gr.; Ac.	Caffeine-Chloral, 3 to 8 gr. hyp. ...	...	200
Carbol., $\frac{1}{2}$ gr.	191	„ Enrichment Method ...	...	915
„ Cocainæ HCl., 1-6 gr.	191	Caffeine-Natr-Benzoic ...	...	199
„ Cupri Sulph., 1-10 gr.	191	„ „ Salicyl ...	...	199
„ and 16 gr.	191	Cajuputol ...	...	317
„ Iodof., 1-6 gr. & $\frac{1}{2}$ gr.	191	<i>Calabar Bean</i> , 1 to 4 gr. ...	...	534
„ Zinci Sulph., 1-10 gr.	191	Calabaza, F.E. = <i>Cucurbita</i> ...	...	...
„ {Aluminis, 1-10 gr. ...}	Calamina Præp. ...	...	435
„ {Zinci Sulph., 1-10 gr. ...}	Cal Apagado, = Calc. Hydras ...	...	206
Bulbocappine	703	Calcii Bisulphis ...	...	81
Bulgarian Bacillus	45	„ Bromid., 10-20 gr. ...	...	191
Buster's Nervine	742	„ Carbide ...	...	201
Buphane, 696; Burdock	712	„ Carb. Præcip., 10 to 60 gr. ...	...	...
Burgeaud's Wine	742	„ Chlorhydroph. Sirop, 10 to	...	205
Burgess' Lion Ointment	742	30 Cc. ...	...	205
Burnet, Great = <i>Sanguisorba</i> off.	„ Chlorhydroph. Sol. ...	...	201
(<i>Rosaceæ</i>)	„ Chloridum, 5-15 gr. ...	...	201
Burney Yeo's Mixture, 1 oz.	576	„ Cyanamidum ...	...	201
Buro's Solution	115	„ Dibromobehenate 15 to	...	413
Burra Gookeroo, 707; Busserole	...	692	45 gr. ...	...	39
Butcher's Broom Tar	555	„ Fluoridum $\frac{1}{4}$ to $\frac{1}{2}$ gr. ...	...	35
<i>Buteæ Gummi, Semina</i>	733	„ Formas, 3 to 10 gr. ...	...	60
Butter Analysis, 891; of Antimony	...	129	„ Glyceroph., 3 to 10 gr. ...	...	6
„ „ of Orris	429	„ Hippuras, 5 to 20 gr. ...	...	206
Buttercloth, 351; Buttermilk	55	„ Hydras ...	...	207
<i>Butyl-Chloral Hyd.</i> , 5 to 20 gr.	194	„ Hypochlor. (Chlorinat.) ...	...	531
Butyrate of Amyl	93	„ Hypoph., 3 to 10 gr. ...	...	40
Butyric Aldehyde, Oxy	109	„ Iodas and Preps., 3 to 4 gr. ...	...	405
„ Ether	93	„ Iodidum (in dilute solution),	...	497
Butyryl-choline	3	2-4 gr. ...	...	412
Butyl-Cresyl-Iodide 402; Buxine	...	695	„ Iodo-Ricinoleas, 3 gr. ...	...	42
Bynin (et Amara), 1 to 4 dr.	445	„ Iodo-Sebacate, 15 gr. ...	...	43
Bynin Emulsion, 742; Bynol	742	„ Lactas, 1 to 15 gr. ...	...	461
Bynoplasmia, $\frac{1}{4}$ oz.	818	„ Lactoph., 3 to 10 gr. ...	...	225
Cacao Butter	663	„ Naphthol - sulphonas, 10 to	...	201
C. B. Q. Tablets	742	30 gr. ...	...	10
„ Liniment	742	„ Nucleinas $7\frac{1}{2}$ to 15 gr. ...	...	449
Cachets	546	„ Nitras ...	...	205
„ Betol, 5 gr Bism. Salicyl.	...	462	„ Perboras ...	...	205
„ Boric Acid, 10 gr.	6	„ Permanganas ...	...	205
„ Methylene Blue, 1-4 gr.	249	„ Peroxid., 3 to 9 gr. ...	...	205
„ Salol, Bism. Carb Sod.	...	75	„ Phosph., 5 to 15 gr. ...	...	205
„ Bic., aa. 5 gr.	517	„ „ Acidus 5 to 20 gr. ...	...	205
„ Trypsin, 5 gr.	33	„ „ Di Acid 5 to 20 gr. ...	...	205
„ Tylmarin, 5 gr.	152	„ „ Di-basic 10 to 30 gr. ...	...	205
Cacodyle 150, "New"	150	„ „ Monoacid 10 to 30 gr. ...	...	206
Cacodyliacal, $\frac{1}{2}$ to 2 gr.	700	„ „ Monobasic 5 to 20 gr. ...	...	206
Cactus 699; Cactina Pillets	...	695	„ Saccharas, 8-30 gr. ...	...	81
Cæsalpinia, 737; C. Bonducella...	...	196	„ Sulphas, 20-30 gr. ...	...	207
Cafamarine	196	„ Sulphis ...	...	207
Caffeina, 1 to 5 gr.	196, 383	„ Sulphid, $\frac{1}{4}$ to 1 gr. ...	...	207
Caffeinæ Citras, 2 to 10 gr.	193	„ Sulphurat, Sol. ...	...	203
„ „ Eff. 1-2 dr.	199	Calcimeter ...	...	201
„ HBr., $\frac{1}{2}$ to 5 gr.	199	Calcinol, 3 to 4 gr. 40; Calcium	...	696
„ HCl., $\frac{1}{2}$ to 5 gr.	199	Calculus, 553; Calendula ...	...	817

NAME.	DOSE.	PAGE.
<i>Calisaya</i> , 10 to 60 gr. ...		237
Californian Syrup of Figs ...		742
Calmette's Antivenene ...		783
Calmette's Ophthalmic Reaction (Liquid and Dry) ...		812 ;
References ...		813
<i>Calomel</i> $\frac{1}{2}$ to 5 gr. ...		377
Cream, L.L. ...		379
" Lambkin (5%) 10 m. ...		359
Calorific Wool ...		220
<i>Calotropis</i> , 733 ; Calox ...		205
<i>Calumbæ Radix</i> ...		696
Calvert's Acid ...		17, 18
<i>Calx Chlorinata</i> ...		207
" <i>Sulphurata</i> , $\frac{1}{4}$ -1 gr.		207
<i>Cambogia</i> (<i>Indica</i> , 733), $\frac{1}{2}$ to 2 gr. ...		696
<i>Camellia Thea</i> ...		196
Cambridge's Reaction ...		880
Camphire 546 ; Camphoid ...		210
Camphor Ball ...		209
" Essential Oil of ...		208
" Julep, or Mist, 1 to 2 oz. ...		209
" Linim 209 ; Wool ...		210
<i>Camphor.</i> (and artif.) 2 to 5 gr. ...		208
" Monobrom., 2 to 10 gr. ...		211
" Salicyl., 1 to 5 gr. ...		211
Camphorated Carbolic Acid ...		19
" Chalk ...		209
" Spirit of Ether ...		288
Camphosan 10 gr. ...		500
Camphre de Persil ...		132
Camphylene ...		462
Canada Balsam, Xylol, etc. ...		728
Canadian Hemp Root, aver. 15 gr. ...		133
Cancer, 758 ; Bush, 727 ; Fluid Coley's, 763 ; Serum ...		763
Cancer Research ...		758
" Causes of ...		762
" Diagnosis of ...		760, 762
Candelilla, F.E. = <i>Cereolum</i> (Bougie) ...		190
<i>Canella Alba</i> ...		696
Cane Sugar & Estimation ...		614
<i>Cannabis Indica</i> ...		211
<i>Cannabis Sativa</i> ...		696
<i>Cannabin Tannas</i> , 2-10 gr. ...		212
<i>Cannabinon</i> , $\frac{1}{2}$ to 1 gr. ...		213
<i>Cantharis</i> , 1-16 to $\frac{1}{2}$ gr. ...		213
<i>Cantharidin</i> ...		214
Canton's Phosphorus ...		207
Cantueso, F.E. = <i>Lavandula</i> <i>Stoechas</i> ...		216
<i>Caoutchouc and Liquor</i> ...		726
Cape Geranium 715 ; <i>Capparis</i> ...		218
<i>Capaicin</i> ...		218
<i>Capnicum</i> , $\frac{1}{2}$ to 1 gr. ...		218
<i>Capaicin</i> , 1-8 to $\frac{1}{4}$ gr. ...		218
" Pencils ...		219
" Wool ...		220
Capsule Cruoris ...		474
CAPS. , Gelatin (G=Gelatin ; Gl= Glass) ...		546
" Adrenalin (Gl), 10 and 15 m. ...		829
" Ammon. Quin. = 1 dr. Tinct. ...		577

NAME.	DOSE.	PAGE.
CAPS. , Amyl Nitrite (Gl.) 1, 2, 3, 4, 5, 6, and 10 m. ...		125
" Salicyl., 3 gr. ...		67
" Amylene-Chloral $7\frac{1}{2}$ m ...		128
" Amylene Hydrate, 10 m. ...		128
" Apiol, 3, 5, & 10 m. ...		132
" " 5 m., Ergotin, 2 grs. ...		133
" Apoline ...		132
" Aromatic Ammonia ...		121
" Arsamin, 1 and 2 gr. ...		155
" " 1 gr. c. Bland Pill 5 gr. ...		155
" " c. Quinin 3 gr. ...		155
" Bland Pill, 5 gr. (& comps.) ...		322, 323
" Blood Corpuscles ...		474
" Brometone 5 gr. ...		194
" Bromine (Gl.), 1, 2-2, 4 Co. ...		191
" Brominol 33%, 2 gm. ...		192
" Bromoform, $\frac{1}{2}$ m. ...		193
" Calc. Iodoricinoleate, 3 gr. ...		497
" Carbol. Acid 1 and 2 gr. ...		23
" Cascara (mild) ...		221
" (strong) ...		221
" (mild) c. Euonymin, 1 gr. ...		221
" Castor Oil, $\frac{1}{2}$, 1 dr. (Co. 496) ...		496
" Chaulmoogra Oil, 5 to 20 gr. ...		491
" Chemical Food, 1 dr. ...		330
" Chloretone, 5 gr. ...		195
" Chlorodyne, 5 m. ...		234
" Chloroform, 10, 20, 30 & 60 m. (Gl.) 232 ; with Ethyl Iodide, 96, & 5 m. (G.) ...		233
" Chloromorph. Sol., 5 m. ...		234
" Cinnamic Aldehyde, 1 m. ...		31
" Cinnamon Ol., $2\frac{1}{2}$ m. c. Quin. 1 gr. ...		241
" Cod L. Oil, $\frac{1}{2}$, 1 dr. ...		493
" " Phosphatd. 1 dr. ...		529
" { Cod L. Oil, 19 m., } and with Bland P. ...		493
" { Creosote, 1 m., } and with Bland P. ...		493
" Colchicine Salicyl. = 1-250 gr. ...		281
" Copaiba, 5, 10, 15 m. ...		500
" { Copaiba, 5, 10 m., } { Cubeb Ol., 5, 10 m., }		500
" Copaiba, 5 c. Santal, 5 m. ...		500
" Creocarb ...		290
" Creosotal, 5, 10 m. ...		291
" Creosote, 3, 5 m. ...		290
" " Valer., 7 m. ...		291
" Cruoris ...		474
" Cubeb Oil, 10 m. ...		295
" Cubeb, 5, c. Santal Oil, 5 m. ...		500
" Cyllin, 1 and 3 m. ...		15
" Cyperi Ext. Liq., 5 m. ...		298
" Damiana Extr. (30 m. Liq.) ...		298
" Distilled Water, Sterile ...		172
" Dormiol, $7\frac{1}{4}$ m. ...		128
" Easton Syrup = $\frac{1}{2}$ & 1 dr., et aa. c. Arsen., 1-50 gr. ...		332
" Rosote, 7 m. ...		291

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Caps., Ergospiol, 133; Ergot and Apiol	...	133	Caps., Pavy's Sol., 10 Cc. ...	...	877
„ Ergotin, 3 and 5 gr....	...	311	„ Phosphorated Cod L. Oil,	...	529
„ Erigeron Oil, 5 m....	...	704	„ ½, 1 dr. ...	...	529
„ Ethyl Bromide (Gl.), 5 m.	94	„ Phosphorated Oil, 5 m. ...	...	546
„ Ethyl Chlor. (Gl.), 3, 5 Cc.,	...	95	„ 'Planten' ...	...	564
30 Gm.	96	„ Potass Iodide, 5 gr. ...	...	447
„ Ethyl Iodide (Gl.), 6 m.	96	„ Potass Permang., 1 gr. ...	...	574
„ Ethyl Iodide, 5 m., c.	96	„ Quin. Salicyl., 5 gr. ...	...	575
„ Chlorof. 10 m.	96	„ Sulph., 1-5 gr. ...	...	336
„ Ethylene Bromide, 1 m. (G.)	...	331	„ Sahli's ...	...	75
„ Ext. Filicis Liq., 15 m.	876	„ Salol, 5 and 10 gr. ...	...	502
„ Fehling's Sol. (Gl.), 1 Cc.	320	„ Santal and Kava ...	...	499
„ Fel Bovinum, 5 gr.	542	„ Santalol, 5 m. ...	...	499
„ Formalised Gelatin	402	„ „ 4 m.c. Methyl Salicyl.	...	499
„ Formidin, 5 gr.	294	„ 1 m. ...	...	500
„ Geosote, 2, 5 m.	336, 399	„ Santal Oil, 5 to 20 m. ...	...	500
„ Glutoid	63	„ Savaresse, 10 m. ...	...	500
„ Glyceroph. = ½ dr. and 1 dr.	...	502	„ Sod. Cacodylate = ¾ gr.	...	151
of Syrup	292	„ Acid (Gl.) ...	...	618
„ Gonol, 500; Gonosan	292	„ Sodium Oleate, 5grs. ...	...	618
„ Guaiacol, 2, 5 m.	292	„ „ Co., m. et n. ...	...	823
„ „ 1 gr., c Iodoform, 1 gr.	292	„ Spermin (Gl.), 1 Cc. ...	...	656
„ Guaiacol, ¼ gr. c. Cod L. Oil,	...	292	„ Sulphonol, 5, 10 gr. ...	...	662
5 m.	294	„ Terebene, 5 and 10 m. ...	...	663
„ Guaiacol Valer., 2, 5 m.	355	„ Terpinol, 1½ m. ...	...	517
„ Gnaiaol. Resin, 5 gr.	491	„ Trypsin et c. Fel Bov. ...	...	546
„ Gynocardia Oil	474	„ Turpentine, 5, 10 m. ...	...	68
„ Hæmoglobin, 5 gr.	30	„ Ulmarene, 8 m. ...	...	578
„ Hetol (Gl.)	372	„ Valerianatum Co., 1 t. d. ...	...	228
„ Hyd. Oleo-brassidas	383	Capsuloids, 742; Captol... ..	...	696
„ Hydrastis = 30 m. Ext. Liq.	368	Caracol, F.E. = Helix Aspera et var	...	675
„ Hydriodol = 1-16, 1-32 gr.	244	Carapa Guiniensis ...	...	677
„ Hypnone, ¾ min.	396	Carbamide, 10 to 60 gr. ...	...	352
„ Ichthyol, Amm., or Lith.,	...	406	Carbanilic Ether, 3 to 6 gr. ...	...	696
4 gr. also aa., 2 gr.	406	Carbasus. See Gauzes ...	...	471
„ Iodinol, 25%, 2 gm.	336, 399	Carbo Animalis ...	...	696
„ Iodipin, 25%, 2 gm.	322	Carbohydrates ...	...	910
„ Iodoform (glutoid)	329	Carbo Ligni (and Cocoa Nut) ...	...	917
„ Iron Carb. Sacch., 5 gr.	14	Carbol-Fuchsin Solution ...	...	911
„ „ Iodide = 10 and 30 m.	249	„ Gentian Violet ...	...	917
„ Syr.	437	„ Methylene Blue ...	...	19
„ Izal, 2 m. (& c. Cod Liver	...	334	„ Thionin ...	...	16, 18
Oil, 5 m.)	452	Carbolated Camphor ...	...	15
„ Lecithin, 1½ gr.	372	Carbolic Acid. 11; Coefficient	...	19
„ Male Fern Ext. 15 m.	466	„ „ Commere. ...	...	13
„ Menthol Paraffin	487	„ „ Lotion ...	...	19
„ Méroléol	495	„ Disinfectant Pdr. ...	...	19
„ Meth. Blue, 2 gr. (and	...	502	„ Oil ...	...	13
Comp.)	717	„ Liq. Disinfectant ...	...	892
„ Myrtol, 2 and 5 m.	501	Carbolised Gauze and Bandages,	...	892
„ Nisbet's Specific, 20 m.	881	20; Iodine Sol. 22; Preserv.	...	697
„ Nitric Acid, 1 m. (Gl.)	466	Sol., 24; Resin, 23; Smelling	...	27
„ Nitroglycerin, 1-100 and 1-50	...	699	Salts, 23; Wool ...	...	896
gr.	67	„ Carbon ...	...	875
„ Ol. Cedri Atlant, 8 m.	491	Carbon Dioxide, 27, 891; Carbon	...	891
„ „ Gaultheria, 10 m.	546	Monoxide ...	...	892
„ „ Gynocard, 5-20 gr.	487	„ „ Estimn. in atmos-	...	892
„ „ Turpentine, 5 m.	495	phere ...	...	697
„ Oleic Acid, 7½ m.	502	„ Monoxide, Detec. in Blood	...	27
„ Olive Oil, ½, 1 dr....	...	502	„ Tetrachloride ...	...	896
„ Papaveris	522	Carbonic Snow ...	...	896
„ Paraffin (Catheters)...	106	Carbonis Bisulphidum ...	...	875
„ Paraldehyde, 20, 30, 40 m.	891	Carbonyl Chloride ...	...	891
			Carburetted Gas ...	...	891

NAME.	DOSE.	PAGE
Carcinoma	758
<i>Cardamom: Semina</i>	697
.. Wild	731
Cardenillo, F.E. = Cupri Subacetas	...	296
Cardol, 691; Cargile Membrane...	...	818
Carica Papaya	518
Carlsbad Salt, True & Artif.	642
Carmalum	697, 874
Carmeliter Geist, 715; Carmine,	697
Carmino-Fibrin	525
Carnaby, 742; Carnauba Wax...	...	927
Carnolite, 675; 'Caroba'	710
Carnrick's Peptonoids	742
Carrageen, 701; Carron Oil	206
Carter's Little Liver Pills...	...	742
Cartons, Boric Acid for Lotions	7
<i>Carui Fructus</i>	698
Carum Copticum	736
Carvacrol, 718; Carvol, 693; Carvonum	698
<i>Caryophyllum</i>	698
Casca Bark	315
Cascara, 3 to 15 gr.	220
.. Caps., 221; Pastils...	223
.. Jelly, 1 to 4 dr.	221
Cascarin Le Prince...	221
Cascarilla, Cascarillin	698
Casein	482
.. Estimation in Milk... ..	50, 888	
.. Hammersten's	482
Cashe ^a Nut	691
Casimiroa Edulis	698
Casse en Batues	698
<i>Cassia Acutifolia, Angustifolia</i>	622
.. Beareana	698
.. <i>Estula and Pulp</i>	698
.. Montana	698
Castile Soap, 618; Castoreum	698
Castor Oil, 1 to 8 dr.	496
Castor Oil Powders	497
.. Solutions of Alkaloids	...	497
Casumen, 482; Cataphoresis	413
Cataplasma Kaolini	343
.. Salicyl. Co.	343
Catarrh, Vaccine for	763
<i>Catechu Pallidum</i> , 5-15 gr.	699
.. <i>Nigrum</i> , 5-15 gr.	734
Catgut Ligatures	20
Catheterpurin	365
Catheters, Sterilisers, etc.	217
Catheter Oil, 19; Salol Oil...	76
Catheter Lubricant 522; (Adrenalin) 829; Surgical Lubricant	19
Cathions, 414; Cathode, 414; Rays,	...	579
Cat's Hair, 319; Cat's Tail...	704
Canlophyllin, 1 to 4 gr.	699
Caustic, Argenti Nit.	136, 137	
.. Mitigated	137
.. Toughened	137
.. Bari, St. J. H.	176
.. Zinc Chlorid	682
Cayenne	218
C.E., 233; Cedrarine	251
Cedar Wood Oil	699

NAME.	DOSE.	PAGE
Cedrene	699
Cedron, 725; Cedrus Atlant.	699
Celandine, 609; Greater	700
Celerina, 198; Celloidin and Sol.	...	282
Cellotropine, $\frac{1}{2}$ to 1 gm.	692
Celluloid	210
Cellulose Wadding and Tissue, 352; Cepa-Coballo	699
Cephaeline (and HCl.), Emetic 1-12 to 1-6 gr.	429
Cephaelis	426
<i>Cera Alba, Flava</i>	699
Cerato Laudanizado, F.E. = Sydenham's Laudanum, 1 to 9 Cerate
Ceratum, U.S., 521; Camphora ^a , U.S., 209; Cantharidis, 216; Gaeni, 498; Iodoform, 400; Petrolei, 520; Plumbi Subacetatis, U.S., 490; Resinae and Co.	721
Cerebos Salt	631
Cerebrin	819, 820
Cerebro-Spinal Fever, 765; Fluid	...	873
Ceredin Pil., $1\frac{1}{2}$ gr.	224
Cereoli vide Bougies.
Ceresin	519
Cereus, Night-blooming	699
Cerevisia Ferment., $\frac{1}{2}$ -1 oz.	224
<i>Cerii Oxalas</i> , 2-10 gr. (Off.)	226
.. Oxidum	226
.. Sulphocarb., 1-5 gr.	226
Cerite	226
Cerium (salts, 226, 227)	226
Cer Oxyduloxalat	226
Ceruleinum	250
Cerussa, 556; <i>Cetaceum</i>	700
Cetraria (Cetrarin, 2-4 gr.)	700
Cetyl Alcohol (and Palmitate)	700
Cevadilla Seeds, Cevadine...	680
Ceyssatite, 435; Chalcolite	590
Chalk's Bottles	169
Chalk, Camphorated	206
Chalk Mixture, $\frac{1}{2}$ to 1 oz.	206
Chamomile Flowers...	692
Chapagar medium	766
Chaput's Stovaine Inf.	273
Charas	212
Charbon Naphthol ⁶ , 69 to 120 gr.	461
Charcoal (Animal, Wood, &c.)	696
Charrua	700
Charta Hydrargyri bichlor, 375; <i>Sinapis</i> (Sinapizata)	624
<i>Chaulmoogra Oil</i> , 5-16 m. 491, 736; Ointment	736
Cheate's Paste	366
<i>Chebulio Myrobalans</i>	704, 736	
Cheese, 482; Chekan	700
Chelidonium Majus...	700
Chelsea Pensioner, 1-2 dr.	657, 658	
Chemical Food, $\frac{1}{2}$ -2 dr.	330
Chenopodium, 700; Cheron's Inf.	...	630
Cherry Bark, Wild...	567
.. Laurel Water	123
Chestnut (Horse)	689

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Chian Turpentine	728	Chlorophyll ...	...	701
Chicken Ess., Peptones	473	Chloro-Sodio-Mag. Aper., 1 dr. or more...	...	642
Chielin Cream and Soap	729	Chloroxylon ...	...	701
Chiendent	398	Chloryl Anæsthetic...	...	94
Chillie Paste (Smedley's)	220	Chocolate, 664; Cholelysin ...	...	619
Chimaphila, U.S., av. 30 gr.	...	701	Cholera, 767; Mixtures, 188, 238; Vaccines, 767; Vibrio ...	...	923
China Clay 434; Green 916; Root 766	...	766	Cholesterin, 89; test for ...	...	864
Chinina, etc., vide Quinine	Choline ...	...	2, 471, 866
Chinoform., 1 to 5 gr.	570	Di-stearo-glyceroph., 3 to 5 gr. ...	...	436
Chinolini Salicyl., Tart., 5 to 15 gr.	...	247	Chologen Tablets ...	...	558
Chinolinum, 3 to 10 m.	247	Chondrus Crispus ...	...	701
Chinosol, 1 to 5 gr.	247	Chorionin ...	...	824
Gauze	247	Chrismaline ...	...	522
Tablets	247	Christal's Gut ...	...	21
<i>Chirata</i>	701	Christmas Rose ...	...	690
Chloral Alcoholate	228	Chromic Anhydride ...	...	29
Caffeine hyp. 3-8 gr.	200	Catgut (Lister) ...	...	20
Camph. (etc. Cocain)	228	Chromo-radiometer ...	...	585
c. Menthol, c. Phenol, c. Thymol	450	Chonirodrendron toment. ...	...	718
Formamide	229	Chrysarobin, Tetra and Tri-Acetate ...	...	237
Hair Stimulant	228	<i>Chrysarobinum</i> , $\frac{1}{2}$ to $\frac{1}{2}$ gr. ...	...	235
<i>Hydras</i> , 5-20 gr	227	crude ...	...	236
Tannin	228	Churchill's Hypophosphites ...	...	534
Urethane, Ethyl., 30 to 45 m.	230	Inhalant ...	...	564
Chloralamid, 15 to 45 gr.	229	Iodine... ..	...	410
Chloralantipyrin, 10 to 20 gr.	254	Chyluria ...	...	874
Chloralose, 3 to 10 gr.	229	Cicatrice 8 to 17 m. ...	...	627
Chloratifice	561	Cicuta, F.E. = Conine; C. Virosa	...	701
Chloratum Æthylum	94	Cicutine, $\frac{1}{2}$ to 2 gr....	...	285
Chlorbutol vide Chlorotone	Cigarettes, Asthmatic 565; Cn- bebs ...	...	295
Chlor-butyl Alcohol	194	Oigué ...	...	284
Chlorotone, 5 to 24 gr.	195	Cilantro, F.E. = Coriander ...	...	702
Inhalant...	195	<i>Cimicifuga Rhizoma</i> , 15 gr. ...	...	701
Chloretum Apomorphie	133	Cimicifagin, 1 to 6 gr. ...	...	701
amido-hydrargyricum...	368	Cimolite, 434; Cina ...	...	615
<i>Chloric Ether</i> , 30 to 40 m., or 5 to 20 rep.	235	Cinchona Calisaya, Lancif., <i>Officinalis</i> ...	...	237
'Chloride of Gold' Commercial, 175; with Sodium	176	<i>Cinchona</i> (Succi.) <i>Rubra Cort</i> , 5 to 60 gr. ...	...	238
Chlorides in Urine	874	Cinchonidin., Salicyl., Sulph., 1 to 10 gr. ...	...	701
Chlori Gargarisma	633	Cinchonidine Bismuth Iodide, $\frac{1}{2}$ to 1 gr. ...	...	185
Chlorobrom, $\frac{1}{2}$ to 1 oz.	229	Cinchonina, 1 to 10 gr. ...	...	240
Chlorodyne (Capsules, 5 m.), 5 to 15 m.	234	Cinchoninæ HCl., $1\frac{1}{2}$ to 10 gr....	...	240
Chlorodyne, Collis Browne's	742	Iodosulph. ...	...	240
Freeman's	744	Sulph., $1\frac{1}{2}$ -10 gr....	...	240
<i>Chloroform</i> , 1 to 5 m.	230	Sulphocarb. ...	...	240
and Ether Anæsthetic	233	Cineol, 1 to 4 m. ...	...	317
Capsules of (Gl., 10, 20, 30, 60 m., and G, 5 m)	232	Cinnabar = Red Mercurio Sulphide ...	...	382
10 m. c. Ethyl Iodide, 5 m.	96	Cinnaldehydum, (Cinnamal), 1 m ...	...	30
Inhalers	232, 233	<i>Cinnam Oliveri</i> ...	...	736
- Oxygen - Anæsthesia	231	<i>Cinnamomi Cort.</i> , 10-30 gr. ...	...	240
Chloroform. Aconiti, 1 in 1	86	Cinnamon Paste, Dental ...	...	241, 401
Belladonnæ	178	Cinnamon, Wild ...	...	696
Camphorat.	233	Cinnamyl-cocaine, ...	...	258
Iodi, 1 in 30	405	Cinyl Alcohol, 683; <i>Cissampelos</i> ...	...	734
Mastiches	234	Citarin, 15 to 30 gr., 109; Citral ...	...	712
Chlorogenine	691			
Chloro-meta-cresol	16			
Chloro-methyl-menthyl ether	112			
Chloromorphiæ, Liquor, 5 to 15 m.	234			

NAME.	Dose.	PAGE	NAME.	Dose.	PAGE
Citrated Caffeine Eff.	1 to 2 dr.	199	Codeine Glycerin Jelly, 1 dr	...	278
Citrine Ointment, 371; Citron	...	713	Codeinæ HCl., $\frac{1}{4}$ to 2 gr....	...	278
Citronella Plantations	...	792	Codeinæ Phosphas, $\frac{1}{4}$ -2 gr....	...	278
Citronellæ Oleum	...	701	" Sulph. av. $\frac{1}{2}$ gr. ....	...	279
Citronellal and Citronellol	498, 701		Codeine Methyl-Brom., $\frac{3}{4}$ gr. ....	...	279
Citrus var.	173, 733, 713		Codrenine, 828; Cofectant ...	17, 18	
Citrophen, 3 to 8 gr.	252		Coffeina v. Caffeina		
Clarke's Blood Mixture	...	742	Cognac...	...	102
" Standard Soap Solution	887		Cohosh, Black, 701; Blue...	...	699
Claudius's Sterile Gut	...	21	Coke Oven Oils	...	13
Claviceps Purpurea	...	309	Cola Acuminata	...	197
Clavo de Especia, F.E. = Caryoph.	698		Colalin Tabs. 1-8 to $\frac{1}{2}$ gr.; Colalin		
Clayton Gas	...	80	Laxative	...	644, 645
Clemens' Solution, 1 to 5m.	...	145	Colchici Cormus, 2 to 4 gr....	...	279
Clereite, 590; Cloudberry...	722		" Semina 3 gr. ....	...	279
Cloudy Ammonia, ...	120		Colchicine	...	280
Cloves, 698; Clubmoss Spores	...	713	Colchicine 1-100 to 1-32 gr....	...	281
Coagulability of the blood,			" Salicyl. (Caps. $\frac{1}{10}$ gr.)	...	281
To increase and decrease	...	202	Colchisal, 281; Coleothar, 326;		
Coal Gas, poisoning by	...	891	Cold Cream, 498; Cold Vaccine, 763.		
" Tar Derivatives	...	241	Coleman's Wincarois	...	742
" Inhaler	...	241	Coley's Cancer Fluid	...	763
Coca Chewing Gum...	256		Colic Root	...	690
Cocæ Folia, 30 to 120 gr.	...	255			
Cocaina, 1-20 to $\frac{1}{2}$ gr.	257				
Cocaina c Oleo, 2%	259				
Cocainæ Carbolas	...	264			
" Citras	...	259			
" Formas	...	259			
" HI., HBr.	...	264			
" Hydrochlor...	...	259			
" Lactas	...	264			
" Nitras	...	264			
" Nitris	...	264			
" Periodid.	...	264			
" Phenaa	...	264			
" Salicyl.	...	265			
Cocaine c. Adrenalin	...	264			
" in Clove Oil...	...	259			
" Ionisation	...	267, 419			
" Lanoline	...	258			
" Local Infil. Anæsthesia c.	264				
" Oleate	...	259			
" -Menthol-Phenol	...	258			
" Sterilisation of Sols.	...	262			
" Toxicology	...	258			
" Uses of	...	265			
Cocamine, 258; Cocculus Indicus	537				
Coccus Cacti	...	697			
Cochineal, Liquid	...	697			
Cochlearia Armoracia	...	702			
Cocillana, 702; Cockle's Pills	742				
Cocoa, 463; Food...	478				
" Nut Charcoal	...	696			
" Nut Stearin	...	78			
Cod Liver Oil 1 to 4 dr....	492				
Cod Liver Oil Emulsions. See					
Emulsions.					
" Substitutes...	494				
Codeina, $\frac{1}{4}$ to 2 grains	...	277			

"COLLAPSUBES" OF OINTMENTS

†	" Aristol, 10% ..	402
*	" Atropine, 1 in 120, &c.	171
*	" Atropine, 1%, & Cocaine, 2%	171
*	" Atropine & Iodoform, aa. 1 in 120	
*	" Atropine, 1 in 120, c. Ung. Hyd. Ox Flav. 4% ..	
§	" Bism., Morph. & Coc.	183
§	" Boric Acid	9
*	" Boric Acid in White Vaseline, 1 in 60	
†	" Boric Cream	9
†	" Vaseline	9
†	" Dermatol, 10% ..	190
§	" Ferri Perchlor.	324
§	" Gall and Opium	508
§	" Hamam. (et c. Cocaina)	358
*	" Homatropine and Cocaine, ea. 2%	
†	" Hyd. Iodid, 1% ..	368
†	" Hyd. Zinc Cy., $\frac{1}{4}$ to 2%...	368
†	" Hydrarg. Salicyl.	377
†	" Hydrastis (6% Liquid Extract)	
†	" Iodoform, 5%, et Cocaina, 2%	402
†	" Iodoform, et Eucalypt. 5%	402
†	" Iodol, 5%, et Eucalypt., 10%	403
†	" Lanolin & L. Cream	
†	" Lubric. Jelly	340
*	" Mercur. Zinc Cy. $\frac{1}{4}$, $\frac{1}{2}$, 1 and 2%, & Paste (Cheate	368

Those marked * are of small size for ophthalmic use.

† are for urethral use. § for rectal use.

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NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
"COLLAPSUBES" OF OINT- MENTS p 8:—			Collyr. Hyd. Biniodidi	367
" Methysal Balm	68	Colocynth, Pulpa 2 to 8 gr....	...	283
* " Pagenstecher's, 1·25 to	...	381	Colocynthin, Colocynthidin ...	...	281
" 10%	520	Colon Bacillus Vaccine and	...	767, 768
" Petroleum Cerate	64	Serum ...	...	476
† " Picric Acid, ½%	140	Colostrum ...	...	508
† " Protargol, 2%	19	Combretum Sundsiacum ...	...	727
**§ " Surgical Lubricant	255	Comfrey ...	...	753, 784
† " Tannin, 10%	68	" Complement ...	...	754
† " Thallin, 5%, c Cocaine, 2%	521	" Anti ...	...	783
† " Ung. Methysal Co.	685	" Fixation Test ...	...	710
*†§ " Vaseline	686	Compo, Dental ...	...	169
† " Zinc Permang., 1 in 2000	139	Comp. Asthma Fluid ...	...	284
† " Zinc Sulph., 1 in 500	178	Condurango 15 to 60 gr. ...	...	449
† " Zinc Sulphocarb., 1 in 500	283	Condy's Fluid ...	...	264, 828
Collargol (Colloid Silver)	282	Conephrin, 15 m. ...	...	506
Collemplastrum Adhasiv.	283	Confectio Aromatica = Pulv Cretæ	...	704
Collemplastrum Salicylicum	282	Aromatica, 10-40 gr ...	...	657
Collie's Ointment	283	Confectio Emblicæ, 1-4 dr. ...	...	437
Collinsonia Canadensis	282	" Guaiaci Co., 1-2 dr ...	...	722
Collodium (contractile)	282	" Lecithin (Granules) ...	...	723
" Acetonum	282	" Piperis, 60-120 gr. ...	...	615
" Aceto-Æthericum	282	" Rosæ Gal. ...	...	616
" Acid. Salicyl.	282	" Rutæ, 1 to 2 dr. ...	...	85 10
" Anodynum	282	" Santonini ...	...	622
" Atropinæ	282	" Co. 1 dr. ...	...	657
" Belladonnæ	282	" Scammonia, Co., '85 10	...	120 gr. ...
" Callosum	282	" Sennæ 60-120 gr. ...	...	622
" Cantharidis (var.)	282	" Sulphuris (et o. Senna)	...	60 to 120 gr. ...
" Cocainæ, 2%	282	" Terebinthinæ '85, 60 to	...	120 gr. ...
" c. Ol. Crotonis, 1 in 7	282	Congo Red Paper ...	...	893 et seq.
" Elasticum, 282; <i>Flexile</i>	282	Congreve's Elixir ...	...	742
" Ichthyol	282	Conhydrine, Coniceine ...	...	285
" Iodi, 30 gr in 1 oz.	282	Conii Folia (and fruits), 2 to 8 gr. ...	...	284
" c. Iodoform	282	Conine, ¼ gr. incr. ...	...	285
" Paraformi...	282	Coninæ, HBr., ½ gr. inc. ...	...	285
" Salicyl. et Lact.	282	Conradi's Koleradraaber ...	...	288
" " c. Hyd. Perch.	282	Conradi's Medium ...	...	916
" " c. Zinc	282	Contractile Collodion ...	...	281
" Salol, 76; Styptic.	282	" Conules Ephedrin Co." ...	...	689
" Vesicans	282	Convallaria Majalis ...	...	287
" Zinci Chloridi	282	Convallarin, 3 to 4 gr., ...	...	287
Colloid, Silver, 133; Colloids	416	Convallamarin, ½ to 2 gr. ...	...	287
Collunarium Alum, T.H. 1%	416	Convolvulin, 1 to 5 gr., 433; Coorchi ...	...	702
" Pot. Permang., Liq.	416	Convolvulus purpureus ...	...	709
" 6 m. in 1 oz., T.H.	416	Copaiba, 30 to 60 m. ...	...	500
" Potass. Chlorat, Co.	416	" Oil, 5 to 20 m. ...	...	500
" C.L.T.E.	416	" Resin ...	...	501
" Quinina	416	" Soluble ...	...	501
" Zinc Sulph. 0·1%	416	Copalchi, 702; Copal Solution ...	...	714
" Zinc Sulphocarb. 1 in	...	416	Copper Points ...	...	115, 297, 686
250	...	416	" Ionisation ...	...	419
Collutorium Acidi Benzoici	416	Coptis Teeta, 703; Cordite ...	...	470
" Alkalinum Co.	416	Corallin, 897; Coriander ...	...	702
" Astringens	416	Corn Ergot and Silk	713
" Formalini	416	" Oil	714
" Potass. Chlor.	416			
Collyr. Adstring. Lut.	685			

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NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Corns, Collodions for	283	Creyat, 732; Crile's Tube...	...	231
Cornezuelo de Centeno, F.E.=Ergot	...	311	Crinoline Bandages ...	...	351, 639
Corrutine, $\frac{1}{2}$ to $\frac{1}{4}$ gr. p.d.	312	Crocq's Pill ...	...	138
Coronilla, Coronilline	702	Crocus ...	...	703
Corpora Lutea, $\frac{3}{4}$ gr.	835	Ferri, 326; Martis ...	...	326
Corpuscles, Counting of	887	Crosby's Balsamic Cough Elixir	...	742
Corrosive Sublimate	373	Crotin... ..	...	718
Corydalis, Corydaline, etc., 702,	703		Croton-Chloral Hyd., 5 to 20 gr.	...	194
Coryfin	452	Eluteria ... ..	...	698
Corynanthe Yohimbi	731	Pseudochina and C. Suber-	...	
<i>Coscinum</i> , 734; Coster's Paste	408	osus, 702; Tiglium ...	...	718
Costo Hortense, F.E.=Tanacetum	...	727	Cryogenin, 3 to 24 gr. ...	...	247
Cotandin Compounds	742	Cryoscopy, 871; Cryptopine ...	...	459
Cotarnine base	463	Crystalloids ... ..	...	416
Cotarnine HCl, $\frac{1}{4}$ to $\frac{1}{2}$ gr. incr.,	...		Cubeb Cigarettes ... ..	...	295
463; Phthalate, $\frac{3}{4}$ gr	464	<i>Cubeba Fruct.</i> , 30-60 gr. ...	294, 499	
Coto Cort., 1 to 8 gr.	287	Cubebin ... ..	...	295
Cotoin, $\frac{1}{2}$ to 2 gr.	288	Cuca, 30 to 120 gr. ... ..	...	256
<i>Cotton</i> , Medicated	351	Cucumber Ointment ... ..	...	703
See i Ext. Pdr., 1 dr...	354	<i>Cucurbita Semina Præp.</i> , 3 to 4 oz.	...	734
<i>Couch Grass</i> , 732; Coulomb	418	Cudbear ... ..	...	62
Coumaric Treatment	31	Culex Impellans, Pip.	774, 904	
Coumaric Anhydride	288	Culture Media, 919; Culvers Root	...	712
Coumarin	288	Cumene, 20; Cuppers ... ..	...	217
Courmont's Tuberculosis Test	815	Cupralgin=Cupri-Alginas... ..	...	690
Court Plaster, 709; Cowbane	701	Cuprea Bark ... ..	...	237
Cowhage, 1 to 2 gr., 335; Crab's	...		Cupri Acet., 1-12 to $\frac{1}{2}$ gr... ..	...	296
Eyes=Calcii Carb.		Alginas, $\frac{1}{2}$ to $\frac{1}{4}$ gr... ..	...	690
Coza Powder, 742; Crab Oil	686	Arsenis, $\frac{1}{10}$ to $\frac{1}{15}$ gr. ... ..	...	147
Cramp Bark=Viburnum	738	Aseptol ... ..	...	25
Cranesbill Root	707	Chloridum, $\frac{1}{4}$ -2 gr... ..	...	297
Cream, Cold	498	Citras, 296; Oxidum ... ..	...	296
Calomel, 10 m.	359	Nucleinas ... ..	...	226
Mercurial, 10 m.	359	Oleas ... ..	...	487
of Malt preparations	445	Subacetas ... ..	...	296
Salicylic	69	<i>Sulphas</i> , $\frac{1}{4}$ - $\frac{1}{2}$ gr.; emetic,	...	
of Tartar (Soluble, 567), 20	...		5 to 10 gr. ... ..	...	296
to 60 gr.	566	Sulphocarbolas ... ..	...	25
883; Preservation, thick-	...		Cupric Test Pellets ... ..	...	876
eners, etc.	889	Cuprol ... ..	...	226
Tube, 890; Zinc	683	Cuprocitol, 5% and 10% ... ..	...	296
Creams, Mucilage for	703	Cuprum, 295; Aluminatum ...	...	297
Creatinine, Creatin	473, 874		"Cuprung" ... ..	...	296
Crédé's Silver (Ung. 140), $\frac{1}{2}$ to 2 gr.	...	139	Curax, 1-20 to $\frac{1}{2}$ gr. ... ..	...	703
Cremalto	742	Curarina, $\frac{1}{10}$ to $\frac{1}{15}$ gr. ... ..	...	703
Cremor Acid Salicyl	69	Curdled Milk	44, 47	
Lowndes	364	Medicated ... ..	...	56
Magnesia, 1 to 4 dr	441	Gurdlng Ferment... ..	...	513
Zinci (et Calaminæ)	683	Curd Soap ... ..	...	617
Creocarb Caps.	290	Curie Wafers, 743; <i>Cusno</i> , $\frac{1}{4}$ to $\frac{1}{2}$ oz.	...	
Creolin Pearson	13	Cutaneous Reaction, Von Pir-	...	
Creosoforme, 291; Creosol	286	quet's ... ..	...	814
Creocauloph	359	Cutch, see <i>Catechu nigrum</i> ...	...	734
Creosotal, 5 to 20 gr.	291	Cuticura, 743; Resolvent ...	...	743
Creosote Carbonate, 5-20 gr	291	"Cyanamide" ... ..	...	201
Oils...	15	Cyanide Paste ... ..	...	366
Valer., 4 to 12 gr.	291	Cyanuretum Hydrargyri ... ..	...	365
<i>Creosotum</i> , 1 to 5 m. incr., 289;	...		Cydonia Semina ... ..	...	703
Creosol	13	Cyllin, and Preps., 1-5 m... ..	...	15
Creseonière Machine	617	Cyna, 615; Cynips Gallæ... ..	...	706
Cretyl hydrate	13	Cynoglossum ... ..	...	703
Creta Gallica...	435	Cyperus Rotundus ... ..	...	297
<i>Præparata</i> , 10-60 gr.		Cypridol (Capsules), 1 or 2... ..	...	368
Crevoisier's (Asthma) Preparation	...	742	Cypripedin, 1 to 3 gr. ... ..	...	704

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Di-iodo-isopropyl Alcohol	412	Douches, Nasal, 217 ; Dourine ...	...	792
Dill's Diabetic Mixture	743	<i>Dover's Powder (P. Ipec. Co.), 5</i>	...	...
Dimatos	434	to 15 gr. ...	...	428
Dimethyl-Amido Antipyrin	254	Doyen's Serum & Coccus ...	...	763
" " -Azo-Benzol	893	Dracontiasis ...	...	909
Dimethyl-Amidobenzaldehyde	881	Dragees Ibogaine, 2 to 6 p.d. ...	...	709
" Benzene	246	Dragendorff's Test ...	...	189
" -diamido-tolu - phenaz.	Dragon's Blood ...	...	704
HCl.	922	Drainage Tubing ...	...	217
" -Ethyl - carbinol, 30 to	Dressings, Dental, 353; Steriloid,	...	...
80 m.	128	353; Surgical ...	352 et seq.	...
" -Ethyl - carbinol-chloral,	Dried Milk ...	...	476
5-50 m.	123	Drigalski's Medium ...	...	923
" -Ketone, 1-1½ dr	104	Drop Measure Table ...	...	934
" Meth-dieth. Sulphone	655	Drosera Rotundifolia ...	...	704
" - Piperazine Tart., 15 to	Duboisia Myoporoides ...	166, 393	...
30 gr.	551	Dugong Oil, 494 ; Dulcamara, ...	...	726
" Xanthine	664, 665	Dumas', Madame, Pills ...	...	743
Dinitro-cellulose	281	Dunbar's Hay Fever Ser. ...	...	719
Dinner Pills and Tablets..	...	558	Dunham's Cassel ...	...	893
Diogen (developer v. P.J. i/07, 429)	Duodenal Membrane ...	...	820
Dionin, ¼ to ½ gr.	458	" " Desicc. and Tabs. ...	...	820
Dioscorides Granules	145	" " Extract, 5 to 20 m. ...	...	820
Dioxogen	387	Duotal, 3 to 8 gr. ...	...	2 3
Dioxybenzol - hexamethylenete-	Durant's Injection, 292, 404 ;	...	...
tramine, 7½ to 30 gr.	553	Durine ...	...	107
Diphenylamin (& Eth - thymyl	Dasart's Syrup, 2 to 4 dr., 44 ;	...	...
benz.)	58	Wine ...	...	743
Diphtheria Antitoxin	769	Dusting Powder, Lysoform (see	...	...
" Bacillus	899	also 435) ...	...	110
" Pigment for	324	Dutch Drops, 549 ; Dymal ...	...	73
" Swab	899	Dysentery, Serum (Bacilli, 901)	...	771
Diplococci, various	903	E. M. F., 418 ; Eade's Pills ...	...	743
Diplo. Intracellularis	765	Ear Cones, 174 ; Cocaine ...	...	262
" Lanceolatus	778	Earth Nut Oil ...	...	736
" Still's	767	Easton's Syrup (also Pills and	...	...
" Weichselbaum	765	Tablets) ½ to 1 dr.	331, 332	...
Dipsal, 15 gr.	69	Eau de Blanc de Perles ...	...	743
Dipsocure	743	" de Botot and Eau Dentif. ...	...	75
Disaccharide	471	" de Cologne ...	...	103
Disinfectants ... 7, 108, 111,	...	448	" de Fleurs de Lys ...	...	743
Chapter on	817	" de Goudron, 5-10 oz. ...	...	551
Disinfection of Rooms	107	" de Rabel, 79 ; Eau de Rose ...	...	498
Disinfecter, Formanganate	107	" de Vie Allemande, ¼ to 1 dr.	...	787
Di-Sodium Methylarsen., 2-5 to	" des Carmes ...	...	716
3 gr.	152	" Oxygénée ...	...	385
Dispnon	665	" Sedative ...	...	209
Disuccinyl-diox., 2 gr.	78	Ecballium Elaterium ...	...	308
Dita Bark & Dittaine ...	691, 732	...	Ecgonine ...	...	257
Di-thymol-iodide	402	Echinacea Angust., 10-30 gr. ...	...	704
Dittany, Bastard	704	Echinococcus ...	...	865
Diuretin, 5 to 15 gr.	664	Echium, 704 ; Echitamine ...	...	691
" Lithium, 5 to 15 gr.	686	Ecthol, 1 dr. well diluted... ..	...	728
Dixon's Pills 743 ; Djocat...	710	Eczema Marginatum ...	...	907
Doan's Pills and Ointment	743	Edington's Solution... ..	...	867
Dock, Yellow	723			
Dodd's Pills	743			
Dogwood, Jamaica ...	385, 719	...			
Dolichos Pubes	335			
Donovan's Sol., 5 to 20 m.	146			
Doradilla, 704 ; Doremus Ure-			
ometer ...	636, 884	...			
Dormiol (Caps. 7½ m.), 6 to 60 m.	...	123			
Doses, Metric, & Imperial	xvii			

EFFERVESCENT SALTS ("gr." in drachm understood—dose, 1 dr. or q.s.):

Acetanilide, 1 and 3 gr.	243
Ammon. Brom., 5 gr. ...	118
" Salicyl., 10 gr.	29
Antipyrine, 5, 10, 15 gr.	790
Caffeine (base), 3 gr. ...	135

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
EFFERVESCENTS (<i>continued</i>)—			Elements, Transmutation of	...	599
Caffeine Citr., 2½ gr.	...	199	Elephantiasis	...	902
„ Citr. 2½ c. Pot. Brom.	Elepizone, 1 dr.	...	730
„ 5 gr.	...	199	<i>Elettaria Cardam.</i>	...	697
„ HBr., 2½ gr.	...	199	Elixirs	...	307
Carlsbad Salt (Vesettes)	...	642	Elixir Acidi Salicyl. Co., 1 dr.	...	67
Chloro-Sodio-Mag. Aper.	...	642	„ Acidum, 2 to 8 m.	...	79
Citarin, 15 gr.	...	110	„ Adjvans, U.S.	...	307
Cystogen	...	552	„ Agrimonie, Co., 1 dr.	...	690
Glyceroph.	...	62	„ Aletridis, ½ to 1 dr.	...	690
Iron & Quin. Citr., 3 gr.	...	569	„ Ammonii Bromidi 1-2 dr.	...	118
Lecithin, 3 gr.	...	437	„ Antimonii Cinnamicum, 1	...	130
Lith. Hippuras, 5 gr.	...	439	„ to 2 dr.	...	130
Lithium Citrate, 5%	...	439	„ Antineuralg., 1-2 dr.	...	198
„ Salicyl., 2 gr.	...	439	„ Aromat., ½ to 2 dr.	...	307
Magnesium Citrate, 1-2 dr. or q.s.	„ Arsamin (½ gr.) 1 dr.	...	154
„ Sulphate, ½-1 oz.	...	443	„ Bismuthi, 60 m.	...	185
Nickel Bromide, 3 gr.	...	717	„ Caffeine, 1 dr.	...	198
Phenacetin, 5 and 10 gr.	...	252	„ Calc. Chlor., 1-2 dr.	...	204
„ 5% et Caffeine, 2½%	...	252	„ Iodidi, 1 dr.	...	405
Piperazin, 5 gr.	...	550	„ Camph., 30 to 60 m.	...	209
„ c. Phenocoll, aa 5 gr.	...	550	„ „ Monobr., 4 dr.	...	211
Piperidine Tart., 5 gr.	...	563	„ Cascara, 15-120 m.	...	221
Potass. Citrate, 1 or 2 dr.	„ Chloralamidi, 1 oz.	...	229
Potassic Aperient et c. Pot. Sul-	„ Cinchonæ, 30-60 m.	...	238
phocarb.	...	565	„ Cocæ, 1 to 4 dr.	...	250
Pullna Salt	...	641	„ Duodenalis, ½ oz.	...	826
Quin. Citrate, 1 gr.	...	569	„ Ergotæ cum Ferro, 2 dr.	...	313
„ Salicyl., 1 gr.	...	574	„ Ferri Phosph. c. Quin. et	...	...
„ Sulphate, 2 gr.	...	577	„ Strych., ½ to 1 dr.	...	332
Sal Bromatum	...	631	„ Ficorum, 1 to 4 dr.	...	308
Salicin, 5 gr.	...	75	„ Formatum Co., 1 to 2 dr.	...	36
Salicyl. Acid, 5 gr.	...	69	„ Gentian Ac., 1 to 2 dr.	...	707
Sodio-Mag. Aper. (et c. Caff-	„ Glandulæ Co., 2 to 4 dr.	...	517
ein, 642)	...	641	„ Glusidi, 5 to 20 m.	...	613
Sodium Benzoate, 6 gr.	...	5	„ Glyceroph., 1-4 dr.	...	62
„ Citro-Tart., 1 or 2 dr.	„ „ c. Format., 1	...	63
Sodium Phosphate, ¼-½ oz.	...	637	„ to 2 dr.	...	63
„ Salicyl., 5, 10 grs.	...	71	„ Guarane, 30 to 120 m.	...	356
„ Sulphate, 1 dr. or more	...	641	„ Hæmoglobin, 1 dr. or more	...	475
Stront. Brom., 10 gr.	...	648	„ Heroin, 1 dr.	...	548
Sulphonal, 5 gr.	...	656	„ Ipecacuanhæ, 10 to 30 m.	...	427
Urotropin, 5 gr.	...	552	„ Lecithin, 2 dr.	...	437
Vesalvine, 5 gr.	...	552	„ Lithia and Hydrangea, 1 to	...	708
Egg-o-tone	...	743	„ 2 dr.	...	708
Ehrlich-Blenden Eyepiece	...	868	„ Manaca et Salicyl, 1 to	...	714
Ehrlich's Indican Test	...	881	„ 2 dr.	...	714
„ Side-chain Theory 753, et seq.	„ Papain, 1 dr.	...	518
„ Stains	...	873	„ Paraldehydi, 1-3 dr.	...	105
Einhorn's Bucket, 894; Ektogan	...	388	„ Paregoric = Tinct. Camph.	...	506
Elæosacchara, P.G. (q.v.)	„ Co.	...	347
Elastica, 216; Elastic Hosiery	...	217	„ Pectorale	...	526
Elaterinum, 1-40 to 1-10 gr.	...	306	„ Pepsini Bism. et Strych.,	...	526
„ 1-10 to ½ gr.	...	306	„ 1 dr.	...	529
Elecampane, 709; Electargol	...	141	„ Pepticus, ½ oz.	...	549
Electricity, Medical	...	413, et seq.	„ Phosphori, 15-60 m.	...	548
„ „ Static	...	586	„ Pini et Terpin Simp., 1 dr.	...	560
Electrodes	...	419	„ Pini Terpin et Heroin, 1 dr.	...	307
Electrolytical Solution Pressure	...	414	„ Quinque Brom., 1 dr.	...	308
Electromotive Force	...	417	„ Rhei, 1 to 3 dr.	...	613
Electronic Theory	...	597	„ Rubrum, 20-60 m.	...	67
Electrolysis, 419; Electrolytes	...	414	„ Saccharini, 5 to 20 m.	...	...
Electuaire Diascord, 15 gr	...	723	„ Salicylic Acid Compound	...	...
Elements, Atomic Wts. of	...	925	„ 1 dr.	...	...

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Elixir Sennæ (Legum., 623) 1 to			Emuls. Iodoformi ..	...	400
3 dr....	...	622	Lecithin, $\frac{1}{2}$ oz. ....	...	437
Sex Iodidorum, 1 to 2 dr....	...	564	Ol. Morrhuæ, 2 to 8 dr....	...	493
Simplex, 20-60 m....	...	507	" Ferrat, 2 to 8 dr. ....	...	494
Sodii Brom-aceto-salicylat.			" Morrhuæ et Glyce-		
$\frac{1}{2}$ oz. rep.	73	roph., 2 to 8 dr. ....	...	63
Sodii Cacodyl, 30 m.	151	" Morrhuæ et Hypoph.,		
" Formatis, 2 dr.	35	2 to 8 dr. ....	...	494
Terpini Acetic 1 dr.	549	" " cum Quinalna...	...	570
Viburn Prunif. (& Co.)	738	" Olivæ, 1 to 2 oz. ....	...	495
of Vitriol, 5-20 m....	...	79	" Tereb. nth, 1 dr. ....	...	547
Elixoid Mucin, 1 to 2 dr.	821	" Petrol. c. Hypoph., 1 to 4		
Elm, 729; Emanosal,	609	dr., 521; Comp. ....	...	521
Embalming and Solutions...	...	921	" Salol, $\frac{1}{2}$ to 1 oz. ....	...	76
Embelia, 1 to 4 dr.	734	" Santonini ....	...	616
Embio Myrobalans, 1 or 2	704	" Seminum Cannabis ....	...	696
Emetina (Alk.)	428	" Sulphuris ....	...	657, 778
HCl. Expt., $\frac{1}{100}$ to $\frac{1}{2}$ gr.	...	429	Endemic Hæmaturia ....	...	376
Emetin (Extractive) Expt. $\frac{1}{15}$ to			Endocarditis Senum ....	...	779
$\frac{1}{10}$, Emetic $\frac{1}{2}$ to 1 gr.	429	Endo's Medium ....	...	923
Émétique, Max. single 3 gr.	130	Enebro, F.E.=Juniperus		
Emmenagogue Mist., Dewees's,			Enemata ....	...	308
$\frac{1}{2}$ oz.	114	Enema, Acid Salicyl, 0.3 %	...	309
Emodin, 220, 622; Emol Keleet,			Alum, 0.5 % ....	...	309
Emplast. Adhesivum	490	" Aperiens ....	...	308
" Aug.	709	" Argent Nit, 0.1 %...	...	309
" Belladonnæ, 178; U.S.	179	" Asafetidæ ....	...	309, 693
" Dil.	178	" Bismuth Carb. or		
" Extensum...	178	Subnit., 1 % ....	...	309
" Fluidum	178	" Boric Acid. Sat. Sol. ....	...	309
" Viride	179	" Chloral, 4 oz. ....	...	227
Calefaciens	213	" Cresol (preparations) 0.5		
Cantharidis	213, 215		to 1 % ....	...	309
" Liq....	...	215	" Cupri Sulph. ....	...	309
Capsici (various)	219	" Evacuans ....	...	308
Cocainæ	259	" Ferri Chloridi (Liq.) 2 %	...	309
Confortativo de Vigo...	490	" Glycerin, $\frac{1}{2}$ oz. ....	...	308
Cupri Oleatis	488	" Hyd. Perchlor. 0.61 to		
Diachyli (Gummatum)	489	0.05 % ....	...	309
Diachylon	489	" Inf. Allii. ....	...	309
Hamamelidis	359	" Mag. Sulph. (& Acida,		
Hydrarg., U.S.	483	Henry), $\frac{1}{2}$ to 2 oz. ....	...	443
" Stearatis...	483	" Mucilaginis, 25 % ....	...	309
Menthol	451	" Naphthalini ....	...	527, 528
Methyl Salicyl...	69	" Nutriens ....	...	303, 527
Mouche de Milan (Em-			" Olei Ricini, 5 to 10 oza.	...	496
plâtre)...	215	" " Terebinth., 0.5 to 1 %	...	309, 517
Mylabridis and Cale-			" Opil ....	...	309
faciens	735, 736		" Plumbi Acet. 1 % ....	...	309
Opil, 506; Picis...	554	" Salol ....	...	309
Plumbi	489	" Stimulant, for Thirst, etc.	...	309
" Rubrum...	490	" Tannin 1 % ....	...	309
Resinæ	490	Enesol (injected), 1 gr. in 30 m....	...	149
Saponis	490, 619		Kno's Fruit Salt ....	...	743
Thapsia	728	Entada Scandens ....	...	704
Venicans	215	Entericin $\frac{1}{2}$ to 4 dr. ....	...	716
de Vigo con Mercurio	490	Kos Ozoniser ....	...	510
Emplastr. I.C. Add.	739	Eosin Solution, 5 %...	...	869
Emulsin	123, 623	" Gram-Weigert Method	...	917
Emuls. Amygdalæ, U.S., av. 4 oz.	...	124	Rosote, 4 to 12 gr. ....	...	291
Asafetidæ, 4 dr....	...	693	Ephedrine, 173; Epicarin...	...	462
Bromoform, 2 to 4 dr.	193	Epinephrin ....	...	826
Chloroformi	235	Epsom Salts (Mag. Sulph.)	...	442
Iodinol, 2 dr.	478			

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Equisetum Arvense	704	Ethylene-diamine - silver Phosph. ...	...	138
Erasmus Wilson's Lotion...	121	"-Ethenyl-diamine and Tart. ...	...	551
Ergoapiol	133	" Periodide ... ..	...	402
Ergot, 20 to 60 gr.	309	Ethyl-Morphine HCl. $\frac{1}{4}$ to $\frac{1}{2}$ gr. ...	...	458
Ergot Aseptic	311	" Sulph. $\frac{1}{4}$ to $\frac{1}{2}$ gr. ...	...	458
of Maize	714	Ethylc Alcohol ... ..	...	97
Physiol. Standardised	345, 752		Ethyl. Chloral Urethane, 30 to 45m. ...	...	230
Ergotinum, 2 to 8 gr.	311	Eucain HCl. B, $\frac{1}{10}$ - $\frac{1}{2}$ gr. ... ..	...	268
Ergotinine Cristallisée 1-200 to	...		" Iact. B, $\frac{1}{10}$ to $\frac{1}{2}$ gr....	...	269
1-64 gr.	312	Eucain c. Adrenalin ... ..	...	269
" Cit., 1-150 to 1-30 gr....	...	312	Eucalypti Folia, 5 gr. ... ..	...	316
Ergotoxine, 1/100-1/50 gr.	312	" Gummi 2-5 gr. ... ..	...	705
Erigeron Canadense	704	Eucalyptol, 1 to 4 m. ... ..	...	317
Eriodictyon Glutinosum	731	" Phosphate, 1 to 5 gr. ...	...	317
Ernutin, 30 to 60 m,	312	Euchlorine Gargle ... ..	...	633
Erucæ Semina	623	Eucodeine, $\frac{3}{4}$ gr., 279; Eudermol ...	...	717
Erysipelas, Anti-Serum	779	Eudrenine, 270; Eugallol... ..	...	65
" Dressing	435	Eugenia Jambolana ... ..	...	710
Erythrol Nitrate, $\frac{1}{2}$ to 1 gr. incr.	...	314	Eugenol	315, 698, 705	
Erythrophloeinæ HCl., 1-40 to	...		Englobulin ... ..	...	863
1-24 gr.	315	Eugol, 318; Eumenol, 705; Eumy-	...	
Erythrosine	589	drine, 173; Eunatrol ... ..	...	618
Erythrotetranitral $\frac{1}{2}$ to gr. incr.	...	314	Eulatin, 4 gr. or more ... ..	...	254
Erythroxylum Coca, 30 to 120 gr.	256	Eulaxans, $\frac{1}{2}$ -3 gr. ... ..	...	26
Esbach's Picric Solution	860	Euonymi Cortex ... ..	...	318
Fscalin and preps.	116, 117		Euonymin, 1 to 2 gr. ... ..	...	318
Eseramine and Eseridine	535	Eupatorium, U.S., 10-30 gr. ... ..	...	705
Eserina, $\frac{1}{100}$ to $\frac{1}{50}$ gr.	535	" Rebadianum... ..	...	705
Eserinæ HBr., Salicyl., and Sulph.,	...		Euphorbia Pilulifera ... ..	...	319
1-60 to 1-20 gr.	536	" Peplus ... ..	...	319
Espey's Syrup	743	Euphorine, 3 to 6 gr. ... ..	...	677
Kapliego, F.E. = Lavandula Vera...	712	Euphthalmia ... ..	...	173
Essence of Ginger	666	Euphyllin, 6 gr. (injected) ... ..	...	665
" Pear	128	Eupneuma Asthma Spray... ..	...	648
" Rennet	525	Eupnine, 1 to 4dr. ... ..	...	200
" Vanilla	729	Eupyrine, 15 to 30 gr. ... ..	...	729
Essentia Anisi, '85, 10 to 20 m.;	...		Enquinæ, 3 to 15 gr. ... ..	...	579
Menth. Pip., '85 10 to 20 m.;	...		Eureka Consumption Cure ... ..	...	743
Yerba Buena (Ph. Notes) =	...		Euresol, 611; Eurobin ... ..	...	237
Menth. Sativa.		Europhen, 402; Eusemine... ..	...	829
Essential Oil of Mustard	624	Eustachian Self-Inflator ... ..	...	234
Estoral	452	Eustenin, $\frac{1}{2}$ to 15 gr. ... ..	...	665
Ether, 90; (Mendeléeff)	926	Ewald's Breakfast ... ..	...	894
" Chloric...	235	Exalgin, $\frac{1}{2}$ to 2 gr.... ..	...	248
" Méthylénique et Diméthyl-	...		Exodin, $\frac{1}{2}$ to 24 gr.... ..	...	223
lique de l'Allyl-apionol	...	132	Exradio, 597; Eye Douches ...	...	217
" Ozonie, $\frac{1}{2}$ to 1 dr.	387	EXTRACTA:—		
" Perles, 3 m. in each...	92	(vide also Fluidextr)		
" Soap with Mercuric Iodide	...	619	" Acalypha Liq. 5-30 m ... ..	...	732
" " also Ether.		" Acoanthæ Liq. max. 4 m.(P) ...	...	84
Ethyl Acetate	93	" Aconiti Rad. Alc., max. $\frac{1}{2}$ gr. ...	...	88
" Bromide (Caps. 5 m)	94	" Adhatoda Liq., 20 to 60 m....	...	732
" Butyrate	93	" Aesc. Hippocast. Liq. ... ..	...	689
" Carbamate, 10-60 gr.	677	" Agropyri Liq., 1 to 2 dr. ... ..	...	732
" Chloride	94	" Aletridis, 15 to 30 m.... ..	...	690
" " and Nitrous Oxide	95	" Allii, 4 to 10 gr. ... ..	...	690
" Iodide...	96	" Alni Glutinosæ Liq., 10 to 30m.	...	691
" " Capsules, 5 m....	96	" Aloes Barb., 1 to 4 gr. ... ..	...	113
" Narceine HCl., 1 gr. daily	...	717	" " Soc., 2 to 4 gr. ... ..	...	113
" Nitrite Sol., 20-60 m.	93	" Anthemidis, 2 to 8 gr.... ..	...	692
" Oxide, 90; Salicyl....	68	" Apocyni Liq., 15 m.... ..	...	133
EthyleneBromide, 1 to 2m....	94	" Bela Liq., 1 to 2 dr.... ..	...	733
" -diamine	138	" Bellad. Alc., $\frac{1}{4}$ -1 gr.... ..	...	179
" -diamine Merc. Sulph.	362	" " Folii (Alec.) .. ..	...	179

NAME.	DOSE.	PAGE
Ext. Bellad. Fol., U.S. av. $\frac{1}{2}$ gr ...		179
" " <i>Liq.</i> $\frac{1}{2}$ -1 m. ...		180
" " <i>Viride.</i> $\frac{1}{4}$ to 1 gr. ...		179
" " cum Dextrino Etsicc. ...		179
" Bone Marrow, 1-2dr.		818
" Brain, 5 to 20 m.		819
" Bynes (and <i>Liq.</i>), 1 to 4 dr. 444,		445
" Cacti Grandiflori <i>Liq.</i> , 1 to 10 m.		699
" Calumbæ, '85 2-10gr.		212
" Cannabis Ind. $\frac{1}{4}$ -1gr.		212
" Carnis ...		473
" Cascaræ Sag., 2 to 8 gr.		221
" Cascaræ <i>Sagrada</i> <i>Liq.</i> , 30 to 60 m.		221
" " Inspid. $\frac{1}{2}$ -1 dr.		222
" " Miscible ...		222
" Cassiæ Beareanæ <i>Liq.</i> , 30 to 60 m.		698
" Caulophylli <i>Liq.</i> , 8 m.		699
" Cerebri <i>Liq.</i> , 5-20 m.		819
" Cerevis. Ferment, 3 gr.		224
" Chekan <i>Liq.</i> , $\frac{1}{2}$ -3 dr.		700
" Chelid. <i>Liq.</i> , 10 to 30m.		700
" Chimaphila <i>Liq.</i> 30 m.		701
" Chinæ, 1 to 4 gr.		238
" Ciguë $\frac{3}{4}$ gr.		288
" Cimicifogæ, <i>Liq.</i> 5-30 m.		701
" Cinchonæ <i>Liq.</i> 5-15m.		238
" Cissamp. <i>Liq.</i> $\frac{1}{2}$ -2dr.		734
" Cocæ, 2 to 15 gr.		258
" " <i>Liq.</i> , $\frac{1}{2}$ -1 dr.		256
" Colæ <i>Liq.</i> , Austr.		197
" Colchici, $\frac{1}{4}$ to 1 gr.		280
" Collinson. <i>Liq.</i> , 1 to 2dr.		702
" Colocynth., av. $\frac{1}{2}$ gr.		284
" Colocynth. Com., 2 to 8 gr. 113, 283		
" Combreti <i>Liq.</i> , 17 m.		508
" Condurango <i>Liq.</i> , 10 to 60 m.		284
" Conii, max. $\frac{2}{3}$ gr. FR. Cx.		286
" " <i>Liq.</i> , 5 to 15m.		286
" Convallariæ, 2-8 gr.		287
" Corn Silk, fl. 1 dr.		713
" Coto <i>Liq.</i> , 2 to 6 m.		287
" Cyperi Rot. <i>Liq.</i> 17 to 60 m.		297
" Damianæ, 2 to 10 gr.; <i>Liq.</i> , $\frac{1}{2}$ to 1 dr.		298
" Digitalis, FR. Cx. (U.S., av. $\frac{1}{2}$ gr.) ...		301
" Dulcamaræ ...		726
" Duodenal <i>Liq.</i> 5 to 20 m.		820
" Ergotæ, 2 to 8 gr.		311
" " <i>Liq.</i> , 10-30m.		310
" " Phys. Stand.		310
" Erigeron <i>Liq.</i> 30-60m.		704
" Erythroxyl. Fl. $\frac{1}{2}$ -1 dr.		256
" Eucalypti Gum. <i>Liq.</i> , 30 to 60 m.		706
" Euonymi <i>Liq.</i> 10-60m.		318
" " <i>Sicc.</i> , 1 to 2 gr.		318
" Euphorbiæ Pepli, 7 $\frac{1}{2}$ to 30 gr.		319
" Euphorbiæ Pil., $\frac{1}{2}$ to 1 $\frac{1}{2}$ gr.		320
" Eye, 2 dr.		820
" Fæxin, 3 gr.		224

NAME.	DOSE.	PAGE
Ext. Ferri Pomatum	328
" Filicis Liq., 45-90 m....	...	334
" Frangulæ Liq., 1-1dr....	...	706
" Fuci Vesic., 3 to 10gr. ; Liq., 1 to 2 dr.	706
" Fungi Secalis Fl.	310
" Galii, 5 to 20 gr.	708
" Gelsem. Pulv., ½-2gr.	337
" Gentianæ, 2 to 8 gr.	707
" Glaucii Liq., 1 dr.	707
" Glycyrrhizæ, 5-60gr.	347
" " Liq., 30-60 m.	347
" " Purum, U.S.	347
" " Spirituos., ½ to 1 dr.	734
" Gokhru Liq., 20-60m.	707
" Gossypii, 1 to 4 gr....	...	354
" " Liq., ½ to 1 dr.	354,	734
" Gossypii Sem., 1 dr.	354
" Grindelæ, 2 to 3 gr., 354; Liq., 10 to 20m....	354,	735
" Hæmatoxyli Liq. (& Solid, U.S., av. 15 gr.), ½ to 2 dr.	707
" Hæmostatic.	311
" Hamamelidis Dest., ½ to 3 dr.	356
" " Liq., 5-15 m....	...	357
" Heart (as Test)	784
" Humuli, 2 to 6 gr.	713
" Hydrastis, B.P.C. ¼ to 2 gr. 385; 2 to 5 gr.	384
" " Liq., 5-15 m....	...	383
" Hysterionice Liq., 5 to 15 m.	709
" Hyoscy. Viride 2-8gr.	392
" Hyoscy., U.S., 1 gr.	393
" " cum Dextrin	393
" Infundibular Body, 1 to 1 Cc.	829
" Inulæ Liq., 10-60 m....	...	707
" Ipecac	422
" Ipe- { Expectorant cac. ½ to 2m. Liq. Emetic, 15 to 20 m.	427
" Iridis	429
" Jaborandi, 2 to 10gr. ; Liq., 5 to 15m.	431
" Jacaranda Liq., 15 to 60 m.	710
" Jalapæ, 2 to 8 gr....	...	433
" Jambul Liq., ½ to 2 dr.	710
" Kavæ, 5 to 10 gr.	711
" " Liq., 30 to 60m.	711,	745
" Kidney	820
" Kolæ Liq., 10-20 m....	...	197
" Krameriæ, 5-15 gr. 711 ; Liq., 5-15 m.	711
" Lactucæ, '85, 5-15 gr....	...	
" Lasiosiphon Liq., 2 to 5 m.	436
" Leptandræ, av. ½ gr....	...	712
" Liebig	473
" Lodh. Liq. 30-60 m.	727
" Lupuli, 2 to 6 gr.	713
" Maidis Stig., Liq., 1 dr.	713
" " Util. Liq ½ to 2 dr....	...	714
" Malti (& Liq.), 1 to 4 dr.	444,	445

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Extr. Malti Ferratum	445	Extr. <i>Stramonii</i> , $\frac{1}{4}$ to 1 gr....	...	647
" " c. Cascara	445	" <i>Strophanthi</i> , $\frac{1}{4}$ -1 gr....	...	650
" " c. Hæmoglobin	445	" Strychni ...	...	484
" " c. Hypophos.	445	" Sumbul, U.S., av. 4 gr. ...	...	727
" " c. " c. Ol. Morr- huæ	445	" Supra - renal Liq., 10 to 15 m. ...	...	825
" " c. Glyceroph	62	" " Sicc., $\frac{1}{2}$ -3 gr. ...	...	825
" " c. Oleo Morrhuæ	446	" Symploci Liq., 30-60 m. ...	...	727
" " c. Pancreatin...	446	" Tanaceti Liq., 15-30m. ...	...	727
" " c. Pepsina, Dose 1 to 2 dr.	446	" <i>Tarazaci</i> , 5 to 15 gr....	...	727
" " Sicc., 1 to 2 dr.	446	" " Liq., $\frac{1}{2}$ -2 dr....	...	728
" " c. Syr. Ferri Phosph., 1 to 4 dr.	446	" Tebalaco ...	...	505
" Manaca Liq. 10-30 m.	714	" Thymi Liq., 5-30 m. ...	...	729
" Menyanthis et Glyc. Liq., $\frac{1}{2}$ oz.	715	" Thyms Gland, $\frac{1}{2}$ -2dr. ...	...	831
" Mezereon Liq.	715	" Tritici Liq., 1-2 dr. ...	...	732
" Monsoniæ Liq., 10 to 30 m.	715	" Uvæ Ursi Liq., 20 to 40 m....	...	692
" Muira Puama	718	" Valerianiæ (Liq., 30 m.), 1 to 5 gr. ...	...	678
" Myrtilli Liq., 2 to 6 dr.	717	" Viburni Prunif., 2 to 10 gr., Liq. 60 to 120 m. ...	...	738
" Nucis Vom., $\frac{1}{4}$ to 1 gr.	484	" Vincæ Majoris Liq., 1 to 2 dr. ...	...	730
" " " Liq., 1 to 3 m.	484	" Violæ Liq., 1 dr. ...	...	730
" " " c Dextrin	484	" Yerbæ Santæ, 10 to 40 m....	...	731
" Oleæ Fol. Rec., 5 gr....	...	496	Extracta Liq. I.C. Add. ...	...	739
" Opû (20% Morph.), $\frac{1}{4}$ to 1 gr....	...	505	Extractions, Dental ...	...	261
" " Liq. (0.75% Morph.), 5 to 30 m.	505	Eye Bottles, 169; Douches, 217; Operation Sets, 353; Pads, 352; Rods, ...	...	170
" Papaveris, '85, 2 to 5 gr.	718	" Extracts from ...	...	820
" Pareira Liq., 30 to 120 m....	...	718	Eyelid Everter ...	...	584
" Physostigmat., $\frac{1}{4}$ to 1 gr.	535	Fæx Medicinalis, $\frac{1}{2}$ to 1 oz. ...	...	224
" Pichi Liq., 10 to 60 m.	719	Fæxin, 1 dr. ...	...	224
" Picrorhizæ Liq., 20 to 60 m.	736	" Extr. Pills, 3 gr....	...	224
" Pini Canad. Liq., 10 to 60 m.	719	Fæxin, Extr. Tablets 3 gr. ...	...	224
" " Sylvestria	548	False Unicorn Root ...	...	708
" Piscidiæ, 2 to 5 gr.; Liq., 20 to 120 m.	719	Fango Mud ...	...	839
" Pituitary Gland, $\frac{1}{2}$ to 1 Cc.	822	Farrant's Mtg. Medium ...	...	919
" Quassia, 3 to 5 gr.	720	Fats, 471 617; Iodine, No. of, 413; Melting Points ...	...	927
" Quebracho Liq., 5 to 10 m.	721	Favus ...	...	906
" Red Bone Marrow, 1 to 2 dr.	818	<i>Fehling's Solution</i> (and Allen's Modifi., 877); Pellets of bodies reducing and not reducing ...	...	877
" Retinale, 2 dr.	820	<i>Fel Bovinum Purif.</i> 6-15 gr. ...	...	320
" Rhamni Frang., 15 to 60 gr.; Liq. 1 to 4 dr.	706	" Exsicc, 5 to 10 gr. ...	...	320
" " Pursh., av. 4 gr.	221	Fellows' Comp. Syrup of Hypo- phosphites, medium adult, 1 dr. 533, 743	...	743
" " Fluid	222	Fell Reducing Treatment ...	...	743
" <i>Rhei</i> , 2 to 8 gr.; & Co.	614	Felt, 352; Fennel Oil and Water ...	...	705
" Rhois Aromat. Liq., 10 to 30 m....	...	722	Fenning's Cooling Powders ...	...	743
" Rhois Glabræ Liq., av. 15 m.	722	Fer Ascoli, 722; Fermentlactyl ...	...	57
" Rubi Chamæmori Liq., $\frac{1}{2}$ to 1 dr.	722	Fermentation Test... ..	...	878
" Salicis Nig. Liq., $\frac{1}{4}$ to 1 dr.	723	Ferments—Digestive ...	...	513
" " Solid, 1 to 5 gr.	723	Ferrated Cod Liver Oil ...	...	494
" Sansivieræ, 10-20 gr.; Liq., 2 to 4 dr.	615	Ferratin, 8 to 15 gr. ...	...	327
" <i>Sarsæ Liq.</i> , 2 to 4 dr....	...	620	Ferri Albuminati, Liq., 1 to 4 dr. ...	...	327
" Saw Palmetto, 3-5 gr.; Liq., $\frac{1}{2}$ to 2 dr.	724	" Alginas, 2 to 15 gr....	...	690
" Scopolæ, $\frac{1}{2}$ gr	724	" <i>Arsenas</i> , 1-16 to $\frac{1}{4}$ gr....	...	147
" Senecio. Liq. 20-60 m.	725	" Cacodylas $\frac{3}{4}$ to 5 gr....	...	15
" Sennæ Leg. Liq., 1-2dr.	623	" Carbonas (et var) ...	...	326
" Sorbi Liq., 10 to 30 m.	726	" Carb. Sacch., 10-30 gr. ...	...	321
" Spinal Cord, 5-20 m....	...	820	" Chlorid., U.S. = Ferri Perchlor	...	

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Ferri Citras, U.S., av. 4 gr.	323	Fever, Tick, 909; Typhoid ...	...	815
" <i>et Ammon. Cit.</i> , 5 to 10 gr....	...	323	Fibro-coumarin Sterules 25 m ...	...	32
" " " Sulph., 3-10 gr.	333	Fibrolysin, 40 m. ...	...	626
" " " Tart. U.S. 4 gr....	...	334	Ficker's Ppn. of <i>B. typh.</i> ...	...	923
" " Mag. Sulph., 2 to 10 gr....	...	333	Fig Syrup, 1 to 4 dr. ...	...	308
" " Mang. Citras, 3 to 15 gr....	...	333	Figuroids ...	...	743
" " Potass. Tart., U.S., av. 4 gr.	333	Filaria (F. Bancrofti, 917) ...	...	902
" " <i>Quin. Citras</i> , 5-10 gr.	569	<i>Filix Mas</i> , Filmaron, ...	...	334
" " " Eff., 3 gr.	569	Filmogen, 282; Filters ...	...	858
" " <i>Quin. et Strych. Cit.</i> , 3 to 6 gr.	653	Finsen Reyn Lamp, 588; Fire-proofing ...	...	637
" " Strych. Cit., 2 gr....	...	652	Fir, Scotch ...	...	546
" " Fluoridum, $\frac{1}{2}$ to $\frac{1}{4}$ gr.	39	Fir Wool, Oil, and Extract ...	...	548
" " Glyceroph., 1 to 5 gr.	61	Fish Poisoning ...	...	893
" " Hydrox.	323	Fitch's Kidney and Liver Cooler ...	...	743
" " c. Mag. Ox.	144	Fixative, 784; Flaginac ...	...	922
" " Hypophosph., 1-5 gr.	532	Flax, 353; Seed, 713; Fleabane... 704	...	704
" " Iodidum, 1 to 5 gr.	328	Fleming's Triple Stain ...	...	917
" " Iodid. Sacch., 2-15 gr....	...	329	" " Liq. Chrom. Acet.-Osmic. ...	...	688
" " Lactas, 1 to 5 gr.	43	" " Syph. Test ...	...	783
" " Lactoph. (Syrup)	44	" " Tinct. Aconite, 1 to 5 m. ...	...	87
" " Nucleinas, 15 gr.	327	Fletcher's Artif. Dentine ...	...	685
" " Oxalas, 1 to 5 gr.	330	Flexner's Serum ...	...	766
" " Oxidum (var.)	326	Fluid Magnesia, 1-2 ozs ...	...	440
" " Oxydat. Sacch., 10 to 40 gr.	326	Fluid-acet-extracts ...	...	427
" " Oxyersulphas (Monsel's)	333	Fluidextr. Aconiti, av. 1 m. ...	...	86
" " Peptonat., 328; Liq., 1-4 dr.	327	" " Apocyni, 15 m. ...	...	133
" " Perchlor. (wool, 324), 2-3 gr.	323	" " Bellad. R., 1 m. ...	...	180
" " Peroxid. (& Hydrat.)... 326	...	326	" " Berberidis, 30 m., ...	...	695
" " Phosphas, 5 to 10 gr....	...	330	" " Buchu, 30 m. ...	...	194
" " " Solubilis, 4 gr....	...	330	" " Calami, 15 m. ...	...	...
" " Pyrophosph., U.S., 4 gr.	534	" " Calumbæ, 30 m. ...	...	696
" " Sesquioxidum	326	" " Cannab Ind, 1 m. ...	...	212
" " Succinas	78	" " Capsici, 1 m. ...	...	219
" " <i>Sulphas</i> (Granulat., U.S.), 1 to 5 gr.	333	" " Chimaphilæ, 30 m. ...	...	701
" " <i>Essicc.</i> $\frac{1}{2}$ -3 gr....	...	333	" " Chirata, 15 m. ...	...	701
" " Valerianas, 3 to 5 gr....	...	679	" " Cimicif., 15 m. ...	...	701
Ferrichthol (Tablets)	397	" " Cinchonæ, 15 m. ...	...	239
Ferrier's Snuff	189	" " Cocæ, 30 m. ...	...	257
Ferrinol, 15 gr.	327	" " Colehici Sem., 3 m. ...	...	280
Ferro-Alumen, 3 to 10 gr....	...	333	" " Conii, 3 m. ...	...	286
Ferrocyanic Pellets	861	" " Convallar., 3 m. ...	287, 300	300
Ferroglydine Tabs....	...	483	" " Cubebæ, 15 m. ...	...	295
Ferro Mang. Cit., 3 to 10 gr.	447	" " Cyripedii (1=1), 15 m. ...	...	...
" " Phosph., 3 to 10 gr.	447	" " Digitalis, 1m ...	300, 302	302
" " Preps.	328	" " Ergotæ, 30 m. ...	...	313
" " c. Quin., 3 to 5 gr....	...	447	" " Eriodictyi, 15 m. ...	...	731
" " Strych., 1 gr....	...	447	" " Eucalypti, 30 m. ...	...	317
Ferroplasma	723	" " Euonymi, 8 m. ...	...	318
Ferropyrin, 3 to 5 gr.	253	" " Eupatorii, 30 m. ...	...	705
<i>Ferrum</i>	320	" " Frangulæ, 15 m. ...	...	706
" " Dialysatum	325	" " Gelsemii, 1 m. ...	...	337
" " Oxydat. Sacch. to 40 gr.	326	" " Gentianæ, 15 m. ...	...	707
" " <i>Redactum</i> , 1 to 5 gr.	320	" " Geranii, 15 m. ...	...	707
" " <i>Tartaratum</i> , 5 to 10 gr.	333	" " Glycyrrhizæ, 30 m. ...	...	347
Fever, Blackwater	758	" " Granati, 30 m. ...	...	524
" " Cerebro-Spinal	765	" " Guarana, 30 m. ...	...	356
Fever, Malarial	773	" " Hamamelid. Fol., 30 m. ...	...	357
" " Malignant Purpuric	765	" " Hydrastis, 30 m. ...	...	382
" " Malta (Mediterranean)	775	" " Hyoscy., 3 m. ...	...	393
" " Petechial	765	" " Ipecac { Emetic, 15 m. } ...	427	427
" " Relapsing	906	" " Krameria, 15 m. ...	...	711
" " Scarlatina	782	" " Lappæ, 30 m. ...	...	712

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Fluidextr. Leptandræ, 15 m	...	712	Formaldehyde 106; Formaldehyde		
„ Lobeliæ, 8 m.	713	Tablets, Internal ...	...	112
„ Lupulini, 8 m.	713	Formaldehydum Polymerisatum =		
„ Matico, 1 dr.	714	Paraform ...	...	111
„ Mezerei	715	Formalin, Formol, 106, 853 :		
„ Nucis Vom., 1 m.	485	Detection in Milk, 890 ;		
„ Pareiræ, 30 m.	718	Disinfecting Tablets, 111 ;		
„ Phyto- { Emetic, 15 m. }			Gelatin, 110 ; Gargle, 109 ; Gut,		
lacc. { Alterative, 1½ }		719	21 ; Preservative Solution, 919		
„ Pilocarpi, 30 m.	431	Formalised Gelatin... ..	...	335
„ Podophylli, 8 m.	567	„ „ Capsules ...	...	542
„ Pruni Virginianæ (Gly-			Formanganate Disinfectant ...	...	107
cero - hydro - alco-			Formanilid 2 to 4 gr. ...	...	109
holic), 30 m.	720	Formamide, 382; Formamint Tablets	...	112
„ Quassia, 8 m.	721	Formitrol Pastilles... ..	...	112
„ Quercus, 15 m.	721	Formawn, 112; Formic Preserva-		
„ Quillaia, 3 m.	721	tive, 35 ; Formidin ...	...	402
„ Rhamni Pursh., 15 m.	222	Formin, 5 to 15 gr. ...	...	551
„ Rhamni Pursh., Aromat.,			Formol, 106 ; Muller Fluid ...	...	919
15 m.	222	Formolyptol ...	...	112
„ Rhei, 15 m.	612	Formosyl, Tooth Paste, &c. ...	...	620
„ Rhois Glabræ, 15 m.	722	Formozone ...	...	112
„ Rosæ, 30 m.	722	Formyl Terchloride, 1-5 m. ...	...	230
„ Rubi, 15 m.	722	Fortoin, 4 gr. ...	...	288
„ Sabinæ, 5 m.	723	Fetus Acid Borici, K.C.H., 6 dr. to		
„ Sanguinaris, 1½ m.	723	1 pint. ...	...
„ Sarsaparillæ, Co 30 m.	621	„ Belladonnæ, K.C.H., 1 to 2		
„ Scillæ, 1 in 1 15 m. ...	300, 724		dr. of Tinct. to 1 pint. ...	...
„ Scopolæ, 1 m.	724	„ Opii, K.C.H., ½ to 1 dr.,		
„ Scutellaris, 15 m.	725	as latter to one pint ...	...
„ Senegæ, 15 m.	725	„ Papaveris, K.C.H., 2 ozs. to		
„ Sennæ, 30 m.	623	1½ pints 15 minutes :		
„ Serpentariæ, 15 m.	725	foment at 120°F. ...	...
„ Spigeliæ, 1 dr.	726	Fournier's Syringe... ..	...	358
„ Staphisagriæ, 1 m.	727	Fowler's Solution, 2 to 8 m. ...	...	144
„ Stillingis, 30 m.	727	Fraenkel's Pneumococcus	778, 905	
„ Stramonii, 1 m.	647	Framboesia, 907; Frangula ...	...	706
„ Sumbul, 30 m.	727	Frankincense ...	...	546
„ Taraxaci, 2 dr.	728	Fraxinus ornus ...	...	714
„ Triticis, 1 to 2 dr.	732	Freeman's Chlorodyne ...	...	744
„ Uvæ Ursi, 30 m.	692	Freezing Mixtures ...	...	929
„ Valerianæ, 30 m.	678	French Chalk ...	...	435
„ Veratri, 1½ m.	680	Friar's Balsam, ½ to 1 dr. ...	...	4
„ Viburni Opuli, 30 m.	733	Friedländer's Pneumo. bacillus	764	
„ „ Prunif., 1 to 2 dr.	738	„ „ Vaccine ...	...	764
„ Xanthoxyli, 30 m.	730	Fröhde's Reagent ...	...	80
„ Zingib., 15 m.	686	Frost's, Mrs., Remedy ...	...	747
Fluid-glycerates	346	Fructose ...	...	614
„ Sanguinaria	346	Fuchsin [Solution (stain), 911], ½		
„ Buchu	346	to 4 gr. ...	...	248
„ Grindelia	346	„ Anilin Green ...	...	911
Fluorescein.....	...	248	Fucus Vesiculosus ...	...	706
Fluorescent Light	588	Fulgurations, 588; Fullers Earth	...	434
Fluor-rheumin	39	Fumitory, Hollow-rooted ...	...	702
Fluoriform (Aq.) 1-4 dr.	40	Fumus Potassii Nitratis.....	...	565
Fly Papers, Sticky	730	Fungi, poisoning by (see Poisons		
Fly, Spanish or Blistering	...	213	and Antidotes)		
Fœniculi Fructus 705; Fœnugreek	...	706	Fungus Ignarius, P. Austr. ...	...	691
Food and Drugs Act	889	„ Larici ...	...	689
Food Preservatives ...	7, 66, 109,	888	Furfural Test for Glucose... ..	...	880
Foods, 471; Infants', A, B, C,	478	Furuncul., 1 dr., 224; Fusel Oil	...	104
Foot's Parsley, 689; Foot Powder	...	117	Gabbett's Stain, 912; Gadolinite	...	226
Foamgules	542, 545	Galanga, 706; Galbanum 5 to 15 gr.	...	706
			Galega, 706; Gale, Sweet	...	695

NAME.	DOSE.	PAGE
Galium Aparine	708; <i>Galla</i> 5 to 15 gr. ...	706
Gallacetophenone	...	85
Gambir	...	609, 734
Gamboge	$\frac{1}{2}$ to 2 gr. ...	696, 733
Gamgee (Gauze and Wool) Tissue,		352
Ganja	...	211
Garcia Nutans	...	706
Garcinia Hanburii	696; <i>G. Morella</i>	733
Gardner's Syr.	1 to 3 dr. ...	412
Gargar. Acidi Salicylici	...	89
" Acid Tannic	...	82
" Aeruginis	...	296
" Aluminis (et Co.)	...	340
" Carbolica	...	20
" Chlori	...	633
" Formaldehydi	...	109
" Hyd. Co.	...	379
" " Perchlor.	...	374
" " et Zinci Cy.	...	366
" Hydrog. Perox	...	387
" Potass. Chlor.,	...	561
" Permang.	...	448
" Resorcinl	...	611
Garlic	$\frac{1}{2}$ to 2 dr. ...	690
Gastric Contents Examn.	...	893
Gastroscope	...	896
Gaubius' Table of Dosage	...	835
<i>Gaultheria, Oleum,</i>	3-10 m. ...	67, 738
Gauze-covered Moss	...	646
Gauze Carbolised	...	20
" Iodoform	...	401
Gauzes and Gauze Tissue, Ribbon & Protective	...	352
Gazoline	...	523
Gee's Cough Linctus,	1 dr. ...	505
Geflecker Schierling	...	234
Gelanthum	...	672
Gelatin Capsules	...	546
" Glycerin	...	342
" Injections (Tubes)	...	335
" Nutrient	...	919
" Pastils	...	342
<i>Gelatinum</i>	...	335
" Formalisat.	...	335
" Glycerinat.	...	342
" Ichthyol, Picis 5%, Resorcin 3%, Sulphuris 4%	...	683
" Zinci	...	683
Gelineau's Dragées	...	129, 744
<i>Gelsemii Radix,</i>	5 to 15 gr. ...	336
Gelsemin (Eclectic),	$\frac{1}{2}$ -2 gr. ...	337
Gelseminina,	1-100 to 1-32 gr.	337
Gelsemininae H Cl.,	1-60 to 1-20 gr.	337
Genoform	...	744
<i>Gentiana Radix</i>	...	706
Gentian Violet, Anilin	...	917
Geoform 291; Geosot	2 to 5 m. ...	294
Geranolol	...	498
Geranium Mac.,	1 to 5 gr. ...	707
Gerhardt's Diacetic Test	...	859
Germander, Water,	10-20 gr. ...	728
German Silver	...	717

NAME.	DOSE.	PAGE
Gerrard's Test Solution	...	878
" Peptonoids	...	528
Ghati or Ghatti Gum	...	672, 735
Giemsa's Stain	...	908
" Quinine Injection	1.5 Cc. ...	571
Gingerin,	$\frac{1}{4}$ to 1 gr. ...	686
Gioddu, 59; Glanders	...	775
Glandula Suprare. Sicc.	4 gr. ...	825
" Thyroides Sicc.	4 gr. ...	833
Glandulen	...	835
Glaser's Salt,	30 to 120 gr. ...	566
Glass Soluble, or Water	...	639
Glauber's Salt	...	641
Glauclum Luteum	...	707
Glaxo 481; Glew's Ra. Test,	...	592
Glew's Scintilloscope	...	594
Glendenning's Beef and Malt Wine	...	744
Glidine	...	483
Globuli, 509; Globulins,	471, 860 et seq.	
Glonoin, Sol.,	$\frac{1}{2}$ to 2 m. ...	466
Gloria Pills and Tonic	...	744
Glossaries	...	935-940
Glossina Palpalis	...	790, 910
Glucantha	...	673
Glucose, 337; Glucose Agar	...	920
" Broth 919; Gelatin	...	920
" Fermentation Test	...	878
" Litmus Broth	...	900
" Syrup	...	538
" Tests for, in Urine	...	875
" Tubes (for feeding)	...	338
<i>Glucosimide, Glusidum,</i>	$\frac{1}{2}$ to 2 gr. ...	613
Glutoid Caps. Iodoform, &c.	336, 399	
Glutol	...	110
Glycaphorm	1 to 2 dr. ...	459
Glycerides	...	471, 617
Glycerin Agar, 920; Broth	...	919
" Estimation of	...	339
" Soap, Comp. Liq.	...	620
" Tinctures 671 v. also	313	
" in Urine	...	880
<i>Glycerin,</i>	1 to 2 dr. ...	339
" <i>Acidi Borici,</i>	3 in 10 ...	7
" " <i>Carbol,</i>	1 in 5 ...	21
" " <i>Hydriodic,</i>	20-60 m. ...	412
" " <i>Tannici</i>	...	340
" <i>Aloes</i>	...	114
" <i>Aluminis,</i> (c. Acid Tannic 310)	...	115, 340
" <i>Amyli,</i>	1 to 8 ...	340
" <i>Atropinæ</i>	...	170
" <i>Belladonnæ</i>	...	180
" <i>Bismuthi Eff.</i>	...	340
" <i>Bismuthi Nitratis</i>	...	340
" <i>Bismuth. et Sod. Tart.,</i>	1 dr. ...	527
" <i>Boracis,</i>	1 to 6 ...	340
" c. Aq. Rosæ	...	341
" Di - acetyl - morphinæ,	1 to 2 dr. ...	459
" Di-iodo-hydrin	...	412
" Eastoni,	15 m. ...	332

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
<i>Glycerin</i> , Ext. Bone Marrow, 1-2 dr.		319	Glycine, 2; Glycocoll ...		2, 472
" Ferri Dialysat., 60 m.		326	Glycocoll Methyl-Guanidin ...		874
" Perchlor....		324	Glyco-gelatin and Pastils...		342
" Glyceroph Co 1-2 dr		62	Glycogen, 1½ to 2 gr.		471, 707
" c. Medulla Rubi-2dr		62	" Iodi, 15-30 drops...		411
" Hyd., Perchlor. ...		341, 373	Glycoheroin 15 m. to 1 dr....		459
" Hypophosp., 1 dr.		534	Glycol Ester of Salicylic Acid ...		68
" Iodoforml ...		400	Glycopasta Aconiti...		347
" Iodi (Morton's)...		405	" Bellad. ...		347
" Jelly, 340; Kaolin Acetic.		435	" Hyoscy. ...		347
" Pancreatis, 1 to 2 dr.		514	Glycoproteids ...		471
" Papain, 1 dr. c.c....		519	Glycosal, 5 to 30 gr.		73
" Pepsini, 1 to 2 dr.		526	Glycosuria, various		875
" Phosphori = Elix 15 to 60m.		529	Glycothymoline, 671; Glycozone		387
" Plumbi Sub.c. ...		341	Glycyrrhiza 5 to 20 gr.		347
" Resorcin, 610; Rose Water		341	Glycyrrhizin. Amm. ½ to 5 gr.		347
" Soap Liq. ...		620	GLYL:—		348, 350
" Sodii Cinnam. 30 to 60 m.		30	" Amygd. Ess. sine HCN		350
" Suppositories ...		343, 385	" Anethi. ...		350
" <i>Tragacantha</i> ...		673	" Anisi ...		350
" Trypsin, 5 m.		517	" Aurant. Amar.		350
<i>Glyceritum Acidi Tannici</i> ...		340	" Aurant. Flor.		350
" Boroglycerini, ...		7	" Carui. ...		350
" Ferri, Quin. Strych. 15m		332	" Cinnam ...		350
" Phenolis ...		21	" Fœniculi ...		350
<i>Glycero-alcohol</i> 5-60 m.		342	" Lavandulæ ...		350
" gelatina-oxidi Zincici		683	" Limonis ...		350
" Piperaz. 2 to 5 gr....		550	" Menthæ Pip.		350
<i>Glycerophosphates</i> ...		60 et seq.	" Vir....		350
<i>Glyceryl Trinit.</i> ½ to ½ gr.		465	" Myrist....		350
GLYCETRACTA:—		343 et seq.	" Pimentæ ...		350
" Aconiti, 0.4 % alk., Av. 1m.			" Pini ...		350
" Bellad., 0.375 % alk., 1 to 2m.			" Rosæ ...		350
" Calumbæ, 10-20 m.			" Sassafras ...		350
" Cascara, ½ to 1 dr.			" Thymi. ...		350
" Catechu, 5 to 15 m			" Vanilla ...		350
" Chirettæ, ½ to 1 dr.			<i>Glymol</i> = Paraff. Liq. q.v.		
" Cinchonæ, 3 % alk., 8 to 25 m.			Gmelin's Reaction ...		864
" Cocæ, 0.25 % alk., 1 to 2 dr.			Gnaphalii Flos, 707; Gnoscopine		459
" Colchici, 0.5 % alk., Av. 3 m.			<i>Goa Powder</i> ...		236
" Conii, 0.45 % alk., Av. 3 m.			Goat Lymph Tablets		744
" Digitalis, ½ to 2 m.			Goat's Rue 706; Gokhru...		707
" Ergotæ, 10 to 30 m.			Gold and Sodium Chloride...		175
" Gelsemii, 5 to 15 m.			" Beater's Skin ...		818
" Gentianæ, 15-30 m.			" Cures ...		175
" Hamamelid, 5 to 15 m.			" Ionisation ...		420
" Hydrastis, 5-15 m.			Golden Rod ...		720
" Hyoscy, Av. 3 m. 0.075 % alk.			" Seal, 10 to 30 gr.		382
" Ipecac., 1.1 % Expt. 1 to 4 m.			Gomenol and Pâte ...		714
" Emetic, 30 to 40 m.			Gomme Gutte, 696; Gonal		500
" Jaborandi, 5-15 m.			Gonococcus Vaccine, ...		772, 902
" Krameriæ, 5-15 m.			Gonolobus Condurango ...		284
" Nucis Vomicae, 0.75 % Stryh.,			Gonorrhœa Bags ...		550
2-6 m.			Gonosan, 502; Goober Nut		692
" Pruni Virg. 5-30 m.			Goose Grass ...		706
" Quassia, 2 to 5 m.			Gorit (Calc. Perox.) 3-9 gr....		205
" Rhei, 5 to 30 m.			<i>Gossyp. Rad. Cort.</i> ...		734, 354
" Sarsæ, 2 to 4 dr.			<i>Gossypium</i> ...		351
" Scillæ, 1 to 5 m.			Gossyp. Acidi Borici ...		7
" Senegæ, 5 to 20 m.			" " Salicyl.		70
" Sennæ, ½ to 1 dr.			" Arseniosium ...		146
" Tarax, ½ to 2 dr.			" Camph. ...		210
" Valerian, 5 to 20 m.			" Capsici ...		220
See also Fluid Glycerates			" Carbolisat....		20

Dose—1 to 2 dr.

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Gossyp. Ferri Perchlor.	324	Guaranine, 1 to 5 gr. ...	...	356, 196
" Hamamelidis	357	Guayacur, 707; Guaza, 211; Gugul 707		
" Hyd. Iodidi	368	Guinea Worm, 909; Guipsine ...	...	730
" Hyd. Perchlor.	375	Gulancha ...	...	737
" Iodi	408	Gum, Blue, 316; Gumchi... ..	...	687
" Iodoformi	402	" Kauri ...	...	710
" Menthol	452	" Plant, 354; Thus ...	...	546
" Sal Alembroth	377	Gummi Indicum ...	...	735
" Stypticum	324	Gun-cotton.....	...	281
Goulard's Extract	341	Günzberg's Capsule... ..	...	896
Gouttes Amères de Baumé 4 m.	486	" Test for HCl... ..	...	894
Gower's Green Pills	744	Gurjun Balsam, 1/2 to 2 dr. ...	...	500, 693
Gowers', Sir W., Glucose Test	879	Gut, Chronic, Iodised, etc. ...	...	20
" Hæmacytometer Sol...	887	Guttæ Acidi Carbolici, 22; Ac.		
" Hæmoglobinometer	866	Salicyl. Co., 69; Alum Acet.,		
Grains de Lin, 713; de Vals.	223	116; Atropinæ Sulph., 1/4, 1/2		
Gram's Method (and Table, 919)...	917	and 1%, 169; Atropinæ c. Co-		
" Solution	917	caina, 170; Atropinæ et Quininæ,		
Granati Cortex	524	170; Castor Co. 1 dr., 699;		
Granula Dioscoridis 1 to 5	145	Chlorof. cum Menthol Co. 234;		
Granules Aconitine and nitras,			Cocainæ Hydrochloridi, 262; Co-		
1/8 mgr.	88	cainæ cum Adrenina, 262; Co-		
Granules Atropine Sulph., 1 mgr.	168	cainæ Oleosæ, 259; Cupri Sul-		
" Digitaline Crystallisée,			phatis, 297; Daturinæ, 1/2%, 648;		
Fr. Cx. and Amorphe	303	Euphthalmiæ, 173; Homatro-		
" Digitaline Nat...	304	pinæ, 1% (et c. Cocaina), 172;		
" Digitoxin 2 3/5 gr...	305	Hydrargyri Nitratis (Aural),		
" Hyoscyamine, 1 hrly	394	372; Hydrogen Perox., 386;		
" Lecithin	437	Hyoscinæ, 0.5% (et c. Cocaina),		
" Strophanthin, 1/10 mgr.	650	390; Morphinæ et Cocainæ		
" Strychnine Sulph., 1 mgr.	654	(Aural), 172; Physostigminæ,		
Grape Sugar	337	0.5 or 1% (et c. Cocaina), 536;		
Grapelax, 1 to 4 dr.	339	Physostigminæ et Quininæ, 536;		
Grasa de Cerdo, F. E. = Adeps			Pilocarpinæ, 0.5%, 432; Quininæ		
Præp.	688	Formatis, 2%, 570; Rosæ, 2 to		
Gray's Stovaine Dextrin Inj.	275	10 m., 456; Sodii Arsenatis et		
Green, Brilliant (Malachite) 249,	...	916	Ferri, 5 m., 148; Spiritus c.		
" China, Agar	916	Formalin (Aural), 102; Spiritus		
Green Mountain Cure	565	Co., 102; Zinci Chloridi (et c.		
Gregory's Pill = Pil. Coloc. Co.,	...	284	Cocaina), 682; Zinc Chlorid		
Gregory's Powder	612	(Aural), 682.		
Grenacher's Solutions	873	Gutta-Percha and Tissue ...	...	217
Grenetina, F. E. = Gelatin...	335	Gutzeit's Test, 143; Gynocardia... ..	...	491
Grey Oil, 2 to 3 gr...	358	Guy's Tonic, 744; Gypsum ...	...	206
" Powder, 1 to 5 gr.	358	Gyrol Pencil, 219; Gytje ...	...	840
Grey's Specific	744	Haarlem Drops ...	...	549
Griffith's Mixture, 1/2-1 oz...	323	Hæmabolooids 1/2 oz. ...	...	328
Grindelia Squarrosa	354, 735	" c. Arsen. and Strych. 1/2 oz.	...	328
Griserin, 403; Ground Nut Oil, 692,	...	736	Hæmacytometers ...	...	867
Guaco, 703; Guaiacotin, 8 gr.	294	" Solutions for (Gower's,		
Guaiaci Resina (& Lig.), 5-15 gr.	355	Hayem's, etc.) ...	...	867
Guaiacol (Cryst. 292), 1 to 5 m...	291	Hæmolum and Acid ...	...	874
" Benz., 4 to 12 gr...	293	Hæmamoba ...	...	904
" Cæodyl., 1/2-2 gr...	160	Hæmatein (Hæmatin) ...	...	866, 707
" Camph., 5-10 gr...	293	Hæmatoba, 744; Hæmatocrite ...	...	868
" Carb., 3 to 8 gr...	293	Hæmatoporphyrin ...	...	864
" Cinnam., 5-15 gr.	294	Hæmatoxylin, 708; Test Solution	...	873
" Salol (Salicyl.), 15-75 gr.	294	Hæmatoxyli Lignum ...	...	707
" Valer., 3 m.	294	Hæmoconia ...	...	871
Guaiacose, 1 to 4 dr.	475	Hæmogallol (and Tabs.) and Hæmol,	...	475, 708
Guaiacum	291	2 to 8 gr. ...	...	475, 708
Guaiasanol, 10 to 60 gr.	294	Hæmoglobin and Caps., 1 to 2 dr. ...	...	474
Guaiaperol, 5 to 30 gr., 294; Guanin	...	883	" Scale Tallquist ...	...	867
Guarana, 10 to 60 gr.	356	Hæmoglobinometers ...	...	866

NAME	DOSE.	PAGE	NAME.	DOSE.	PAGE
Hæmolysis	784	Hecht's Syphilis Method ...	...	781
Hæmomanometers	872	Hedonal, 15 to 30 gr. ...	...	678
Hæmoptysis (<i>v. also Therap Index</i>)	...	125	Hehner's Test ... ..	...	890
Haffkine's Prophylactic	776	Heidenhain's Stain ... ..	...	873
Cholera Vaccines	767	Helalin, 702; Helba ... ..	...	320, 706
Hagedorn Moss	646	Helecho Macho, F.E. = Filix Mas	...	
Haine's Fehling Test	877	Helenin, $\frac{1}{2}$ to 2 gr. ... ..	...	709
Hair Dyes, 138; Henna, 708; Hydrog Perox, 386; Pot. Permang. 447; Pyrogallol	138	Helianthin ... ..	...	897
Hair Lotion, Amyl Nit. and Pilocarpine	128	Heliotropin, 708; Helium ...	...	595
E. Wilson's	121	Hellebore, Black, 680; Green, 1-5 gr. 680; White ... ..	...	680
Hair's (Dr.), Cure for Asthma	744	Heller's Test ... ..	...	865
Hall's Coca Wine	744	Helmerich's Pomade ... ..	...	659
Haller's Acid Elixir, 2 to 8 m.	79	Helmitol (Tablets, $7\frac{1}{2}$ gr.) 15 gr.	...	552
Halvira, 5 to 30 m.	703	Helonias dioica ... ..	...	708
Hamamelidin, $\frac{1}{2}$ to 2 gr.	357	Hematic Hypophosphites ...	...	533
<i>Hamamelidis Cort. et Fol.</i>	356	<i>Hemidesmi Radix</i> ... ..	...	708
Hamamelis Wool	357	Hemisine ... ..	...	826
Hamilton's Pill (Colic. Hyos.)	284	Hemlock (Lesser, 689) 285; Spruce 719; Water ... ..	...	701
Hamm's Rheumatic Cure	744	Hemp, Canadian, 133; Russian ...	...	696
Hammond's Remedy	142	Henbane, 392; Egyptian ... ..	...	393
Handkerchiefs, Aseptic	352	Henna, 708; Henry's Solution ...	...	443
Hardhack, 702; Hard Soap	618	Hepatic Abscess, 782; Hermite ...	...	634
Hargreave's Reducing Wafers	744	Herniaria <i>var.</i> ... ..	...	708
Harlene, 744; Harrogate Salts	840	Heroin HCl, 1-24 to 1-12 gr. ...	...	458
Hartin's Salt	449	Hetol, 3 to 6 gr. ... ..	...	29
Hartmann's Wood Wool	550	Hetraline, $7\frac{1}{2}$ to 30 gr. ... ..	...	553
Hartshorn and Oil	120	Hevea Brasiliensis ... ..	...	216
Harvard Liquid, 714; Harvey's Pills	...	744	Hexamethylenesamina, 5 to 15 gr.	...	551
Hashish	211	Sod, Acet., 30 gr. ....	...	553
Haust. Cascara Sag. 1 oz.	223	Borate, 15 to 60 gr. ....	...	553
Chloralamidi, 1 oz.	229	Bromethylate ... ..	...	192
Copaiba, 1 oz.	501	Hexantrin, 1 gr. ... ..	...	316
Creosoti, $\frac{1}{2}$ to 1 oz.	290	Hiera Piera, 3 to 10 gr. ... ..	...	114
Filicis, $1\frac{1}{2}$ oz.	334	Hierro, F.E. = Ferrum ... ..	...	320
Imperialis	566	High Frequency Current ... ..	...	586
Nitroglycerini, $\frac{1}{2}$ to 1 oz. 486	...	486	Hill's (Leonard) Oxygen Bag ...	...	511
Santonini et Ol. Ricini, $1\frac{1}{2}$ oz.	616	Hill's (William) Laryngoscope ...	...	606
Strychnine Co., 1 oz.	653	Himred's Cure ... ..	...	585
Strych. et Ac. Phosph. 1 oz.	653	Hindu Dates ... ..	...	727
Sulphonal, 1 oz.	656	Hinojo, F.E. = Fœniculum ... ..	...	705
Terebenti	662	Hippocastanum ... ..	...	689
Trional, 1 oz.	657	Hippoceras, 687; Hippurates ...	...	6
Hayem's Blood Fluid	867	<i>Hirudo</i> ... ..	...	735, 835
Solution (Serum)	830	Hiss' Serum Water ... ..	...	900
Hay Fever Nebulae	466	Histosan, 3-7 $\frac{1}{2}$ gr. ... ..	...	294
(See also Therapeutic Index.)	...		<i>Hoffman's Anodyne</i> ... ..	...	92
Hay Fever Serum	719	Headache Powders ... ..	...	744
Hay's Test for Bile Salts	864	Holadin ... ..	...	517
Hayes' Medicines	744	Holloway's Ointment and Pills 744, 745	...	745
Hazel Foam and Comps.	357	Holocaine HCl ... ..	...	270
Eazeline, $\frac{1}{2}$ to 3 dr.	358	Holzknicht's Radiometer ... ..	...	585
Headache Powders	197, 744	<i>Homatropina HBr.</i> , 1-80 to 1-20 gr.	...	172
Heal-All, 702; Healine	744	HCl, 171; Salicyl 1-80 to 1-20 gr. ...	...	171
Health Resorts, British, 845; Irish	...	846	Homatropine ... ..	...	167, 171
Heart Extract, 784; Tonic Units	...	299	Homolle's Digitalin Gran. ...	...	303
Heat Treatment	588, 858	Honey, Bee, 692; Water ... ..	...	104
Heberden's Ink, = Mist. Ferri Arom., '85, 1 to 2 oz.	...		Honeysuckles, 713; Honey Yerba	...	705
Hebra's Spirit. Saponat.	619	Hood's Sarsaparilla ... ..	...	745

Vide also Mistura.

NAME.	DOSE.	PAGE
Hordenine, 708; Horehound, 30 gr.		714
Hormones, 823; Horn Poppy ...		707
Horse-chestnut, 689; Horshair ...		21
Horse-nettle, 726; Horseradish ...		702
Horse Serum	799,	818
Horticultural Poisons		141
Hot Water Bags		217
Hound's Tongue		703
Household Ammonia		120
Hübl's Iodine Solution		413
Ilueppe's Bacillus		46
Hughes' Pills and Lotion		745
Huile de Cade		534
" foie de Morue		492
" d Iodure Mercurique, 1 Cc.		368
" de Pétrole		522
" Lourdes de Pétrole		520
" Grise Injectable, 2 to 3 gr.		358
Humulus Lupulus		713
Huxham's Tincture, ½-1 dr.		239
Hydatid Fluid, 885; Hydraceum		709
Hydramyl, 523; Hydrangea ...		708
Hydrargyrum		358
Hydrargyri Amalgam		361
Hyd. Amido-Acetas		2
" Amino-phenylarsonas ¼ gr.		
incr.		159
" Ammoniat		363
" Arsanilas ¼ gr. incr.		159
" Asparaginas		360
" Atoxilas, ¼ gr. incr.		159
" Benzoes, 1-50 to 1-10 gr.	361,	364
" Bichloridum = Perchloridum,		
1-32 to 1-16 gr.		373
" Bijodat (Biniodid)		367
" Biniodidum, 1-16 to ¼ gr.,		
367; v. also		368
" Bisulphid. or Bisulphuret		
P.L. '51 = Vermilion		382
" Bromidum, 1-16 to ¼ gr.	360,	364
" Carbolas, ½ to 2 gr.		365
" Chloratum misce Sublim. et		
vapores		378
" Chloridum = Subchloridum,		
½-5 gr.		377
" Chloridum Corrosivum ...		373
" Mite, U.S. = Subchlor		377
" c. Creta, 1 to 5 gr.		353
" Cyanidum, 1-20 to 1-4 gr.	360,	365
" Dimethylas		365
" Formamidum	360,	382
" Gallas, ½ to 1 gr.		367
" Glycooil		2
" Imido-Succinas, ¼ to ½ gr.		380
" Iodas, 1-6 to 1-3 gr.		40
" Iodidum Flavum		367
" (-ous), ½ gr.		370
" Iodidum Rub., 1-32 to 1-16 gr.		367
" Viride, 1-6 to 1 gr. ...		370
" Lactas, ½ gr. hyp., per os		
½ gr.	360,	370
" Naphthol-Acetas, ½ to 1 gr.		382
" Nitras, 371; Nitroso Nitras,		862
" Oleas		487, 488

NAME.	DOSE.	PAGE
Hyd. Oleatum, 5, 10, 20 & 25% (et		
c. Morphine)	488,	489
" Oleo-Brassidas		372
" Oxycyanidum	360,	365
" Oxidum (-ous)		379
" c. Asparagin		360
" c. Formamido	310,	382
" Flavum	361,	381
" Rubrum, ¼ to 1 gr.		382
" Oxysulphas		380
" Peptonas, per os ½ to 1½		
gr., hyp. ½ gr.		372
" Perchloridum (Wool, 375),		
1-32 to 1-16 gr.	360,	373, 854
" Persulphas, 2 to 5 gr.		380
" et Potass-Hyposulph., ½		
gr. hyp.		377
" et Potass Iod., 1-16 to 1-4 gr.		368
" Rhodanidum		382
" Salicyl, ½ gr.	361,	377
" Salicyl-Arsenas		149
" Sozoiodol	361,	403
" Stearas		488
" Subchloridum, ½ to 5 gr.	361,	377
" Crystallizat.		379
" Succinas, ½ to ½ gr.		380
" Succinimid., ¼ to 1-3 gr.	361,	380
" Sulphas, Subsulph., 2 to 5 gr.		380
" Sulphidum		382
" Sulphocyanidum		382
" Sulphuret, c. Sulph.		382
" Tannas, 1½ gr.	361,	381
" Thymol-Acetas, ½ to 1 gr.		382
" et Zinci Cyanidum	366,	853
Hydrastin, ½ to 2 gr.		385
Hydrastina (Alk.), ½-1 gr.		384
Hydrastina HCl., ½-1 gr.		384
" Tart. Acid., ½-1 gr.		384
Hydrastininæ HCl., ½ gr.		384
Hydrastia, 10 to 30 gr.		382
Hydriodic Ether		96
Hydriodol, 3 to 6 m.		368
Hydrobromic, Hydrochloric Ether		94
Hydrocotyle Asiatica, 4 to 10 gr.		708
Hydrogen		512
" Borate		6
" Peroxide, ½-2 dr.	385,	854
" Borated		387
Hydroquinone, ½ to 5 gr.		709
" Developers		581
Hydroxylamine and HCl.		708
Hydroxy-caffeine, 1 to 5 gr. or		
more		201
Hydroxy phenylethylamine ½ gr.		
hypod.		312
Hydroxyphthalophenon ½-8 gr.		25
Hygiene Lamp, 107; Hygrophila		735
Hyod n, 1 to 3 dr., 412; Hyoscina		389
Hyoscina HBr., 1-200 to 1-100 gr.		389
" HCl. & Hl., 1-200 to 1-100		
gr.		392
Hyoscyami Folia		392
" Mutic Fol.		393
" Semina, 2-10 gr.		393

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Hyoscyamina, 1-120 to 1-40 gr. ...		394	Inf. Abri... ..		687
Hyoscyaminæ HBr. et Sulph.,			„ Acontheræ (½ oz. F) ...		84
1-200 to 1-100 gr....		394	„ Alstonia, ½ to 1 oz....		732
Hypochlorhydria ...		594	„ Andrographidis, ½ to 1 oz....		732
Hypnal, 15 gr., 254; Hypnogen...		675	„ *Anthemidis, 1 in 20 to 20 oz.		692
Hypnone, 1½ to 5 m. ...		244	„ *Aurantii, 1 in 20, & *Co.,		
Hypobromite Sol. ...		635	½ to 1 oz.		
Hypod. Injections v. Inj. ...			„ Azadiractæ, ½ to 1 oz. ...		733
„ „ c. Vaseline Oil... ..		521	„ *Buchu, 1 to 2 oz ...		194
„ Purgatives: Apocodeine,			„ *Calybæ, ½ to 1 oz....		696
135; Colocynthin... ..		284	„ *Caryophylli, 1 in 40, ½ to 1		
„ Sterules, see Sterules			oz.		
„ Tabs., v. Tablets,			„ *Cascarilla, ½-1 oz. ...		698
Hypodermic 661 and Index			„ *Chirata, ½ to 1 oz. ...		701
Hypophosphites ...		531 et seq	„ Cinch. Acid. ½ to 1 oz.		239
Hypoxanthin, 583; Hysterionica		709	„ Cocæ, 4 to 8 oz. ...		257
Ibogaïne and HCl., ½-½ gr....		709	„ Condurango, ½-2 oz. ...		284
Ice Bags, 217; Iceland Moss ...		700	„ *Coscini, ½ to 1 oz. ...		734
Ichthalbin, ¾ to 15 gr. ...		397	„ *Cusparia, 1 in 20, 1 to 2 oz.		
Ichthargan, 140; Ichthoform ...		397	„ *Digitalis, ¼ to ½ oz. ...		301
Ichthyocolla ...		709	„ Digitalis, c. Nitro, ¼ to ½		
Ichthyol, Ammon. 395, Lith. 396			oz. ...		302
Sod. Zinc ...		396	„ Ergotæ, 1 to 2 oz. ...		311
Ichthyol, Paste 397, Resorcin 396,			„ Gentianæ Aromat ...		707
Salicyl 397, Silver ...		140	„ „ Co., ½-1 oz....		707
Ichthyolidine, 8 gr. ...		551	„ „ Co. Conc ...		174, 398
Ignatia Amara Beans ...		485	„ Gokhru, 20 oz, daily...		707
Ille's Paste ...		611	„ Hydrastis ...		383
Ilex paraguayensis ...		198	„ Kara-Kava, ½ pint ...		711
Immune Body ...		784	„ *Krameria, 1 in 20, ½ to 1 oz.		
Immunisation, 756 et seq.			„ Lini, 1 in 30, Liquorice, 1 in		
Immunity Units ...		769	90, ad lib.		
Imperial Drink ...		566	„ *Lupuli, 1 in 20, 1 to 2 oz.		
Impermeable Piline... ..		352	„ Marubii ...		714
Indaconitine ...		88	„ Menyanthis, 2-6 oz. ...		715
Indian Colonial Addendum ...		732	„ Polygalæ Co. ¼-1 oz....		725
India Rubber ...		216	„ *Quassia, ½ to 1 oz....		720
Indian Hemp, Amer. 133; White,			„ *Rhei, 1 in 20, ½-1 oz		
693; Squill... ..		738	„ *Rosa Acidum, ½-1 oz....		722
Indian Licorice ...		687	„ *Rubi Cham., ½ oz. ...		722
„ Pink Root ...		726	„ *Scoparii, 1 in 10, 1 to 2 oz.		
„ Tincture ...		745	„ *Senega, ½ to 1 oz....		725
Indican ...		881	„ *Senna, ½ to 2 oz.,...		623
Indigo ..		250, 879, 881	„ *Serpentaria, ½-1 oz....		725
„ Carmine ...		250	„ Simarubæ, 1 oz. ...		725
„ Soluble, 250; Sulphate,			„ Tinosporæ, ½-1 oz ...		737
250; Indigotin, 250			„ Toddalica, 1-2 oz. ...		737
Indol, 881; Indoxyl ...		881	„ *Uva Ursi, ½ to 1 oz....		692
Industrial Methyl. Spirit... ..		103	„ *Valeriana, 1 in 40, ½ to		
Inebriety—See Intemperance			1 oz. ...		
Infant Feeding ...		478	„ Vincæ Majoris., 5 oz....		730
„ Foods "A," "B," "C,"			„ Violæ Tricolor... ..		730
and Cocoa ...		478	„ Ingluvin, 5 to 20 gr. ...		628
Infiltration, Anæsthesia ...		266	„ Inhalations, Oro-nasal ...		291
„ Eucaine ...		269	„ Inhaler, Ammon. Chlor ...		119
„ Novocain ...		272	„ „ Nasal Ozonic,		
Influenza Bacillus ...		773, 903	„ „ Ozonic, 450; Poor Man's,		
„ Vaccine ...		773	Portable ...		451
Infundibular Ext., ½ to 1 Cc. ...		822	INJECTIONS, HYPODERMIC:—		
Infusa Concentrata ...		397	Inj. Acid Carbol., 5-20m....		22
Infusorial Earth ...		435	„ „ Lactici (laryngeal) ...		42

* Also Conc., i.e., 8 times strength, v.p. 397, 398.

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Inj. Acid Lactici Bacilli (vaginal and urethral) ...		52	Inj. Iodoformi (bladder) ...		400
" " Osmici, 1% ...		688	" " Aetheræa ...		401
" " Salicyl. ...		66, 67	" Lecithin, 1 Cc. ...		436, 437
" " Sclerotic ...		314	" Menthol, C.L.T.E. ...		451
" Antimonii Cinnamici, 15 to 30 m. ...		130	" Morphine Acet., 1 to 2 m. ...		455
" Antimonii Oxidi, 15 to 30 m. ...		130	" " et Atropinæ, 1 to 3 m. ...		455
" Antipyrin, 8 to 30 m. ...		253	" " Hyp., 2-5 m., 458; Dil. ...		458
" " et Cocainæ, 8 to 30 m. ...		253	" Nitroglycerin, 1 to 4 m. ...		466
" Apomorph. 5 to 10 m. ...		134	" Nuclein, 15 m. ...		225
" Argenti Nit. (urethral) ...		137	" Physostigmin, 1 to 4 m. ...		536
" Arsen. Iodid., 6 m. ...		146	" Picrotoxini, 3 to 6 m. ...		537
" Arsenii (Sod. Arsenat.) et Ferri, 5 to 10 m. ...		148	" Pilocarpin Nit., 2 to 6 m. ...		432
" Arsenii (Sod. Arsenat.) et Strych., 5 to 10 m. ...		148	" Plumbi (vaginal) ...		556
" Arsenii (Sod. Arsenat.) et Strych. et Quin., 5 to 10 m. ...		148	" Potassii Cantharidatis, 1-400- to 1-200 gr. ...		216
" Atropinæ, 2 to 8 m. ...		169	" " Permang. (vaginal) ...		448
" Bismuthi Subnitrat. ...		189	" Pyoktanin ...		255
" Brou. (urethral) ...		745	" Quin. HBr. Ac., 3 to 12 m. ...		570
" Cacodylat. Co., av. 17 m. ...		151	" " HCl. Ac., 3 to 12 m. ...		571, 572
" Caffeinæ Hyp., 1 to 6 m. ...		200	" " HCl.-Sulph., 2 to 12 m. ...		572
" Calcii Iodatis ...		40	" Ragazzoni, 2 to 6 m. ...		360, 367
" Champoræ, see Sterules Hyp.			" Sal-Alambroth, 10 m. ...		376
" Cocainæ Hyp. (10%), 2 to 5 m. ...		262	" Sodii Arsenatis et Ferri No. 1 and No. 2, 1 Cc. ...		148
" Cocainæ et Nitroglycerini up to 15 m. ...		263	" " Arsen. et Strych., 5 to 10 m. ...		148
" Codeinæ Hyp., 6 m. ...		278	" " c Quin., 5 to 10 m. ...		148
" Coninæ HBr., Hyp., 1 to 3 m. ...		286	" Sodli Cacodyl., 17 m. ...		151
" Cresoli, F.E. = Cresol 1, Glycerin 50, Alcohol 80% to 100			" (Hyp. Intrav. & Rectal)		
" Curare Hyp., 1 to 6 m. ...		703	" Sodii Chloridi ...		628 et seq.
" Dental ...		261	" " Cinnamatis, 10% sol. 30 to 60 m. ...		30
" Digitalin Nativelle ...		304	" " Coumaratis 25 m. ...		31
" Durant's ...		292	" " Salicyl. 15 to 30 m. ...		71
" Ergotæ Hyp., 3 to 10 m. ...		311	" Sparteinæ, 2 to 6 m. ...		645
" Ergotexinæ, 2 to 15 m. ...		312	" Strych. HCl., 2 to 6 m. ...		653
" Eucain., Lact. ...		269	" " Sulph., 1 to 6 m. ...		654
" Guaiacol (Durant) ...		292	" Suprarenal, 1 to 5 m. ...		825, 826
" Homatropinæ, 1 to 6 m. ...		172	" Sulphatum (Vagina) ...		686
" Hyd. Biniodidi (vaginal) ...		367	" Thallin 2% ...		255
" " Cyan. et Acuin, 10 m. ...		365	" Thiosinamin et Antipyrin, 8 to 17 m. ...		627
" " Intramusc., 10 m. ...		359	" Trypsin Hyp. (Sterules), 30 m. ...		517
" " Intrav. ...		361	" Zinc Sulph. (Vagina) ...		686
" " Iodid, Ragazzoni, 2 to 6 m. ...		367	" Ink, Sympathetic ...		717
" " Lambkin, 10 m. ...		359	" Insufflatio Bismuth. et Morph. ...		189
" " Oxidi c. Asparagin, 10 m. ...		360	" " Eucalypt. Gum. ...		705
" " Oxidi Flavici. Formam. id., 15 m. ...		382	" " Calcis Iodatis c. Bism. ...		40
" " Perchlor. ...		360	" " Iodoformi & Comp. ...		401
" " Perchloridi (Uterine and Vaginal) ...		375	" " Menthol (& Comp.) ...		451
" " Subchlor., 10-20 m. ...		378	" " Morphinæ ...		455
" " Succinimidi ...		361, 380	" " Orthoformi c. Resorcin ...		271
" " Thymol-Acet. ...		382	" Insufflators ...		451
" Hyoscine, 5 to 10 m. ...		390	" " Drops ...		234
" Hyoscyaminæ, 1-2 m. ...		394	" Intemperance, Mixture for see also Therap. Ind. ...		239
" Iodi Hyp. Fortiss., 3 to 5 m. ...		405	" International Atomic Wts. ...		25
" Iodi, C.L.T.E. (also Douche) ...		405	" Intralaryngeal Syringes ...		218
" " Carbolisati (uterine) ...		22	" Intra-spinal Anæsthesia ...		266 et seq
" Iodized Phenol Dil. (Douche) ...		22	" Intravenous Saline Inj. ...		628 et seq
			" Introduction ...		xx
			" Inula Helenium, 709; Inulin ...		709
			" Invert Sugar ...		614

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Iodabacid, 15 gr.	411	Iridin, <i>syn.</i> Irisin, 1 to 3 gr. ...	...	429
Iodalbin, 5 to 10 gr. 411 ; Iod-eosin	...	85	Iris Florentina, versicolor ...	...	420
Iodine	404	Irish Horticultural Poisons ...	...	933
„ Deuche	405	Irish Moss ...	...	701
„ Iontophoresis of	420	Iron Alum, 3 to 10 gr. ...	...	333
„ Numbers of Fats	413	„ and Arsenic Drops, 5 drops	...	148
„ Sterilising Tablets	565	(And Inj.) ...	...	328
Iodinol, 30 to 45 gr.	405	„ -Vitellin... ..	...	745
„ c. Ext. Malti, 1 oz.	408	Irrigators, 216 ; I. R. S. Compound	...	397
Iodipin (Caps., 406), 30 to 45 gr.	405	Irristum, 745 ; Isarol ...	...	258
„ Phosphor., 1 dr.	407	Isatropyl-Cocaine ..	...	709
„ Tablets	408	Isinglass and Preps. ...	...	689
Iodised Oil	407	„ Japanese ...	...	830
„ Phenol and dil. Injectn. ...	22	630	Iso-amyl-amine ...	...	93
„ Serum, De Renzi's	408	Iso-amyl-butyrate ...	...	263
„ Wool	411	Iso-nitroso-antipyrin ...	...	432
Iodival, 5 gr.	105	Isophyaostigmine, 536 ; Iso-pilo-	...	228
Iodo-Acetone	200	carpine ...	...	20
„ -Caffeine	403	Isopral, 5 to 15 gr. ...	...	625
„ -chloroxychinolin	405	Iso-propylbenzene ...	...	735
„ -Glyc. Sol., 1 in 50	412	Isatropyl-cyanate of Allyl ...	...	135
„ -Iso-propyl-alcohol	408	Ispaghula, 50 to 150 gr. ...	...	14
„ -Tannin Syrup, ½ to 2 dr.	665	Itroi (Argentin Citras) ...	...	217
„ -Theobromine, 2-10 gr	401	Izal, 13, 17, 18 ; Caps., Fluid	...	430
Iodof. and Eucal. Bougies	336, 399	Jabon, F.E.=Sapo. Jacaranda, 710 ;	...	881
„ Caps., Glutoid	401 <i>et seq.</i>	Jaconet ...	...	433
„ Dressings	401	Jaborandi, 5 to 60 gr. ...	...	433
„ Gauze and Bdges.	401	Jadbar, 688 ; Jaffe's Indian Test	...	720
„ Paste, Dental, 401 ; Pencils	...	401	Jalapa, 5 to 20 gr. ; Jalapa Resina,	...	710
„ Varnish, 401 ; Vaseline 10% 402	...	402	2 to 5 gr. ...	...	745
Iodoformum (& Pæcip.), ½ to	...	396, 399	Jalapin, 1 to 5 gr. ...	...	131
„ 3 gr.	399	Jamaica Dogwood, 719 ; Quassia...	...	688
„ Aromat.	411	Jambul (Jamun) 5 to 30 gr. ...	...	654
Iodoglidine, 2 to 6 tabs.	403	James's Fever Powder ...	...	336
Iodol, 1 to 3 gr.	411	„ Powder, 3 to 6 gr. ...	...	745
Iodolose, 15 to 30 drops	411	Japaconitine ...	...	341
Iodolysin, Injection Solution	411	Jarabe, F.E.=Syrup ; Brea ...	...	869
„ Pigment	411	Jasmine, Yellow ...	...	454
Iodoménin, 7½ gr.	665	Jefferson Dodd's Corrective ...	...	658
Iodosol, 410 ; Iodotheobromine...	...	833	Jelly Fish Stings ...	...	16, 18
Iodothyryne	854	Jennerisation, 817 ; Jenner's Stain	...	405
Iodum	407	Jennings' 'Therapeutic Triad' ...	...	411
Iodum Oleatum, 10%	412	Jephson's Powder, 60 gr. ...	...	880
Iohydryn	413	Jequiritol, Serum, Jequirity, 687 ;	...	275
Ionic Medication	419	Jervine, 680 ; Jewellers' Rouge,	...	412
„ Solubes, Cocaine HCl.	420	326 ; Jeye's Fluid ...	...	638
„ „ Copper	421	Jodipin, 25%, 30-45 gr. ...	...	710
„ „ Magnes. Sulph.	421	Jodival ...	...	699
„ „ Quin. HCl. Ac.	422	Johnson's Saccharimeter ...	...	473
„ „ Sodii Chlorid.	422	Jonnescoc's Injections (various)	...	898
„ „ Salicyl.	423	1 Cc. ...	...	903
„ „ Zinc Sulphat.	425	Jothion ...	...	73
„ <i>Vide also for each of above,—</i>	...	413 <i>et seq.</i>	Joulie's Sesquiphosphate ...	...
„ Sterules, see Sterules	730	Juglandin (and Juglandis Folia),	...	
Ionisation	413	2 to 5 gr. ...	...
Ionium, 594 ; Ionone	418 <i>et seq.</i>	Jujubea—see Trochisci 'G' ...	...
Iontophoresis	412	Jumble Beads, 687 ; Juniper Tar	...	
„ Chemicals used in	425	Oil, 554 ; Juniperus ...	...
Iothionol	425	Juniperus Virginiana ...	...
Ipecacuanha, ¼-2 gr. exp.	428	Jusquiaume, 392 ; Jute, 352 ; Ju-	...	
„ 15-30 gr. emetic	428	venia, 745 ; Ju-vis ...	...
„ s. Emetina, 5-20 gr.	735	Kachur, 691 ; Kakke Coccus ...	...
Ipomœa Congesta, 709 ; Hederacea	...	737	Kakodyle, 150 ; Kala Azar ...	...
„ Pupura, 709 ; Turpethum	...		Kaladana, 735 ; Resin, 2 to 8 gr. ...	...

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Kalandura	297	Lactigen, Lactiloids ... ..	...	57
Kamala, 30 to 120 gr.	334	Lactobacilline, 57; Lactometer ...	...	890
Kangaroo Tendon	21	Lactono ... ..	...	57
Kanker Bosche, 727; <i>Kaolin</i>	434	Lactophenin, 5 to 15 gr. ... ..	...	243
Kaposi's Ointment, 461; Kaputine	745	Lactophosphate de Calcium	...	...
Kargon Compound, 745; Kastanol	689	Dissous ... ..	...	44
Kataphoresis, 413; Kathions	414	Lactoscope ... ..	...	890
Kaur, 691; Kauri Gum	710	Lactose ... ..	...	711
<i>Kava Rhizoma</i>	710, 735	Estimation in Milk ... ..	...	888
Kay's Ess. Linseed, 745; Tic Pills	745	Lacto-Serum, Artificial ... ..	...	921
Keating's Pectoral Lozenges	745	Lactoserve ... ..	...	57
Keene's Cold Cure	745	Lacto-Somatose, 1 to 2 dr. ... ..	...	475
Kefir, 45, 483; Kelene	94	Lactucarium, 15 gr. ... ..	...	394
Kelpion, 410; Kephaldol, 30 gr.	251	Lactuca Virosa ... ..	...	394
Kephir	45, 492	Lactylphenetidin, 5 to 15 gr. ... ..	...	248
Kepler Solution of Malt and Oil	745	Lacumea, Lacvitem ... ..	...	477
Keratin, 8 gr., 546; Pill Coating	539	Ladies' Slipper ... ..	...	704
Kermes Minerale	129	Lady Webster's Pills ... ..	...	745
Kernel Oil, 122; Kerol	17, 18	Lævo-Scopolamine ... ..	...	391
Kerosene, 522; Khomé Seeds	728	Lævulose ... ..	...	614, 880
Kidd's Preparations	745	Lambkin's Injections, 10 m. ... ..	...	359
Kidney Extract, 820; Kieselguhr	435	Lamb's Wool ... ..	...	352
Kilmer's Cure	745	<i>Lamella</i>—	...	...
Kimkel's Colour Test	892	Alum, 1-250 gr. ... ..	...	115
<i>Kino</i> , 5 to 20 gr., 711, 733, 735;	735	Atropine 1-2000 to 1-250 gr. ... ..	...	169
<i>Eucalypti</i> , 5 to 20 gr.	735	<i>(Off.)</i> 1-5000 gr. ... ..	...	169
Kineurine, 3 to 8 gr.	61	{ Atropine 1-5000 to 1-50 } ... ..	...	169
Kiryat, 708, 732; Kitasato's Method	924	{ Cocaine 1-200 to 1-50 } ... ..	...	169
Kjeldahl's Estimation	882	Cocaine, 1-100, 1-200 gr.; <i>(Off.)</i>, ... ..	...	263
Kleinenberg's Solution	874	1-50; $\frac{1}{10}$ gr. ... ..	...	263
Klein's B. Enteritidis	924	{ Cocaine, 1-200 to 1-50 } ... ..	...	172
Prophylactic	776	{ Homatrop. 1-5000 to 1-50 } ... ..	...	172
Klipdass, 709; Klipzweet	709, 711	{ Cocaine, 1-200 gr. } ... ..	...	530
Knob Root, 702; Wood	731	{ Physostig., 1-1000 gr. } ... ..	...	530
Koch's Tuberculin	793 et seq.	Daturine, 1-5000 gr. ... ..	...	648
Koko, 745; Kola Nut, 10 to 20 gr.,	745	Eucaïne, 1-100, 1-50 gr. ... ..	...	269
197; Wine, Christy's	745	Euphthalmine, 1-100, 1-50 gr. ... ..	...	173
Koleradraaber Thieleman, av. 30 m.	288	Gelseminine, 1-500 gr. ... ..	...	337
Conrad., acc. to age	283	Homatropine, 1-5000, 1-1000, ... ..	...	172
Kolle's Vaccine	767	1-100 gr. <i>(Off.)</i> ... ..	...	172
Koromiko, 711; Koumiss	45, 482	Hyd. Perchlor., 1-100,000 gr. ... ..	...	375
<i>Kousso</i> , $\frac{1}{4}$ to $\frac{1}{2}$ oz.	Hyosine, 1-500, 1-200 gr. ... ..	...	390
<i>Krameria</i> 711; Kreatinin	874	Hyoscyamine, 1-5000 gr. ... ..	...	394
Kreat Haliva, 5 to 30 m.	708	Iodoform, 1-1000 gr. ... ..	...	401
Kreosote, 1 to 5 m. incr.	289	Lead Acetate 1-500 gr., and ... ..	...	...
Kreosotum Carbonic.	291	with Opium, 1-250 gr. ... ..	...	...
Kresolum (and Liq.)	13	Morphine (et c. Atrop., 1-5000), ... ..	...	169, 455
Krönig's Scopolamine-Morphine	390	1-500 gr. ... ..	...	169, 455
Method	390	<i>Physostigmine</i> , 1-1000 gr. <i>(Off.)</i> ... ..	...	536
Kryogenin (<i>vide</i> Cryogenin)	17, 18	1-500, 1-250 gr. ... ..	...	536
Krystall Violet, 915; Krysyl.	911	Pilocarpine, 1-500 gr. ... ..	...	432
Kühne's Carb.-Meth. Blue	702	Scopolamine 1-500, 1-200 gr. ... ..	...	390
Kurchi	44	Silver Nitrate, 1-500 gr. ... ..	...	133
Kwass	184	Thymol, 1-1000 gr. ... ..	...	670
Lac Bismuthi, 1 to 2 dr.	184	Zinc Sulph. (et o. Op. et c. ... ..	...	636
" et Cerii, 1 to 2 dr.	188	Atrop., 1-250 gr. ... ..	...	711
Sulphuris, 20 to 60 gr.	711	Laminaria Tents ... ..	...	746
Lacca, 725; Lachnanthes	354	Lamplough's Saline ... ..	...	88
Lacmoid, 893; Lactagol, 1 dr.	57	<i>Lana Adeps</i> ... ..	...	169
Lactalbumen, 480; Lacteol	57	Lane's Cure, 746; Lang's Bottle ... ..	...	811
Lactic Acid Bacilli Cultures, 57;	Lannelongue's Serum ... ..	...	15
Culture Medium, 56; Curdled	Lano-cyllin ... ..	...	89
Milk, 47; Dates, 56; Local	50	Lanolin, 89; Anhydrous, Cream, 89; ... ..	...	89
Use, 52; Tablets, 46; Uses of	50	Hydrous, 89; Ointment ... ..	...	89

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Lanolinum Hydrargyri	89	Lime Free Diet, 204; Limnatis ...	...	835
Lanthanum, 226; Laparotomy Pads	...	352	Limonade Purgative, 440; Rogé...	...	441
Lapis Calamin. Præp., 435; Divinus	...	297	Limonis Cort. Sicc. and Succus ...	...	739
Lappa, U.S., 712; Larch...	...	549	Linalool ...	...	498
Lard; Lard Oil	688	Linct. Ammonii Bromidi, 1 to 2 dr.	...	118
Larix Europæa, 549; Lassar's Paste	...	684	" Apomorph. cum Codein,	...	...
Lasiosiphon and Bassorin Paste...	...	436	1 dr. ...	...	135
Laudanosine	459	" 'Bart.'s' & T.H., 1 dr. ...	...	505
Laudanum, 5 to 30 m.	507	" Camph. Co., 1 dr. ...	...	505
" Sydenham's, 5 to 20 m.	...	507	" Codeinæ, 1 to 2 dr. ...	...	279
Laurel Berries	712	" Expectorans, $\frac{1}{2}$ -1 dr. ...	...	132
Lauri Fruct., Olenm	712	" Gee's, 1 dr. ...	...	505
Laurocerasi Folia	123	" Glycerini, 1 dr. ...	...	427
Lautier's Von Pirquet Test	814	" Heroin, 1 to 2 dr. ...	...	459
Lavage of Stomach	896	" Morph., 1 dr., 455; Co. ...	...	456
Lavandula vera	712	" Morph. Hydrocyan., 1 dr. ...	...	456
Laveran's Stain	910	" Opiatus, 1 dr. ...	...	505
Laville's Remedy	746	" Pini Terpin et Heroin,	...	...
Lawes' Disinfectant	17, 18	1 dr. ...	...	548
Laxans Laxatol, Laxen, Laxoin,	" Scillæ, St. M.'s H. 1 dr. ...	...	505
$\frac{1}{2}$ to 8 gr.	25	" " Opiatus, 1 dr. ...	...	505
Lead, estimation of	83	" Sedativus, 1 dr. ...	...	456
Leben Raib, 45; Lecanora	62	" Tolu c. Opio, 1 dr. ...	...	505
Lechuga, F.E. = Lactuca Sativa;	Lindenblüthen ...	...	398
Lecithin, 3-5 gr.	436	Liniment, A. B. C. ...	...	86
Lecitogen, 3 to 4 dr.	437	Linim. Aconiti and Co. ...	...	86
Leduc 417 et seq; Mercurial In-	" Aconiti et Chlorof. ...	...	86
jection	421	" Æruginis ...	...	296
Leeches, 735, 835; Leek	690	" Album = Linim Stokes ...	...	547
Legal's Acetone Test	853	" Ammonia ...	...	120
Leishman-Donovan Bodies	905	" Atropinæ ...	...	170
Leishman's Stain and Modifica-	" Belladonnæ and Co. ...	...	180
tions. 870; Lemco	473	" " Æthereum ...	...	182
Lemon Grass, 736; Juice, 924;	" Bellad. c. Chlorof. ...	...	180
Oil, 712; Syrup	712	" Betulæ Co. ...	...	68
Lenigallol, 65; Leni-robin	237	" Calaminæ, 435; Calcis ...	...	206
Lenitive Electuary	622	" Camphoræ et Ammon. ...	...	209
Leprosy, 773; Bacillus	904	" Cantharidis Co. ...	...	215
Leptandra, $\frac{1}{4}$ to 2 gr.	712	" Capsici (Co. and Dx.) 219,	...	220
Leptothrix Buccalis	54	" Chloral Co. ...	...	228
Leszczynsky's Stain	902	" Chloroformi ...	...	234
Leucin	865	" Crinale, 214; Crotonis ...	...	718
Leucocyte Enumeration	888	" Eriaccans ...	...	673
Levaditi's Silver Stain	908	" Hydrargyri ...	...	381
Levathin. 746; Levico Water	841	" " Oleat. c. Morph. ...	...	488
Levigations	674	" Iodi, syn. Liq. Iodi Fortis	...	407
Levisticum Officinale, 712; Levulose	...	614	" Jaborandi ...	...	431
Levurine (and Tab.) 1 dr.	224	" Menthol (& Co.) ...	...	451
Levy-Bing Lafay Syringe	358	" Methyl Salicyl ...	...	68
Lewis Jones Medical Electricity	...	425	" Opii ...	...	505
Libanol	699	" Picis ...	...	555
Lichenoids, 1 or more	700	" Potass. Iod. c. Sap. ...	...	564
Licoricine	746	" Salicyl (Methyl) ...	...	68
Lieben's Acetone Test	858	" Saponis (& Viridis) ...	...	619
Liebig's Extract of Beef, 473;	" Stokes' ...	...	547
Wine	746	" Succini Co. ...	...	727
Ligatures var.	20	" Sinapis ...	...	624
Light Treatment, Blue, 589; Finsen,	" Terebinthina (and Ace-	...	...
588; Fluorescent, 589; Red, 589;	ticum) ...	...	547
Sun, 589; Ultra Violet, 589;	" Zincicum Comp. ...	...	684
Violet	589	Linley Process of Preserving ...	...	107
Ligroin 523; Detection of T.B.	913	Linseed and Oil ...	...	713
Lilac Artificial = Terpeneol	Linteum Ac. Carbol, 5% ...	...	20
Lily of the Valley	287	Linteum Sypticum ...	...	324

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Lints, 352, 363; <i>Linum Usitat.</i> ...		713	Liq. Copaiba et Buchu et Cubebæ		
Liquid Air 511, & Hydrogen ...		512	<i>c. Santal.</i> , 1 to 2 dr. ...		502
Liquifruta ...		746	<i>Cocain. Conc.</i> , $\frac{1}{2}$ -1 dr. ...		734
Liq. Acid. <i>Chromici</i>		29	<i>Cresol Sap.</i> , and Co... ..		14
<i>Chrom.-Aceto-Osmici</i> ...		688	<i>Creosoti</i> , av. 2 dr. ...		290
<i>Osmici</i> , 2-10 m. ...		688	<i>Cuspariæ Conc.</i> , 1 in 2, $\frac{1}{2}$ to		
<i>Salicyl.</i> ...		69	1 dr. ...		438
<i>Acidus Halleri</i> , 2-8 m. ...		79	<i>Delphinine Co.</i> ...		727
<i>Aluminii Acetici</i> ...		115	<i>Donovani</i> , 5-20 m. ...		146
<i>Aceto-Tart.</i>		116	<i>Eastoni pro Syrup.</i> , 331;		
<i>Chloridi</i> ...		117	<i>ditto sine Ferro</i> ...		331
<i>Formatis</i> ...		117	<i>Epispast.</i> ...		213, 215
<i>Ammonia</i> , 10 to 20 m... ..		120	<i>Myiobridis</i> ...		736
<i>Domest.</i> ...		120	<i>Ergotæ Acet.</i> , et <i>Ammon.</i> ,		
<i>Ammon. Fort.</i> , 3-8 m... ..		120	10-60 m. ...		313
<i>Acet.</i> , 2 to 6 dr... ..		121	<i>Ethyl Nitriti</i> , 20 to 60 m. ...		93
<i>Fort.</i> , '85, 25-75 m. ...		121	<i>Euonymin et Cascara</i> , $\frac{1}{2}$ to		
<i>Anisat.</i> ...		347	1 dr... ..		318
<i>Cit.</i> , 2 to 6 dr. ...		121	<i>et Iridin</i> , $\frac{1}{2}$ to 1 dr. ...		319
<i>Fort.</i> , '85, $\frac{1}{2}$ -1 $\frac{1}{2}$ dr. ...		121	<i>et Pepsini</i> $\frac{1}{2}$ to 1 dr. ...		319
<i>Andrograph. Conc.</i> , $\frac{1}{2}$ to 1 dr. ...		732	<i>Ferri Acet.</i> , 5-15 m... ..		328
<i>Antihystericus</i> , $\frac{1}{2}$ -1 dr. ...		693	<i>Albuminati</i> , 1 to 4 dr. ...		327
<i>Antim. Chlor.</i>		129	<i>et Ammon. Acet. U.S.</i> ,		
<i>Antirheumatic</i> , 30 m... ..		280	4 dr. ...		328
<i>Antisepticus</i> , U.S., 1 dr. ...		7	<i>Chloridi</i> , $\frac{1}{2}$ m. ...		324
<i>Aristoloch. Conc.</i> , $\frac{1}{2}$ to 2 dr... ..		733	<i>Chlorox.</i> , 10 to 30 m... ..		325
<i>Arsenicalis</i> , 2 to 8 m... ..		144	<i>Dialysat.</i> , 10 to 30 m. ...		325
<i>Arsenici Bromatus</i> , 1 to 5 m. ...		145	<i>Hypoph. Co.</i> , $\frac{1}{2}$ to 2 dr. ...		532
<i>HCl.</i> , 2-8m. ...		144	<i>Fortis</i> , 10 to 30 m. ...		532
<i>Arsen. et Hyd. Iodidi</i> , 5 to			<i>Iodidi</i> , 3 to 6 m... ..		329
20 m... ..		146	<i>Oxychlor.</i> ...		325
<i>Atropinæ Salicyl.</i> ...		168	<i>Oxyd. Sacch.</i> , $\frac{3}{4}$ oz. ...		326
<i>Sulphatis</i> , 1%, $\frac{1}{2}$ to			<i>Pept. (c Quin. 325)</i> , 1 to		
1 m. ...		169	4 dr. ...		327
<i>Auri et Arsen. Brom.</i> , 5 to			<i>Pept c. Mang</i> ...		327
10 m. ...		175	<i>Perchlor.</i> , 5-15 m ...		324
<i>Auri et Hyd. Brom.</i> , 5 to			<i>Fortis</i> , 1 to 4 m. ...		324
10 m. ...		175	<i>Pernit.</i> , 5-15 m. ...		326
<i>Berberidis Conc.</i> , $\frac{1}{2}$ to 1 dr. ...		733	<i>Persulph.</i>		332
<i>Bismuth. Ammon. Cit.</i> , 30-60 m. ...		183	<i>Subsulphat.</i> , 3 to 6 m... ..		333
<i>Conc.</i> , 15-30 m... ..		185	<i>Tersulphat.</i> , ...		333
<i>Sed.</i> , 1 dr. ...		184	<i>Ferro-Mang. Pept.</i> , 1 to		
<i>Bromi</i> ...		636	4 dr... ..		328
<i>Arsenitis</i> , 1-5 m... ..		145	<i>Ferro-Mang. Pept. c Hæmo-</i>		
<i>Bromo-Chloral Co.</i> , $\frac{1}{2}$ to 2 dr. ...		228	<i>globin</i> , 1 to 4 dr. ...		328
<i>Calcii Chloridi</i> , 15 to 50 m... ..		204	<i>Fluoresceinæ</i> ...		248
<i>Calcis</i> , 1 to 4 oz. ...		206	<i>Formaldehydi</i>		106
<i>Lactat.</i> , $\frac{1}{2}$ oz. ...		43	<i>Glonoïn</i> , $\frac{1}{2}$ to 2 m... ..		466
<i>Lactoph.</i> ...		44	<i>Gutta Percha.</i> , ..		236
<i>Sacch.</i> , 20 to 60 m. ...		206	<i>Hæmoglobin Co.</i> ...		751
<i>Calumbæ Conc.</i> , $\frac{1}{2}$ to 1 dr... ..		438	<i>Hamamelidis</i> ...		356
<i>Caoutchouc</i> ...		216, 624	<i>Helalin c. Pepsin et c. Cas-</i>		
<i>Carbonis Deterg.</i> ...		241	<i>cara</i> , 1 dr. ...		702
<i>Carmini</i> , 40 gr., 1 oz... ..		697	<i>Hyd. Nitratis Acid.</i>		371
<i>Carnis</i> , 2 to 4 dr. ...		474	<i>Perchlor.</i> , $\frac{1}{2}$ -1 dr ...		373
<i>Chirata Conc.</i> , 1 in 2, $\frac{1}{2}$ to			<i>et Pot. Iod. Conc.</i> ...		370
1 dr... ..		438	<i>Hydrogenii Perox.</i> , $\frac{1}{2}$ to 2		
<i>Chloromorph.</i> , 5-15m. ...		234	dr. ...		385
<i>Cocci</i> ...		697	<i>Hyoscinæ HBr.</i> , 3 to 15 m. ...		390
<i>Cocainæ HCl. (Inj.)</i> , 2-5 m. ...		262	<i>Hypoph. Co.</i> , $\frac{1}{2}$ -2 dr... ..		532
<i>et Antipyrin.</i>		263	<i>Iodi (Co. U.S., 407)</i> 5 to		
<i>Copalbæ</i> , $\frac{1}{2}$ to 1 dr... ..		501	30 m. ...		407
<i>c. Buchu et Cubeba</i> ,			<i>Dil.</i> , 407; <i>Fortis</i> ...		407
1 to 2 dr. ...		501	<i>Oleicus</i> ...		407

NAME.	DOSE.	PAGE
Liq. Iodo Ferro-Mang. Pept., 1 to 4 dr. ...		328
Jaborandi 5 to 15 m. ...		431
Keratin ...		540
<i>Krameria Conc.</i> , $\frac{1}{2}$ to 1 dr. ...		438
<i>Mag. Carb.</i> , 1 to 2 oz. ...		440
" Cit., av. 12 oz. (divided) ...		440
<i>Morphina Acet.</i> , 10 to 60 m. ...		465
" Bimec, 1%, 5 to 40 m. ...		457
" HCl, 1%, 10-60 m. ...		456
" Tart., 10-60 m. ...		458
<i>Nitroglycerini</i> , $\frac{1}{2}$ -2 m. ...		466
<i>Opii Sedativus</i> , 5-20 m. ...		505
<i>Pancreatis</i> , 1 to 2 dr. ...		513
<i>Pancreaticus</i> , 1-2 dr. ...		513
<i>Papain et Iridin</i> , 2 to 4 dr. ...		519
<i>Pectoralis</i> , 1 dr. ...		347
<i>Pepsini et Caffeinae</i> , 2 to 4 dr. ...		526
<i>Pepticus</i> , 1 to 2 dr. ...		526
<i>Picis Benzol et Acetoni</i> ...		242
<i>Picis Carbonis</i> (et c. Ligno) ...		242
<i>Picis Ligni</i> ...		242
<i>Picrotoxini</i> , 2 to 12 m. ...		537
<i>Plumbi Lactat.</i> ...		341
" <i>Subacet.</i> , Dil., <i>Fortis</i> ...		341
<i>Potassa</i> , 10 to 30 m. ...		562
<i>Potass. Arsenat. et Bromid.</i> , 1 to 5 m. ...		145
<i>Potass. Arsenit.</i> , 2-8 m. ...		144
<i>Potassi et Sodii Hypochloritum</i> $\frac{1}{2}$ to 2 Cc. ...		633
" <i>Permang.</i> , 2-4 dr. ...		447
<i>Pro Syr. Eastoni</i> ...		331
<i>Protargol</i> ...		140
<i>Quassia Conc.</i> , $\frac{1}{2}$ -1 dr. ...		438
<i>Rhei Conc.</i> , $\frac{1}{2}$ to 1 dr. ...		438
" Dule., 1 to 3 dr. ...		307
<i>Rosæ Dulcis</i> ...		498
<i>Santal. c. Buchu et Cubeba</i> , 1 to 2 dr. ...		502
" Co., 1 to 2 dr. ...		502
" c. Kava, 1 to 2 dr. ...		502
<i>Sassa Co. Conc.</i> , 2-8 dr. ...		438, 620
<i>Sedans</i> , $\frac{1}{2}$ to 1 dr. ...		385
<i>Senega Conc.</i> , $\frac{1}{2}$ -1 dr. ...		438, 725
<i>Senna Conc.</i> , $\frac{1}{2}$ -1 dr. ...		438
<i>Sennæ Dulcis</i> , 1-3 dr. ...		622
<i>Seriparus</i> ...		525
<i>Serpentar. Conc.</i> , $\frac{1}{2}$ to 1 dr. ...		438, 725
<i>Soda Chlorinata</i> , 10 to 20 m. ...		634
<i>Sodii Arsenatis</i> , 2-8 m. ...		149
" <i>Carbolatis</i> ...		22
" <i>Ethylatis</i> ...		635
" <i>Hydroxidi</i> , U.S., 5% ...		635
" <i>Hypobrom.</i> ...		635
" <i>o-coumarat.</i> , 25 m. ...		31
<i>Stillingia Co.</i> , 1 dr. ...		727
<i>Strych. HCl.</i> , 2-8 m. ...		653
<i>Stypticus</i> , Ph. Ned. ...		324
<i>Testicularis</i> , 15-30 m. ...		823
<i>Thymol</i> , 1 in 800 (Co.) ...		670
<i>Thyroidei</i> , 5 to 15 m. ...		932
<i>Tinosp. Conc.</i> , $\frac{1}{2}$ -1 dr. ...		737
<i>Toddal. Conc.</i> , $\frac{1}{2}$ -1 dr. ...		737

NAME.	DOSE.	PAGE
Liq. Tolu pro Syrup ...		694
" <i>Trinitrini</i> , $\frac{1}{2}$ to 2 m. ...		466
" <i>Trypsin</i> , 1 to 2 dr. ...		517
" <i>Viola Glucosidi</i> , $\frac{1}{2}$ oz. ...		730
" <i>Zinci Chloridi</i> ...		682
<i>Liquores Concentrati</i> ...		438
<i>Liquorice</i> , 347; <i>Chocolate Tablets</i> , 348; <i>Compound Powder of</i> , 60 to 120 gr., 348; <i>Liquorice</i> (Indian) ...		687
<i>Listerine</i> , 1 to 2 dr. ...		7
<i>Lister's Antiseptic</i> , 366; <i>Litharge</i> ...		557
" <i>Lithiated Sorghum Co.</i> ...		726
<i>Lithii Agaricinas</i> ...		690
" <i>Benzoas</i> , 2 to 10 gr. ...		438
" <i>Bromid.</i> , 5-15 gr. ...		191, 438
" <i>Carb.</i> , 2 to 5 gr. ...		439
" <i>Citrus</i> , 5 to 10 gr.; <i>Effervesc.</i> , 1-2 dr. ...		439
" <i>Cit. Laxativ.</i> Eff. 1 to 2 dr. ...		439
" <i>Formas</i> , $\frac{1}{2}$ to 2 gr. ...		36
" <i>Glyceroph.</i> , 3-10 gr. ...		61
" <i>Guaiacas</i> , 2 to 5 gr. ...		439
" <i>Hippuras</i> , 5-20 gr. ...		439
" <i>Iodidum</i> , 1 to 5 gr. ...		439
" <i>Quinas</i> , 5 to 15 gr. ...		569
" <i>Salicylas</i> (Eff., 1 to 2 dr., 439); 5-20 gr. ...		439
" <i>Sulpho-Ichthyolas</i> , 10 to 30 gr. daily ...		396
" <i>Tart. Acid.</i> , 5-20 gr. ...		440
<i>Lithion</i> , $\frac{1}{2}$ to 1 dr. ...		440
<i>Lithium</i> ...		438
" <i>Diuretin</i> , 5-15 gr. ...		666
" <i>Iontophoresis of</i> ...		421
<i>Litmus Paper, Solution</i> ...		893
" <i>Broth</i> , 919; <i>Milk</i> ...		920
<i>Liver of Sulphur</i> ...		558
" <i>Extract</i> , 20 Cc. ...		820
<i>Livingstone Rousers</i> , 577; <i>Lobelia</i> ...		713
<i>Lockyer's Sulphur Hair Restorer</i> ...		746
<i>Locoek's Wafers</i> ...		746
<i>Lodal</i> , 1 gr., 459; <i>Lodh</i> , 20 gr. ...		727
<i>Löffler's-Alk. Methylene Blue</i> ...		911
" <i>Blood Serum Culture Medium</i> ...		921
" <i>-Neisser Stain</i> ...		900
" <i>Pigment</i> (<i>Diph.</i>) ...		324
<i>Lofotol</i> , 494; <i>Logwood</i> ...		707
<i>London Paste</i> , 635; <i>Lonicera var.</i> ...		713
<i>Lotio Acid. Boric</i> , 4% ...		7
" <i>Carbolici</i> (et c. <i>Co-caina</i>) ...		19
" <i>Citrici et Phenolis</i> ...		34
" <i>Hydrocyan. c. Sodii</i> ...		38
" <i>Picric.</i> , 1% ...		64
" <i>Aetheris Compositus</i> ...		92
" <i>Ammonii Chloridi</i> ...		118
" <i>Balsami Peruviana</i> ...		694
" <i>Boeck</i> ...		341
" <i>Calaminæ</i> (<i>Oleosa</i> , 435) ...		435
" <i>Calcii Sulphurat.</i> ...		207
" <i>Calc. Iodat.</i> , 40; <i>Capillaris</i> ...		610
" <i>Creolin</i> , 15; <i>Evaporans</i> ...		104
" <i>Excitans</i> ...		610

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Lotion Hyd. Acetica, 374; Biniodidi, 367; <i>Flava</i> , 373; <i>Nigra</i> , 379; Perchlor., 374; c. Acid. Carbol., 374; et Zinci Cyanidi...		366	Magenta, $\frac{1}{2}$ to 4 gr. ...		248
„ <i>Krameria</i> Co. ...		4	Magisterium Bismuthi ...		188
„ Pancreatis ...		517	Magnesia Cream, 1 to 4 dr. ...		441
„ Paraffini Co. ...		524	„ <i>Levis</i> and <i>Pond.</i> , 30 to 60 gr., 5 to 30 gr. rep. ...		440
„ Parasiticidus ...		374	„ Mixture (<i>v.</i> also <i>Mist.</i>) ...		443
„ Picis Carb. Aromat. ...		242	Mag. Benzoes, 5 to 15 gr. ...		5
„ „ Carb. Alk. ...		242	„ Borocit., 15 to 30 gr. ...		9
„ <i>Pilocarpinae</i> (hair) ...		432	„ Bromid., 10 to 20 gr. ...		191
„ Plumbi Detergens ...		242	„ <i>Cucodylas</i> , $\frac{3}{4}$ gr. ...		150
„ „ Lact. ...		341	„ Carb. <i>Levis</i> , <i>Pond.</i> , 30 to 60; 5 to 30 gr. rep. ...		440
„ „ Spirituos. ...		556	„ Chloridum, $\frac{1}{4}$ -1 oz. ...		441
„ „ Talc et <i>Amyli</i> ...		341	„ Citras Ver., 30 to 120 gr. ...		440
„ pro Acne ...		435	„ Ethylarsonas ...		153
„ Resorcini (and Co.) ...		610	„ Glyceroph., 3-10 gr. ...		61
„ „ et Ac. Borici ...		610	„ Hydrox., 5 to 120 gr. ...		441
„ Rubra ...		685	„ Hydrox., c. Carbone, 1-2 dr. ...		441
„ Sulphatum ...		686	„ Hypochloris ...		634
„ Sulph. c. Sapone ...		659	„ Hypophos., 3-10 gr. ...		532
Lotion Ammoniacale Camphree		209	„ Lactas, 15 to 60 gr. ...		441
Lovage ...		712	„ Perhydrol; Peroxid. ...		385
Lowndes Cream; <i>vide</i> Cream			„ Pyrophosphas, 443; Propylarsonas ...		153
Lowndes ...			„ Ricinoleas, 1 to 4 dr. ...		497
Lozenges, Bases for ...		674	„ Salicyl., 10 to 30 gr. ...		70
Lubricant Glyc. Jelly ...		340	„ Sulphas, $\frac{1}{4}$ - $\frac{1}{2}$ oz.; 30-120 gr. rep. ...		442
Lubricant Surgical ...		19	„ Sulphas Eff., $\frac{1}{2}$ -1 oz.; 60-240 gr. rep. ...		443
Lubricating Oils ...		522	„ Sulphis, 10 to 30 gr. ...		81
Ludwig's Mixture ...		883	Magnesium Ions, Iontophoresis of		421
Lugol's Solution = Liq. Iodi, '85, 5 to 10 m. ...		407	Maidis Stigmata, 713; Maize Ergot 714; Maize Oil ...		714
Lumbar, Anesthesia ...		266	Make-man Tablets ...		746
Lumbricus ...		615	Malachite Green ...		240
Lunar Caustic, 136; Mitigated, Toughened ...		137	Malade de Coit ...		792
Lun's Oil ...		19	Malaria ...		157, 773, 904
Lupulin (<i>Lupulus</i>), 2 to 5 gr. ...		713	„ Aestivo-Autumnal, Benign Tertian, Malignant, Quartan, Tropical ...		904, 905
Lycetol, 15 to 30 gr. ...		551	Male Fern (Caps.) ...		334
Lycopodion Gig. 713; Lycopodium ...		713	Malignant Purpuric Fever ...		765
Lygosin-Quinine ...		573	Mallein ...		775
Lymph, Oalf, Glycerinated ...		817	Mallotus Philippinensis ...		353
Lymphoid Compound ...		824	Malonal, Malourea, 5 to 10 grs. ...		675
Lymph Serum 824; Lysin ...		784	Malt Bouillon for Lactic Acid bacilli ...		56
Lysidine, Bitart., 5 to 15 gr. ...		551	Melt Extract, 1 to 4 dr. ...		444
„ of sol. 10 to 30 m. ...		551	„ and Cascara, 1 to 4 dr. ...		446
Lysolform, 110, 855; Dental Dressing, 111, Dusting Powder, 110; Mouth Wash, 111; Ointments, 110; Pastils, 111; Pensaries, Tooth Paste, Powder and Toilet Soap ...		110	„ „ Hamoglobin, 1 to 4 dr. ...		446
Lysol, 14, 17, 18; Lytta, $\frac{1}{4}$ - $\frac{1}{2}$ gr. ...		213	„ „ Hypophosph. (and with Oil) 1 to 4 dr. ...		445
McBride's Treatment ...		167	Malta Fever 775; Maltebeer ...		722
McConkey's Stain ...		923	Malted Glyceroph., 1 to 4 dr. ...		62
McCrorie's Stain ...		915	Maltico 746; Malti Pulvis, 1 to 2 dr. ...		443
McDade's Succus, 1 dr. ...		727	Maltine and Preps., 1 to 4 dr. ...		445
McDougall's Fluid ...		17, 18	Maltoferrose, 1 to 4 dr. ...		446
Maintosh Sheeting ...		217	Maltolivine, 2 to 4 dr. ...		495
Mackenzie's Cure 746; Eyewash ...		874	Malto-Yerbine, 1 to 4 dr. ...		731
MacLagan's Test ...		260	Maltose Agar ...		920
Macrocin = Cimicifugin ...		701	Malva 398; Maminan ...		702
„ Madame Rachel " 81; Madar ...		733	Mammary Substance 835; Manaca ...		714
			Mandl's Pigment ...		408

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Mandrake Amer.	557	Menstruation Diapers of Cotton	...	...
Mang. Bromid., 1 to 3 gr	191	352; Wood Wool, 550; Moss...	...	646
" Citras, 3 to 5 gr.	447	Menthol, $\frac{1}{2}$ to 2 gr....	...	449
" Ferro Cit., 3 to 10 gr.	447	" Camphora et c. Phenol ...	...	450
" " c. Quin., 3-5 gr.	447	" Paraffin Caps. ...	...	452
" " c. Strych., 1 gr.	447	" Plaster ...	...	451
" Phosph., 3 to 10 gr.	447	" Snuff, 451; Spray; Wool;	...	...
" Glyceroph., 1 to 5 gr.	61	" Valerianate ...	...	452
" Hypoph., 1-10 gr....	...	447	Mentholeate 452; Menthoc-Phenol	...	450
" Ox. Præcip. 3-10 gr....	...	448	Menthyl- Ethyl-Glycolate...	...	452
" Phosph., 1 to 5 gr....	...	447	Menyanthes 715; Mercaptan ...	...	655
" Sulph., 2 to 10 gr....	...	447	Mercuramalgam ...	...	363
Manna, 1 dr. to 1 oz.	714	Mercurettes 362; Mercurial Bibs	...	362
Mannitol (Syn. Mannite)...	...	714	Mercur-Naphthol Acet., $\frac{1}{2}$ to 1 gr.	...	382
" Nitrate Tabs., 1 gr....	...	315	Mercurial Cream, 10 m. ...	...	359
Manometers	872	" Injections Intrav....	...	361
Maran (W. Indies) = Bals. Copaiba.	" " Summary	...	360, 421
Marchi Reaction 438, Margarine	...	889	Mercuric Ammon. Chloride ...	...	363
Margosa Bark	733	" Iodide, $\frac{1}{2}$ to 1 gr. ...	...	367
Maricol, 1 to 4 dr.	497	" Ethylene-diamine Sulph	...	362
Mariani Wine	746	" Iodide Oil, 3-6 m. ...	...	369
Marienbad Salt	642	" Soaps 369; Wool... 368	...	...
" Tab., 60 gr... 642	" Lactate ...	...	370
" Tab. (vegetable) ... 115	" Oleate and Comps. ... 488	...	...
Marigold = Calendula ... 696	" Oxide Yellow 381; Red... 382	...	...
Marjoram ... 718	" Oxysulph. ... 380	...	...
Marking Nut 691; Marmola ... 746	" Potass. Iodide, 1/16-1/4 gr. 368	...	...
Marmorek's Tuberculin ... 815	" Rhodanide... 382	...	...
Marrow, Glyc. Ext.... 818	" <i>Vide also Hyd.</i>	...	...
Marrubin, 1 to 2 dr. ... 819	Mercuriol 363; Mercurius Dulc.,	...	377
" Compounds ... 819	Mercuro Zinc Cy, Bandges., Cream,	...	...
Marrubium, U.S., av. 30 gr. ... 714	Gze., Paste, Wool ... 366	...	...
Marsh Mallow 691; Marsh's Test	...	143	Mercuro ... 226, 363	...	...
Martin's Pills and Preps. ... 746	Mercurous Iodide 370; Oxide ... 379	...	...
Martinotti's Nigrosin ... 874	Mercury Amalgam ... 361	...	...
Marza Wine ... 746	" Dimethylate ... 365	...	...
Massa Ferri Carb., U.S., 4 gr. ... 322	" Vapour Bath 362; Lamp 589	...	...
Massicot 557; Massol's Bacillus... 46	Meres 416; Mergal... 365	...	...
Mastiche and Chloroform... 714	Méroléol ... 372	...	...
Maté, 198; Matico ... 714	Mescal Buttons, 692; Mesotan ... 68	...	...
Maubeere 722; Mauve (Malva) 398	Meta-arsenic Anilide ... 154	...	...
May Apple ... 557	" -benzamine -s.-carbazide, 3 to	...	...
Mayer's Carmine, etc., Stains 873, 874	24 gr. ... 247	...	...
Mayer's Reagent (Caffeine & Theo-	" -cresol ... 13	...	...
bromine with, 196) ... 369	" -dihydroxybenzene ... 609	...	...
Meadow Saffron ... 279	Metaphenylene diamine ... 886	...	...
Meat Extract, 473; Juice... 473	Metchnikoff's treatment ... 44	...	...
" Preps. 473; Powder... 475	Methanal ... 106	...	...
Meconin 459; Medinal, 5 to 15 gr. 676	Methyl-acetanilide, $\frac{1}{2}$ -2 gr. ... 248	...	...
Mediterranean Fever ... 775	" -acetyl-salicylas, 1 to 2 dr.	...	...
Medullary Glyceride, 1-2 dr. ... 819	in die ... 69	...	...
Melaleuca ... 696, 714	" Aldehyde ... 106	...	...
Mel Boracis, 10; Depuratum, 714;	" Amino-oxy-benzoate ... 271	...	...
Rosatum ... 714	" Atropine Brom. and Nit. 171, 173	...	...
Melissa Officinalis ... 715	" Benzene ... 246	...	...
Mellitum Mercurialis from M.	" Benzoyl Ecgonine .. 257	...	...
Annua v. Fr. Cx.	" " Salicyl, 8-15 gr... 73	...	...
Melon Pumpkin Seeds ... 734	" Chloridum ... 715	...	...
Melting Points of Fats ... 927	" Citrate of Salicyl Acid ... 73	...	...
Membroids 426; Memoranda ... xxvi	" Codeine Bromide, $\frac{1}{2}$ gr. ... 279	...	...
Mendelëeff's Periodic Table ... 926	" Ditannin ... 82	...	...
Meningitis, Cerebro-Spinal ... 765	" -glyoxalidin ... 551	...	...
Meningococcus ... 765	" -hydroxybenzene ... 13	...	...
Menispermin, 1 to 5 gr. ... 538			

NAME.	DOSE.	PAGE
Methyl Iodide	96
„ Morphine = Codeine, <i>q.v.</i>
„ -nonyl ketone	723
„ Orange, 897; Phenol	13
„ -propyl-carbinol Urethane	...	678
„ „ phen. Hexa hydride	...	449
„ -protocatechuic Aldehyde	...	729
„ Rhodin. 1 to 2 dr. in die	...	69
„ Rosanilin	255
„ -Salicyl (Plaster 68)	...	67
„ -Sulphonol	656
„ -Theobromine	196
„ Thioninæ HCl.	249
„ Vinyl-diacetone Alkaniline
„ HCl.	173
„ Violet	255
„ Xanthines	196, 664, 883
Methylated Spirit (Mineralised
and Industrial)	103
Methylene Blue (Loeffler's, 911),
1 to 4 gr.	249
„ „ Carbolised...	911
„ „ Kidney test	249
„ „ Dicotoin	288
Methylene-di-salicylic Iodide	402
Methylenum Cœruleum...	...	219
Methylic Alcohol	103, 104
Methysal Balm 68; Methysticin	...	710
Metol Developer 581; Metramine	...	551
Metric Wts., etc.	xxiv <i>et seq.</i>
Mexican Hair Restorer	746
Meyer-Bergell's Serum	816
<i>Mezereon</i> , av. 7½ gr.	715
Mezzoraddu 50; Miclaratu	...	50
Micrococcus Catarrhalis	783
„ „ Gonorrhœa	902
„ „ Melitensis	775
„ „ Neoformans	763
„ „ Paratetragenus	...	763
Microscopic Glyc. Jelly	340
„ „ Varnish	714
Microcosmic Salt	637
Microsporon Audouini; Furfur	...	907
Midges	904
Miel de Mercuriale from M.
Annua. Fr. Cx. <i>q.v.</i>
Migraine Powders	197
Migrainine, 8 to 15 gr.	200
Migralgin, 8 to 15 gr.	201
Migranol	746
Milk, Analysis, 887; Artificial
Human, 477; B. Tuberculosis
in, 913; Budde process of treat-
ing, 481; Condensed 891; Curd-
led, 47; Curdled Medicated and
its Examination of, 47-56; Digest-
ible, 634; Dry Sterile, 476;
for Bacterial Culture, 920;
'Humanizer,' 477; Human
Normal, 477; Lactometer for,
890; Lactoscope for, 890;
Pasteurised, 478; Peptonised,
478, 514; Preps., 475; Pre-
servation, 7, 491, 888; Regu-

NAME.	DOSE.	PAGE
Milk, Analysis— <i>continued.</i>
lation of Sales, 888; Serum of
(Bacteriological), 920; Soma-
tose, 475; 'Soured,' 44 to 57;
(Uses of, 50); Sugar, 711; Sugar
Estimation, 888; Thickeners,
889; 'Upper,' 476; Whey Pow-
der, 480.
Milk, Asses', Goats', Mares',
Sheeps'	476
„ Tuberculous	793
Miller's Mouthwash	4
Milliampère	418
Millon's Reagent	862
Mineral Naphtha	522
Mineral Waters, 836; Radioactive	...	608
Minium = Red Lead	557
Miol 746; Mirbane	123
Mistletoe, 10 to 60 gr.	730
Mist. Acidi Borici, 1 oz.	7
„ „ Sulph. c. Opio	505
„ Ætheris c. Ammon., 1 oz.	92
„ Agrimonie Co., ½ oz.	690
„ Alba, ½ to 2 oz.	443
„ Ammoniaci, ½-1 oz.
„ Ammon. c. Aether, 1 oz.	92
„ Amygdalæ, ½-1 oz.	123
„ Anodyna, ½ oz.	456
„ Anticatarhalis, 1½ oz.	559
„ Anti-choleraic (2), 1 oz.	288
„ Anti-dipsom., ½ oz.	239
„ Antispasm., ½ oz.	648
„ Arsenii Quininae et Ferri, ½
to 1 oz.	145
„ Asthmatica, ½ oz.	648
„ Bacelli, ½ to 1 oz.	145
„ Belladonna, Xanthoxyli et
Hyoscy, 6 to 8 mins.	182
„ Bismuthi, 1 oz.	163
„ „ c. Pepsina 1-2 dr.	186
„ Brominol c. Nuc. Vom.,
½ oz.	192
„ Bromoformi, 2-4 dr.	193
„ Butyl-Chloral, 1 oz.	194
„ Calcii Hypoph., 1 oz.	631
„ Camphora, 2 oz.	209
„ Capsici Sed., ½ oz.	220
„ Cascara, 1 dr.	222
„ „ Co., 1 oz.	223
„ Catarrhalis-Anti, 1½ oz.	559
„ Chlori c. Quin., 1 oz.	576
„ Cholera, 1 oz.	288
„ Copaiba, ½ to 1 oz.	501
„ Creosoti, ½ to 1 oz.	250
„ Creta, ½ to 1 oz.	206
„ Cyperi Rotondi, ½ to 1 oz.	298
„ Damiana Co., 1-2 dr.	298
„ Diarrhœa, Bd. Hlth., 1 oz.	288
„ Diuretica, 1 oz.	559
„ Dysmenorrh., ½ oz.	560
„ Ergotæ c. Ferro, 1 oz.	313
„ „ Sedativa, 1 oz.	314
„ Exalgin, 2 to 4 dr.	248
„ Febrifuga, ½ oz.	121

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Mist. Ferri, Aper., 1 oz.	325	Morphina, 1-10 to $\frac{1}{3}$ gr. ...	...	453
" " Aromat., '85, 1 to 2 oz.	325	" Iontophoresis of ...	...	421
" " Arsen., $\frac{1}{2}$ -1 oz.	325	<i>Morphina Acetas</i> , 454; <i>Diacetyl.</i>	...	
" " Co., $\frac{1}{2}$ to 1 oz.	323	and HCl., 1-24 to 1-12 gr., 459;	...	
" " Laxans, 1 oz.	325	HBr., HCl., 455; Meconas, 457;	...	
" " Perchlor loz.	325	Sulphas, 457; <i>Tartras</i> , each 1-8	...	
" " Salina, 1 oz.	325	to $\frac{1}{2}$ gr., 458; <i>Oleatum</i> , (1 to 60)	...	454
" Filicis, 1 oz.	334	<i>Morphina Methyl Brom.</i> , hyp. $\frac{1}{4}$...	
" Gentianæ Alk., 1 oz.	707	$\frac{1}{4}$ gr., ...	...	459
" " Co., $\frac{1}{2}$ to 2 oz.	355	<i>Morphine Habit</i> ...	...	454
" <i>Guaiaci</i> , $\frac{1}{2}$ to 1 oz.	355	" <i>Scopolamine</i> ...	...	390
" <i>Guaiacol</i> , 1 oz.	292	<i>Morphosan. Hypod.</i> $\frac{1}{4}$ to $\frac{1}{2}$ grain...	...	459
" <i>Hepatica</i> , 1 to 2 dr.	223	<i>Morris's</i> (Malcolm), Stain... ..	...	906
" Hyd. Biniodidi, var.	369	<i>Morton's Fluid</i> ...	...	405
" Perchlor., 1 dr.	374	<i>Morue</i> , Huile de Foie de... ..	...	492
" <i>Hydrastis Co.</i> , 1 oz.	383	<i>Morus Nigra</i> ; <i>Moschus</i> , 5 to 10 gr. ...	...	715
" " et Ergot, 1 oz.	383	<i>Moser's Scarlatina Serum</i>...	...	783
" <i>Ichthyol</i> , 1 to 3 dr.	396	<i>Mosetig Battiste</i> ...	...	351
" Iodi Co., 1 dr.	408	<i>Moss Accouchement Sheets</i> , Felt,	...	
" <i>Ipecac. Ammon.</i> 1 oz.	428	Gauze - Covered, Towels, Loose,	...	
" " Salina, 1 oz.	428	Pillows, Soles ...	...	646
" <i>Laxativa</i> , $\frac{1}{2}$ to 1 oz.	223	<i>Mosquitos and Malaria</i> ...	...	904
" <i>Mag. Sulph. Co.</i> , (Mist. Alba),	...		" to ward off ...	...	701
2 to 4 dr.	443	<i>Moss, Irish</i> , 701; 'Mother's advice'	...	747
" <i>Morph. et Phenazon. Co.</i> , 1 oz.	456	<i>Motor Spirit</i> ...	...	522
" <i>Moschi</i> , 1 oz.	716	<i>Mountain Ash</i> , 726; <i>Damson</i> ...	...	725
" <i>Mucilag.</i>	656	<i>Mouth Washes</i> , 75, 110; <i>Permang.</i>	...	448
" <i>Olei Olivæ</i>	495	<i>Mowrah Seeds</i> , <i>Mowrin</i> ...	...	691
" " <i>Ricini</i> , 1 to 2 oz.	496	<i>Mrs. Frost's Remedy</i> ...	...	747
" " <i>Santali</i> , 1 oz.	501	<i>Much's Modified Gram.</i> ...	...	912
" <i>Oleo-balsamica</i> , 1 to 4 dr.	670	<i>Mucilago Acaciæ</i> , ad lib. ...	...	672
" <i>Paraldehydi</i> , 1-2 oz.	106	" <i>Amyli</i> , 12 gr. to 1 oz. ...	...	186
" " et Pot. Iod, 1 dr.	106	" <i>Bismutbl.</i> ...	...	703
" <i>Quininæ c. Ferro</i> , $\frac{1}{2}$ oz. t.d.	571	" <i>Cydonii</i> ...	...	735
" <i>Santali Co.</i> , $\frac{1}{2}$ -1 dr.	623	" <i>Gummi Indici</i> ...	...	724
" <i>Senna Co.</i> , 1 to 2 oz.	505	" <i>Sassafras</i> ...	...	673
" <i>Sodæ cum Opio</i> 2 dr.	679	" <i>Tragacanthæ</i> ...	...	729
" <i>Sodii Valer.</i> , $\frac{1}{2}$ oz.	728	" <i>Ulm</i> , 4 dr. ...	...	223
" <i>Spiritus Vini Gallici</i> , 1-2 oz.	288	<i>Mucogène Caps.</i> , 2 to 3 ...	...	821, 895
" <i>Tereb. Ch.</i> , 1 to 3 dr.	456	<i>Mucin</i> , 5 to 10 gr. ...	...	335
" <i>Thielemanni</i> , av. 30 m.	678	<i>Mucuna Pruriens</i> , 1 or 2 gr. ...	...	895
" <i>Tussi Rubra</i> , $\frac{1}{2}$ -2 dr.	683	<i>Mucus in Stom. Contents</i>...	...	733
" <i>Valerianæ Co.</i> , 1 oz.	137	<i>Mudar</i> ...	...	716
" <i>Zinci Oxid.</i> , 1 dr.	834	<i>Mulberry Juice</i> 715; <i>Mullein</i> , Great	...	730
<i>Mitigated Caustic</i>	715	<i>Müller's Fluid</i> ...	...	559
<i>Mixtura, see Mistura.</i>	...	80	" <i>Formol</i> ...	...	919
<i>Modelling Wax</i>	308	<i>Mulls</i> , 460; <i>Manyon's Preps.</i> ...	...	747
<i>Moebius's Thyroid Serum</i>	746	<i>Murexide</i> , 884; <i>Muscarine</i> ...	...	3, 689
<i>Mollinum and Comps.</i>	667	<i>Mushroom Poisoning, See Fungi</i>	...	
<i>Molybdate Test</i>	26	in Poisons and Antidotes	...	
<i>Momordicin</i> , 1-40 to 1-10 gr.	471	<i>Musk</i> (and artif.), ...	...	715
<i>Monaid Tablets</i>	291	<i>Mustard</i> , 623; <i>Muslin</i> ...	...	352
<i>Monazite</i>	333	<i>Mutton Essences</i> ...	...	473
<i>Monochlorophenol</i>	715	<i>Mydrasine</i> , 171; <i>Myelin</i> ...	...	819
<i>Monosaccharides</i>	733	<i>Myelocene</i> , 10 drops or more	...	819
<i>Monotal</i> , 60-75 gr.	520	<i>Mylabris Phalerata</i>...	...	214, 735
<i>Monssel's Salt & Sol.</i> , 3-6 m.	722	<i>Myrica Acris</i> , 103; <i>Myrica Gale</i>	...	695
<i>Monsonia Ovata</i>	746	<i>Myricin</i> , 2 to 5 gr. ...	...	716
<i>Moodooga Oil</i>	814	<i>Myristica</i> <i>Myristicin</i> ...	...	716
<i>Moorhof's Mixture</i>	709	<i>Myrobalanum</i> , $\frac{1}{2}$ to 1 dr. ...	...	736, 704
<i>Mori Succus</i> , 715; <i>Moroshka</i>	...		<i>Myrosin</i> 623; <i>Murrh.</i> , 5 to 20 gr. ...	...	716
<i>Morison's Pills</i>		<i>Myrtillus</i> (<i>Vaccinium</i>) ...	...	717
<i>Moro's Tuberculin Test</i>		<i>Myrtol</i> , 5 to 15 m. ...	...	717
<i>Morning Glory</i>				

NAME.	DOSE.	PAGE
Myrtus Chekan	...	700
Naftalan	...	717
Naphthalene, 2 to 15 gr....	...	462
„ Tetrachlor. (HCl.), 3 to 12 gr.	463
Naphtha Mineral	...	522
„ Solvent, 246; Wood	...	104
Naphthalol, 3 to 8 gr.	462
Naphthamine, 5 to 15 gr....	...	551
Naphthol a-2 to 5 gr. or more	...	461
„ β -, 3 to 10 gr. max., 15 gr.	...	461
„ Benzoate	...	461
„ Bismuth, 10 to 30 gr....	...	190
„ Camphor	...	462
„ Charcoal	...	461
„ Salicyl.	...	462
Naranja, F. E. = Aurantii Amaræ Cortex	...	
Narceina, 1-8 to 1 gr.	717
Narcotina, 1 to 3 gr.	463
Narcyl, 1 gr. p.d. 717; Nargol	...	226
Nasal Douches (et v. Collunaria)	...	217
„ Bougies	...	191
„ Ozonic Inhaler	...	450
Nasgar Medium	...	766, 902
Nastin and Comps.	30, 491,	773
Natrium Sulph. Sic.—(For other salts see Sodii) $\frac{1}{2}$ to 2 dr.	...	641
Nativelle's Digitaline Granules	$\frac{1}{10}$ gr. ...	304
„ „ Solution, 1 Co.	...	304
Nauheim Baths, 204; Salts	...	640
Neatsfoot Oil...	...	821
Nebulæ	...	464
Nebula Acid Boric	...	464
„ Acid Lactic	...	42
„ Acid Tannic, T.H....	...	464
„ Alkalina	...	464, 632
„ Alumina, 5 to 15 gr. to oz.	...	
„ Analgesic	...	464
„ Antiasthmatica	...	169
„ Antipyrini	...	464
„ Antiseptic	...	464
„ Asthma	...	464
„ Catarrh	...	464, 465
„ Cocainæ HCl.	...	263
„ Cocainæ Co.	...	464
„ „ Oleosa	...	259
„ Creosoti Co....	...	465
„ Cupri Sulph.	...	464
„ Diphtheria	...	464
„ Eucain HCl.	...	269
„ Eucalypti, T.H.	...	464
„ „ Co.	...	317, 318
„ Ext. Supra-renal	...	464, 825, 826
„ Ferri Perchlor.	...	324
„ Hay Fever	...	464
„ Iodoformi, 40 gr. to oz.	...	
„ Ether	...	
„ Iodi Co.	...	465
„ Lobelinæ Co.	...	464
„ Menthol (& Co., 465)	...	452
„ Phthisis	...	465
„ Pini Co.	...	465

NAME.	DOSE.	PAGE
Nebula Potass. Chlor. c. Ferro...		465
" Potassii Permang. T.H....		464
" (Potass. Permang 1 gr.		
" Sodii Chloridi 5 grs.		
Water to 1 oz.)		
" Quin. Antiseptica ..		464
" Resorcini ..		610
" Sodii Bicarb. ...		632
" " Salicyl., 20gr. to oz.		
Aq.		
" Stimulant ...		465
" Suprarenal ...		464
" Tonic... ..		465
" Zinci Chlor vel Sulph., 10		
to 25 gr. in oz.		
" " Sulphocarb., 5 gr. to		
oz.		
Nectandrine ...		695
Neelsen's Solution ...		910
Neem, Nim, 733; Negative Phase		803
Neisser's Stains ...		900
" Treatment (Syphilis) ...		377
Nelli, 704; Nelson Lloyd's Treat-		
ment ...		747
Neodymium, 226; Neoform ...		26
Nepaul Aconite ...		688
Nepenthe, 5 to 30 m. ...		507
Nernst Lamps, 226; Neroli Oil ...		173
Nervelettes, 747; Nervol... ..		747
Nesfield's Sterilising Tablets ...		634
Nessler's Solution ...		886
Nettle, 34; Neuralgic Pills ...		195
Neuralgic Powders, 16 gr. ...		197
Neuraline, 747; Neurine, ... 3,		471
Neuronal, 15 gr., 245; Neutral Red		922
Neutralisation Table ...		924
'New' Cacodyle ...		152
New Skin ...		283
Niccolum and Salts... ..		717
" Carbonyl ...		892
Nicholson's Blue ...		4
Nicotina, 1-6 to 1 gr. ...		717
Nicotinæ Salicylas ...		717
Nightshade, deadly... ..		176
" black, Woody ...		726
Nilcamam, 704; Nirvanin... ..		270
Nisbet's Specific ...		501
Nisal's Stain, 902; Nitre... ..		665
Nitrated Papers ...		565
Nitragin, Nitrifying Bacteria ...		918
Nitrite $\frac{1}{2}$ - 1 m. by mouth 2-5 m. }		
of Amyl $\frac{1}{2}$ inhaled }		124
Nitrobacterin, 918; Nitrobenzene		123
Nitro-celluloses ...		281
Nitro-erythrite, $\frac{1}{2}$ to 1 gr... ..		314
Nitroglycerin, 1-200 to 1-50 gr; incr.		465
" Solution, $\frac{1}{2}$ - 2 m. incr. ...		466
Nitroglycerin Tablets, 1-600, 1-400,		
1-200, 1-100, 1-75, 1-50 & 1-25 gr.,		
also 1mg. (See also Tabellæ.),		
466 et seq.		
Nitro-mannite, 1 gr., 315; -propiol		879
Nitrometer, Allen's... ..		124
Nitroso-Nitrate of Mercury ...		866

NAME.	DOSE.	PAGE
Nitrous Oxide, 119; Nizin...	...	245
Noguchi's Diagnosis Method	...	909
Non-Electrolytes	...	414
Nopalea, 697; Nordhausen Acid...	...	80
Normal Saline Solution	...	628
Normyl Treatment	...	102
Norton's Pills, 747; Novaspirin,	...	73
10 to 15 gr.	73
Novaspirinoids, 5 gr.	271
Novocain, $\frac{1}{2}$ to 1 gr.	272
" -Suprarenin	...	273
" with Mannitol	...	273
" " Strychnine...	...	273
Nourry's Iodinated Wine...	...	409
Nuclein, Nucleol, 15 gr.	225
Nucleogen Tablets, 2 thrice daily	...	226
Nucleo-proteids	...	471 et seq.
Nucleotin - phosph. Acid...	...	831
Nutmeg, 716; Nutrimenta...	...	471
Nutrient Powder, Brand's...	...	475
Nux Vomica, 1 to 4 gr.	483
Nylander's Reagent...	...	879
Oak Agaric, 691; Oak Bark	...	732
Ochre 326; Odol	...	75
Oenanthe Crocata	...	718
Ogle's Drops, 1 dr., 456; Ohm's	...	418
Law	...	481
Oidium Albicans	...	481
Oil, Camphor, 208; Carron, 206;	...	79
Sterilised, 124; of Lemon Grass,	...	736
736; of Mirbane, 123; of	...	736
Verbena	...	79
Oil of Vitriol,	66, 736
of Wintergreen	...	496
Oils, Emulsifying of, in Mixtures	...	218
Oiled Calico, Silk, etc.	...	218
Oiled Silk Dextrinised	...	218
Okol. See Sanitas Okol.	...	486
Olea Essentialia, P. Off	...	487
Olea Europæa, 494, Oleanodyne	...	487
Oleate, 486; Prepn. of	...	89
Oleatum Aconitine, 1 in 50	...	259
Cocainæ, U.S.	...	488, et seq.
Hydrarg., 5 to 25%	...	488
" c. Morph	...	489
" c. Sulph.	...	407
Iodi	...	454
Morphinæ, 1 in 60	...	486
Quininæ	...	681
Veratrinæ, 1 in 50	...	291
Oleo-cresote, 10 to 30 m.	...	523
Oleogen, Camphor 20%, Guaiacol	...	334
20%, Ichthylol 10%, Iodi 5 and	...	218
10%, Menthol 2%, Salicyl. 10%...	...	295
Oleo-res. Aspidii, 30 gr.	...	719
" Capsici	...	69
" Cubebæ, 5-30 m.	...	736
" Piperis, U.S., Av. $\frac{1}{2}$ gr.	...	690
Oleosaccari, F. Ital., q.v.	...	124
Oleum Acidi Salicylici	...	736
Adipis=Lard Oil	...	690
Ajowan, $\frac{1}{2}$ to 3 m.	...	124
Allii Essent., $\frac{1}{2}$ -1 m.	...	736
Amygd., 122; Sterilisat	...	124

NAME.	DOSE.	PAGE
Oleum Amygd., Ess. (et s. HCN)	...	122
Persicæ	...	122
Anethi, $\frac{1}{2}$ to 3 m.	...	691
Anisi, $\frac{1}{2}$ to 3 m.	...	692
Anthemidis, $\frac{1}{2}$ -3 m.	...	692
Arachis	...	736
Aseptice	...	124
Atropinæ	...	170
Aurantii Cort.	...	173
Terpeneless	...	173
Bergamot	...	713
Betulæ, U.S., 555; Pyrolig.	...	555
Cadinum	...	554
" Acetic	...	555
Cajuputi (U.S., 55% vol.	...	696
Cineol, $\frac{1}{4}$ -3 m.	...	208
Camphoræ	...	209
Camphorat.	...	19
Carbolicum	...	698
Carui, $\frac{1}{2}$ to 3 m.	...	698
Caryoph., $\frac{1}{2}$ -3 m.	...	240, 698
Cassiae, $\frac{1}{2}$ -3 m.	...	699
Cedri var.	...	491
Chaulmoogra, 5-10 m. incr.	...	700
Chenopodii, 3 m.	...	234
Chloroformii	...	358, 361
Cinereum, 10 m.	...	240, 698
Cinnamomi, $\frac{1}{2}$ to 3 m.	...	241
" Leaf	...	713
Citron	...	701
Citronellæ	...	259
c. Cocaina, 2%	...	500
Copaibæ, 5 to 30 m.	...	702
Coriandri, $\frac{1}{2}$ -3 m.	...	718
Crotonis, $\frac{1}{2}$ to 1 m.	...	295
Cubebæ, 5 to 20 m.	...	704
Erigeron, 5 to 30 m.	...	497
Eserinæ	...	316
Eucalypti, $\frac{1}{2}$ -3 m.	...	555
Fagi Pyrolig.	...	705
Feniculi, 5-15 m.	...	736
Gaultheriæ, 10 m.	...	209
Gossyp. Sem.	...	736
Graminis Cit.	...	491, 736
Gynocardia, 5 to 60 m.	...	720
Hedeomæ, U.S.	...	172
Homatropinæ	...	172
" c Cocaina	...	172
Hyd. Biniodidi, 1 Cc.	...	368
Hyoscine	...	389, 497
Hyoscyami	...	393
Iodi	...	407
Jecoris c. Benz. Ferric...	...	494
Juniperi, $\frac{1}{2}$ to 3 m.	...	710
" " Ligni	...	555
" Pyrolig.	...	554
Lauri	...	712
Lavand., $\frac{1}{2}$ to 3 m.	...	712
Limonis, $\frac{1}{2}$ to 3 m.	...	712
" Terpeneless	...	712
Lini, 713; Lubricans	...	19
Maidis	...	714
Menthæ Piperitæ, $\frac{1}{2}$ to 3 m.	...	450
" Viridis, $\frac{1}{2}$ -3 m.	...	450

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Oleum <i>Morrhua</i> , 1 to 4 dr. ...		492	<i>Opium</i> , Deodoratum, 1 gr. ...		504
" " Aromat., 1 to 4 dr. ...		494	" Granulat., 1 gr. ...		504
" " c. Creosot, 1 to 4 dr. ...		290	Opocerebrin ...		820
" " Phosphorat 1 to 4 dr. ...		529	Opsonins, Opsonic Index (Refs. 804, 806) ...		797, 802
" " o Quin. ...		487	Opsonic Index and when to operate ...		806
" Myrcia ...		103	" " as Diagnostic 802 <i>et seq.</i> ...		
" <i>Myristica</i> , 1/2-3 m. ...		716	" " variations in ...		804, 809
" Myrti ...		717	Opticine ...		820
" Neatsfoot ...		821	Oquit, 747; Orange Bloss. Specif. ...		747
" Neroli ...		173	Orethite Fluid ...		823
" Nitroglycerini, 1%, 1 to 2 m. ...		466	Ordeal Bark, 315; " Beans ...		534
" Nuclei Arachidis, ...		692	Orexine Tannate, 4 to 8 gr ...		251
" <i>Olivea</i> (sterilised 495), 1/4 to 1 oz. ...		494	Organic Analysis Chart—Sep. Volume ...		
" Origani ...		718	Organic Arsenic Compounds ...		149
" Paraffini ...		522	Organotherapy, 818; Orge ...		398
" Pedum Tauri ...		821	Organum Sp., 718; Orizabin, 1 to 5 gr. ...		433
" Petrolei (& Flav. 521) ...		522	Ormesukker ...		615
" Phosphorat., 1 to 6m ...		529	Oro-nasal Inhalations ...		291, 450
" Pici Rect ...		554	Orphol 190; Orpiment ...		156
" Pilocarpinae ...		497	Orris Root, 429; Orseille de terre ...		62
" <i>Pimenta</i> , 1/2-3 m. ...		719	Orthoform, 1 1/2-3 gr., HCl. ...		271
" <i>Pini Pumil.</i> and <i>Sylvestris</i> ...		548	Ortho-Krerolum ...		13
" <i>Ptychotis</i> ...		736	" meth.-amino-phen.-sulph. ...		481
" <i>Pulegii</i> , 720; <i>Rapii</i> ...		495	Ortol, 481; Osazone Cryst. ...		871
" Resinae Empyr. ...		60, 721	Osborne's Mixture ...		747
" <i>Ricini</i> , 1 to 8 dr. ...		493	Osmium Tetroxid., 1-64 gr. ...		688
" " Aromat., " ...		496	<i>Otto of Rose</i> ...		497
" <i>Rosa</i> ...		497	Quabain, 84, 651; Ourari, 1-20 to 1/2 gr. ...		703
" <i>Rosmarini</i> , 1/2-3 m. ...		498	Ovaltine, 747; Ovariectomy Aprons ...		218
" <i>Ruscii</i> Pyrolig. ...		555	Ovary Juice, Ovarin ...		821
" Sabinæ, U.S., 1-4 m ...		723	Oroferrin ...		328
" <i>Santali</i> , 5 to 30 m. ...		499	Ovo-lecithin, 436; Granules, Inj., Pills, Tabs. ...		437
" <i>Sassafras</i> ...		723	Ovules, see List ...		508, 509
" <i>Sesami</i> ...		192, 736	" Cupri Oleat ...		488
" <i>Sinapis Express.</i> & <i>Volatile</i> ...		624, 625	" Mass. ...		508
" " <i>Æthereum</i> ...		625	Owbridge's Lung Tonic ...		747
" <i>Staphisagriae</i> ...		726	Oxaphor, 30 to 60 m. ...		210
" <i>Saccini</i> , 1 to 5 m. ...		727	<i>Ox Bile</i> , 5 to 15 gr. ...		320
" <i>Terebinthinae</i> , 2 to 10 m., as Anthelmintic, 3 to 4 dr. ...		546	Ox Heart Extract (Antigen) ...		784
" " Rectif. and <i>Æthereum</i> ...		546	Oxlen ...		747
" <i>Theobromatis</i> ...		663	Oxybenzylidin Arsanilic Acid ...		161
" <i>Thymi</i> , U.S., 3 m., ...		669, 718	Oxybutyric Aldehyde ...		109
" <i>Tiglii</i> , U.S., 1 m. ...		718	Oxy camphor, 15 to 30 gr. ...		210
" <i>Valerianæ</i> , 1-5 m ...		678	Oxy-chinolin Sulph. ...		247
" <i>Veratrica</i> ...		681	Oxy-cinnamic Anhyd. ...		288
<i>Oliveri Cortex</i> ...		736	Oxygen ("solid," 388) 509; Baths, 10; Cylinders, Inhaln. Bag, 510; Oxygenator, 388; Water ...		10
Oliver's Test ...		864	Oxyhaemoglobin ...		474
" Haemomanometer ...		872	Oxylithe ...		388, 511
Omphalea Sp. ...		718	<i>Oxymel</i> , 1 to 2 dr., i; <i>Scilla</i> , 1/2 to 1 dr. ...		724
Onguent Napolitain ...		363	" <i>Urginea</i> , 1/2-1 dr. ...		738
" Populeum ...		182	Oxymethylene ...		111
Opal Blue ...		4	Oxyphenyl-alanin-a. ...		864
Ophthalmic Bottle ...		169	Oxyperceina (and HCl.), 1/2 to 1 1/2 gr. ...		645, 646
" Lamellæ, see Lamellæ ...			Oxytoluyltropelne ...		167
Ophthalmic Reaction ...		812			
Opil et Ipecac. Pulv. Co. F.I. ...		428			
Opium, Anti, Plant ...		508			
Opium, 1/2 to 2 gr., ...		532			

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Ozerine, 747; Ozokerite...	...	519	Pasta Iodoformi Cinnam. ...	...	401
Ozoniser, Eos.	510	„ Londinensis ...	...	635
Ozone, 510; Ozonio Ether, $\frac{1}{2}$ to	...	450	„ Plumbi c. Cupro ...	...	556
1 dr. 387; Inhalers	450	„ Potass c. Calc. ...	...	635
Ozoniser, Eos	510	„ Resorcini, Fort. Mitis, et c. ...	...	611
'P.T.O.', 810; 'P.T.R.'	798	„ Zinci Oxido... ..	...	661
Paarde-Pram...	731	„ Theobromat ...	...	664
Paciderma Cream	747	„ Unna, 683; Vienna ...	...	635
Page-Woodcock's Pills	747	„ Zinci c. Amylo ...	...	684
Pagenstecher's Ointment...	381	„ „ Composita ...	...	684
Pakes' Discs	922	„ „ et Gelatini ...	...	683
Palladium Chloride	892	„ „ V.C.H. ...	...	683
Palmetto, 724; Palmitin, 359; Pan	...	733	Pasteurisation of Milk ...	...	478
Panama Bark	721	Pastilles, Asthmatic... ..	...	565
Pancreatic Diastase...	513	„ or Jujubes v. Trochisci ...	...	348
„ Emulsion, 1 to 3 dr.	515	„ Réglisse ...	...	342
„ Solution, 1-2 dr.	513	Pastilli, Glyco-gelatin ...	...	8
Panoreatinum, 2 to 4 gr.	513	„ Acid Boric ...	...	23
„ Fluid Experimental	544	„ Acidi Carbolic, $\frac{1}{4}$ gr. ...	...	118
Pane and Renzi's Pneumo. Serum	...	778	„ Ammon. Brom., 1 gr. ...	...	223
Pankreon 516; Pansy, 10 to 60 gr.	...	730	„ Cascara ...	...	257
Panopeptone	747	„ Cocæ Ext., $2\frac{1}{2}$ gr. ...	...	263
Papain, 1 to 8 gr.	335, 518	„ Cocainæ HCl. $\frac{1}{10}$ c. Antipyrin	...	263
Papaver Somniferum	502	3 gr. ...	...	263
Papayotin, 1 to 8 gr.	518	„ Cocainæ HCl., 1-10 gr. (et	...	263
Papaw Juice, 518; Papine, 1 dr.	505	c. Morphina) ...	...	278
Pappenheim's Stain...	902	„ Codeinæ $\frac{1}{4}$ gr. ...	...	287
Para-acet-phenetidin, 5 to 10 gr.	251	„ Convallariæ ...	...	111
Paracarmine Mayer...	874	„ Lysosorum ...	...	452
Paracoto Bark	287	„ Menthol $\frac{1}{4}$ gr. ...	...	455
Paracotoin, $1\frac{1}{2}$ to 3 gr.	288	„ Morphinae $\frac{3}{10}$ gr. ...	...	720
Paracresol	13	„ Pyrethri ...	...	727
Paraffin, Dur. (& Sterilised)...	519	„ Tamarind Co. ...	...	740
„ Liq. (Sterilised) 124, 522, 699	...	520	PATENT MEDICINES ...	...	356
„ Mollæ	520	Paulinia Sorbilis ...	...	290
Paraform, 111, 856; Collodion	111	Pautauberge's Sol., $\frac{1}{2}$ oz. ...	...	877
Paraguay Tea	198	Pavy's Cupric Test ...	...	877
Paraldehydum, $\frac{1}{2}$ to 2 dr.	105	Pavy-Fehling Sol. ...	...	122
„ Capsules, 20, 30, 40 m.	...	106	Peach Kernel Oil ...	...	692, 736
Paramidophenol HCl. P.J.i./07, 208	...	26	Pear Essence, 123; Pearl Disease	...	793, 810
(Photo. developer).	...	26	Pearson's Antiseptic Fluid	...	17, 18
Paramonochlor phenol	907	„ As. Solution ...	...	527
Paranephrin, 826; Parangi,	729	Peguin ...	...	718
Paraphenetidine Vanill.-Ethyl Carb.	...	248	Pelargonium, 5 to 20 gr. ...	...	907
„ Lactate	244	Pellagra ...	...	684
Paraphenylenediamine	834	Pellanthum and Comps. ...	...	524
Parathyroid Preps.	916	Pelletierina, 3 to 6 gr. ...	...	525; Sulph.
Paratyphoid Bacillus	506	Pelletierinae HBr., 525; Sulph.	...	524
Paregoric (Scotch, 508), $\frac{1}{2}$ to 1 dr.	...	718	Tannas (5 to 8 gr.) and	...	335, 524
Pareira (Av. U.S., 30 gr.)...	...	620	Comps ...	...	693
Parillin	522	Pellotine, 1-3 to 2-3 gr. ...	...	720
Parogens, 524; Paroleine...	330	Pennyroyal ...	...	129
Parrish's Ch. Food, $\frac{1}{2}$ -2 dr.	747	Pentasulfure d'Antimoine ...	...	523
Parr's Life Pills	701	Pentoses, 880; Pentyl Hydride ...	...	719
Parsley 139, 689; Piert, 690; Wild	...	718	Pepo, av. 1 oz., 718; Pepper ...	...	631
Passiflora	69	Peps, 747; Pepsalia ...	...	525, 526 et seq.
Pasta Acid. Salicyl...	146	Pepsin (Soluble and Insol.) 5 to 10	...	544
„ Arsenicalis (& Arsenios)	189	gr., ...	...	527
„ Bismuthi Beck	684	„ Fluid, Experimental ...	...	525
„ Carbonis et Zinci	111	„ with Diastase ...	...	527
„ Formalini...	397	Pepsine Amylacée, Lactosée ...	...	527
„ Ichthyol et Ol. Tereb.	410	Pepsin. Saccharat. ...	...	864
„ Iodi et Amyli	408	Peptone, 527; Bile Test ...	...
„ „ et Picis	

NAME.	DOSE.	PAGE
Peptone Test for in Urine...	...	863
„ Water	920
Peptonised Beef	527
„ „ Essence	473
„ „ Jelly	515
„ „ Suppos.	527
„ „ Chicken Jelly,	515
„ „ Milk	478, 514
Peptonising Powder for humanis- ing Milk	515
„ Powders	515
Peptonoids of Beef	528
Perborates, 10; Perborol	10
Percentage Table	930
Perchloride, <i>see</i> Hyd., also Sol- ubles.	...	
Perenyi's Solution	874
Perhydrol, 385; Periwinkle	730
Periodic Table of Elements	926
Peritonitis	905
Perlea Apiol, 3 m., 1 or 2	133
„ Camph. Monobr., 2 gr.	211
„ Carbolic Ac., 1, 2 gr.	23
„ Chloroform, 3 m.	235
„ Creosote, 1, 3 m.	290
„ Ether, 3 m., 1 to 4	92
„ „ 2 m., c. Tereb., 3 m., 1 to 4	92
„ Guaiacol, 1, 2, 3 m., 1 or 2	282
„ Izal, 2 m. (Caps.), et c.	
„ Ol. Morrh., 5 m.	14
„ Phosphorated Oil, $\frac{1}{16}$ m., $\frac{1}{8}$ m., and $\frac{1}{4}$ gr., 1 or 2	519
„ Quin. Sulph., $\frac{1}{16}$ gr.	576
„ Tar, 1 or 2	553
Perlsuchtbazillen Emulsion	811
„ Tuberculin	795
„ „ Original	810
Peroxide Hydrogen, $\frac{1}{2}$ to 2 dr., 385; of Sodium	389
Perry Davis Pain Killer	747
Persio, 62; Persulphates	640
Peru Balsam, 5 to 15 m.	694
Pertussin, 1 to 4 dr.	729
Pessar-Suppositories	343, 659
Pessaries, Mass for	343
„ Hollow, 343 (<i>q.v.</i> for list); Rubber	218
„ with Cacao Butter, 15, 20 (flat shape), 60 or 120 gr. —	...	
Pessus Acidi Borici, 10 gr.	8
„ Tannici, 10 gr.	82
„ { Acid Tannic, 10 gr. } „ { Morphine, 1 gr. }	...	
„ Atropinæ, $\frac{1}{8}$ gr.	170
„ Bellad. Ext., $\frac{1}{2}$ gr.	141
„ Bismuthi Oxichlor., 10 gr.	147
„ Boroglyceridi, 70 gr.	7
„ Chloral Hydrate, 10 gr.	
„ Cocainæ, $\frac{1}{2}$ gr.	264
„ Coninæ, $\frac{1}{2}$ m.	286
„ Glycerin	343
„ Ichthyol	396

NAME.	DOSM.	PAGE
Pessus Iodoformi, 1, 3 or 5 gr., & c. Eucalypt. Oil, 5 m.	401
„ Morphine, $\frac{1}{2}$, 1 gr., et c. Bellad. Ext., 2 gr.	
„ Opil Pulv., 2 and 3 gr.	
„ Plumbi Iodidi, 5 gr. (et c. Atropina, $\frac{1}{8}$ gr.)	
„ Potassii Bromidi, 10 gr.; Potass. Iodidi, 10 gr.	571
„ Quin. HCl, 3 to 5 gr.	
„ Zinci Ox., 10, 15 gr.	
„ Zinci Sulphcarb., 5, 10 gr.	
Petechial Fever	765
Petit's Liquor	305, 342
Petrol, 522; Petrolatum, U.S., 520, 521; Liq.	522
Petroleine	523
Petroleum, 522; Benzine, 246, 522; Cerate, 521; Emulsion, 1 to 4 dr., 521; Ether, 522; Jelly, 520; Spirit	522
Pétrole léger	523
Pettenköfer's Test	864
Petty Spurge, 319; Peumus Boldus	695
Pfefferman's Compress	747
Pharaoh's Serpents	382
Pharbitis Hispida	700
Pharbitis Nil...	735
Phaseolus Rad.	718
Phellandrene	317
Phelps Brown's Restorative	748
Phenacetinum, 5 to 10 gr.	251
„ c. Caffein. Eff. 1-2 dr.	252
Phenalgine, 5 to 20 gr.	244
Phenazonum, 5 to 20 gr.	252
„ Kff., 5, 10, 15 gr. in dr.	253
„ Salicyl.	254
Phenetidin, 251; Phenobromate	26
Phenocoll HCl., 7 to 15 gr.	255
„ Salicyl., 10-30 gr.	255
Phenol, 1 to 3 gr.	11, 12
„ Bismuth, 10 to 30 gr.	180
„ Iodized, 22; Lotion	19
„ Mercury, $\frac{1}{2}$ to 2 gr.	365
„ Phthalein (as a Test, 893), $\frac{1}{2}$ -8 gr.	25
„ Phthalin	39
„ Sod.-Sulphoric.	497
„ Sodique	22
Phenolax, $\frac{1}{2}$ to 8 gr.	25
Phenoloids	13
Phenoloid Disinfectant	19
Phenosalyl, 1 to 2 m.	26
Phenyl-acetamide, 1-3 gr.	242
Phenyl-acetyl-Salicyl, 15 gr.	73
„ -amine	244
„ -carbonate	675
„ -dihydro-quinaz. Tannas., 4 to 8 gr.	251
„ -dimethyl-iso-pyrazolone, 5 to 20 gr.	252
„ hydrate, 1 to 3 gr.	11
„ -hydrazine	879
„ Salicyl., 5 to 15 gr.	75

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Phenyl-urethane, 3 to 6 gr. ...		677	Pilocarpina ...		431
Phenylene-diamine ...		886	Pilocarpine HCl., 1-20 to $\frac{1}{2}$ gr. ...		431
Phloridzin ...		250, 718	„ Nitras, 1-20 - $\frac{1}{2}$ gr. ...		432
Phloroglucin Sol. ...		894	„ Phenas ...		432
„ Formalin Test ...		890	„ Salicyl., 1-20 - $\frac{1}{2}$ gr. ...		432
Phorxal, 708; Phosgene ...		675	Pilocarpine Hair Lotion ...		432
Phosferline ...		748	Pilocarpus Jaborandi ...		430
Phosphates, Sacchar. Wheat ...		534	„ Microphyll. etc. ...		430
Phosphates in Urine ...		882	PILULÆ ...		538
‘Phosph.- ammon - Phenyl-acet- amide,’ 5 to 20 gr. ...		244	Pill Excipients, 538; Gelatin-ctg., 539; Keratin, 539; Pearl, Sugar- ctg., 539; Salol-ctg., 540; Stearin Coating, 541; Varnishing ...		539
Phosphorated Cod L. Oil, 1 to 4 dr. ...		529	Ac. arsenics, 1-50 gr. ...		145
„ Oil, 1 to 5 m. ...		529	{ Quin. Sulph., 1 gr. ... }		
„ Suet, 1 in 10 ...		530	{ Strych. Sulph., 1-64 gr. ... }		
Phosphor-Iodipin ...		407	{ Phosphori, 1-50 gr. ... }		
Phosphorus, 1-100 to 1-20 gr., 528; Perles, 1-65 and 1-32 gr. 529		529 et seq	Acidi Arsen. $\frac{1}{120}$ to $\frac{1}{30}$ gr. ...		145
„ Pills ...		282	Ac. Arsen et Ferri Redact. ...		145
Photoxylin ...		282	Acidi Carbolici, 2 gr. ...		23
Photographic Developer ...		628	Aconiti Rad., $\frac{1}{2}$ gr., 1 hourly ...		86
Physiological Salt Solution ...		762	Aconitinae, 1/600, to $\frac{1}{300}$ gr. ...		87
„ Standardisation ...		534	Addison's ...		362
Physostigma, Sem., 1 to 4 gr. ...		536	Alginoid Iron and Comps. ...		690
Physostigmina, 1-100 to 1-50 gr. ...		536	Aloes Barb., 4 to 8 gr. ...		113
„ HBr., Salicyl, Sulphas, 1-80 to 1-20 gr. ...		536	„ Cascara et Hyos. ...		113
Phytin, Pulv. Liq. Cachets 8 gr., Caps., Tabs. 4 gr. ...		534	„ et Asafetida, 4 to 8 gr. ...		113
Phytolaccin, 1 to 5 gr., 719; Pichi Pieric Acid as Sugar Test ...		880	„ et Ferri; Aloes et Myrrha, 4 to 8 gr. ...		113
„ Wool, Gauze ...		64	„ Nuc. Vom. et Bellad. ...		114
Picrocarmine, 874; Picro-nigrosin, 874		874	„ Socot., 4 to 8 gr. ...		114
Picro-Sulphuric Acid ...		874	Aloin, 1-10 and 1 gr. ...		115
Picrorhiza, 10 to 50 gr. ...		736	„ Co., 1 a. cib. ult. ...		115
Picro-Saccharometer ...		880	„ Strych. et Bellad. ...		115
Picrotoxinum, 1-100 to 1-25 gr. ...		537	Aloin $\frac{1}{2}$ gr., Podoph., $\frac{1}{2}$ gr., Ext. Cascara, 1 gr., Ext. Bellad., $\frac{1}{2}$ gr., Oleores. Capsici, $\frac{1}{2}$ gr.		
Pierre's Eau Dentif. ...		75	Alterativa S.H. :—		
Pigment. Acidi Tannici ...		339	{ Pil. Hyd., 2 gr. }		
„ Antiseptic. ...		22	{ Pil. Rhei. Co., 3 gr. }		
„ Argent Nit. Ether ...		138	Antidipsom :—		
„ Benzoini ...		4	{ Strychnine 1/60 gr. }		
„ Casein ...		482	{ Atropine 1/200 gr. }		
„ Chloral et Camph. et Co. 228		228	{ Quin. Sulph. 2 gr. }		
„ Chrysarobini, et c. Pyro- gallol ...		236	Antimonii, Coniet Quin. ...		131
„ Cocaine et Hydrargyri		266	Aperiens = Hyd. Col. Ipec. et Hyos. “78” U.C.H. ...		
„ Perchlor ...		374	Argent. Cyanidi, 1-60 gr. ...		135
„ contra Tineam ...		324	„ Nit., $\frac{1}{2}$ gr.; et c. Morph. $\frac{1}{2}$ gr. ...		138
„ Ferri Perchlor. ...		293	Arsamin, $\frac{1}{2}$ gr. ...		154
„ Guaiacol ...		408	Arsenicallis, $\frac{1}{120}$ to $\frac{1}{30}$ gr. ...		145
„ Iodi ...		408	„ et Strych., $\frac{1}{50}$ gr. ...		145
„ Iodi et Aconiti ...		408	Arsen. Hyd. Iodid. ...		147, 368
„ „ Aethereale ...		408	„ Ferri, et Hyd. Iod., 1 or 2		368
„ „ Carbol. ...		22	Asafetid. Co., 4 to 8 gr. ...		145
„ „ Oleatum ...		407	Asiaticæ, 1 or 2 daily ...		153
Pigment. Iodi et Olei Picis ...		408	Atoxyl, $\frac{1}{2}$ gr. ...		170
„ Iodoformi, v. Collod. ...		400	Atropinæ, 1-120 to 1-60 gr., 1 h.s.		170
„ Lactic. Ac. Bacillorum ...		52	„ Arsen, et Quin. ...		175
„ Mandl ...		408	Auri Chloridi, $\frac{1}{50}$ to $\frac{1}{2}$ gr. ...		302
„ Menthol ...		450, 462	Baillie ...		460
„ „ c. Guaiacol ...		452	Beta-Naphthol., 3, 5 gr. ...		
„ Thymol, 670; Trypsin ...		517			
Pilene, Imperm. Spong. ...		352 353			
Pilewort and Suppos. ...		609			

NAME.	DOSE.	PAGE.	NAME.	DOSE.	PAGE.
<i>Pilulæ</i> —			<i>Pilulæ</i> —		
<i>Bland's Ferruginous</i> , 5 to 15 gr.		322	Ext. Bellad., $\frac{1}{2}$ gr., $\frac{1}{2}$ gr., $\frac{1}{2}$ gr.,		
Butyl Chloral, 3 gr. ...		195	Ext. Nucis V., $\frac{1}{2}$ gr., $\frac{1}{2}$ gr., $\frac{1}{2}$ gr.,		
{ " Hydr., 3 gr. ... }		195	Salol, 2 or 3 gr. (Mayo Robson).		
{ Gelsemininæ HCl., 1-200 gr. }			Extr. Cannab. Ind., $\frac{1}{4}$ to 1 gr.		213
Caffeinæ, 3 gr. ...		196	Fæxin Ext., 3 gr. ...		224
Calcil Chlorid ^l gr., 5 ...		202	Fel Bovini et fœni græci. ...		320
Calc. Sulph., 1-12 to 1 gr. ...		207	Ferri Arsen. (et c. Strych HCl.		
<i>Cambog.</i> Co., 4 to 8 gr. ...		114	gr. 1-60) ...		145
Camphoræ ...		210	" (<i>Bland</i>), Carb. 5 to 15 gr.		322
" Monobrom, 3 gr. ...		211	" Carb. Sacch., 4 gr. ...		322
" Salicyl., 1 to 5 gr. ...		211	" Glyceroph., 1 c.cib. ...		61
Cannabin Tann., 2 to 4 gr. ...		213	" Hypoph. c. Strych., 2 or 3 p.d.		532
Capsici Co. ...		218	" Iodidi, 3 to 8 gr. ...		329
Cascara Ext., 2 gr.			" Quin. et Strych. Phosph.		
" Co., 1 h.s. ...		223	(et c. Arsen.) ...		332
Cathartic Co., U.S.:—			" Sulph. Kxs., 3, 5 gr. ...		333
Ext. Col. Co., 2½ gr.;			" Redact. 1, 2 gr. ...		321
Gamboge, ½ gr.; Hyd. Sub-			Ferri Redacti, 1 gr., Ext Nux.		
chlor., 2 gr.; Jalap Res., ¾			Vom. ¼ or ½ gr. ...		
gr., approx. in 2 pills for av.			Ferri Sulph., 1 gr. c. Strych.,		
dose			1-30 gr. ...		
Cathartic Co. Vegetabiles, U.S.:—			<i>Galbani Co.</i> , 4 to 8 gr. ...		706
Ext. Col. Co., 2 gr.; Ext. Hyoscy.			Garrodii ...		330
1 gr.; Jalap Res., ¾ gr.; Lep-			Gossypii Co., 3 or 4 dally..		354
tandra Ext., ½ gr.; Podoph.			Gout—		
Res., ½ gr.; Peppermint Oil,			Pil. Hydrarg gr., 1; Ext. Col-		
¾ m., in 2 pills for av. dose			chici gr., ¼; Pil. Col. c.		
Chlorure Mercurique Opiacées		375	Hyos. gr. 1½.		
Cocainæ HCl., ½ gr. ...		263	Gregory = Col. Co ...		284
Codeinæ Co., ¼ to 2 gr. ...		278	Guaiacol, 1 to 3 gr. ...		292
<i>Colocynth.</i> Co., 4 to 8 gr. ...		284	Guy's ...		302
" et Hyos., 4-8 gr. ...		284	Hænni, Belg. = Aloes Pilulæ Co.:		
" c. Ipecac. Aperient,			Aloes 0'1, Scam. Res. 0'03,		
U.C.H., '78':—			Jalap Res. 0'03, Ginger 0'04,		
Ext. Hyoscy. 1 gr. Ipecac., ½ gr.			Soap 0'1 Gm.		
Pil. Col. Co., 2 gr. Pil. Hyd 1½ gr.			Hamilton = Col. et Hyos.		
Coninæ HBr., ½ gr. ...		286	Hutchinson, N.H.W = Hyd. c.		
Convallariæ Ext., 1 gr. ...		287	Cret., Pulv. Ipec. Co., a.a.		
Creosoti, 1 in 2, 2-5 gr. ...		290	gr. 1 v. also C.D., ii/07, 95.		
Crooq ...		138	Hydrargyri, 4 to 8 gr. ...		362
Cupri Acet., ½ gr. ...		296	Hyd. et Digital. Co. ...		302
Cynoglossæ Opiacées ...		393	{ Pil. Hyd., 2½ gr.		
Damianæ Co., 1 t.d. ...		298	{ Pil. Coloc. Co., 2½ gr }		
Digitalis Fol., ½ gr., 1 t.d.			{ Pil. Hyd., 2½ gr.		
" Opii et Quin. (Heim's):—			{ Pil. Rhei Co., 2½ gr. }		
" Digitalis, ½ gr.; Ipecac. ½ gr.;			{ Pil. Hyd., 1 gr. ... }		'Third
Opi ^l , ½ gr.; Quin. Sulph., 1 gr.			{ Pil. Col. c. Hyos., 4 gr. }		'night.'
" Co., St. G. H. ...		302	{ Pil. Hyd., 1½ gr.		
Digitoxin, 1/250 gr. ...		305	{ Ext. Col. Co., 2 gr		
Diureticæ S.H.:—			{ Ipecac., ½ gr.		
Pil. Hydrarg. Pulv. } a.a. 1 gr.			{ Ext. Hyos., 1 gr.		
Scillæ Pulv. Digital. }			{ Pil. Hyd., 3 gr.		
Donovani ...		147, 368	{ Opii Pulv., ½ gr.		
Dupuytren ...		376	{ Hyd. c. Creta. 1-3, ½ gr.		
Easton's (et c. Arsen., 1-60 gr.),			{ Hyd. c. Creta, 1, 2, ½ gr. }		
2 or 3 daily ...		332	{ P. Ipec. Co., 1, 2, 3 gr. }		
Elateril Co. ...		306	{ Hyd. Cyanidi, 1-10 gr ...		365
Ergotin ^l , 1, 2, or 3 gr. ...		311	{ Hyd. Gallat., ½-1 gr., 3 p.d. ...		367
Ergotin, gr. 3; Strychnine Solph.,			{ Hyd. Iod. Flavi, 1/8 gr. ...		370
gr. ½; Ext. Cannab. Ind.,			{ Hyd. Iod. Rub., 1-50 to 1/8 gr.		367
gr. ½ (Owen Lankester).			{ Hyd. Iod. Rub., ½ gr., et Pot.		
Euoynmin, 2 gr. ...		318	{ Iod., ½ gr. ...		369
Exalgin, 1 gr. ...		248	{ Hyd. Iod., Vir., ½ to ½ gr. ...		370

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Pilulæ—			Pilulæ—		
Hyd. Iod. Vir., B S.H.=Hyd.			Quin. c. Bellad. ...		180
Iod. $\frac{1}{2}$ gr., Opium $\frac{1}{4}$ gr., Ext.			Hydrargyri et Opli ...		576
Gent., 2gr.			Ipecac. et Camphora...		576
Hyd. Peronlor., 1-40 to 1-12 gr.	375		Salicyl 2-6 gr. ...		574
Hyd. Subchlor., $\frac{1}{2}$ -3 gr.			Sulph. 1 to 5 gr. ...		576
Hyd. Subchlor. Co., 4-8gr. ...	379		Valer., 1 gr. ...		578
{ Hyd. Subchlor., 1, 2 gr. }			Rhei Co., 2½, 3, 4, and 5 gr. ...		612
{ Pil. Col. c. Hyos., 3, 4 gr. }			{ Pil. Rhei Co., 4 gr. }	t.d.	
{ Hyd. Subchlor., 1, 2 gr. }			{ Ext. Nuc. Vom. $\frac{1}{2}$ gr. }		
{ Opii Pulv., $\frac{1}{4}$ gr., 1 gr. }			{ Pil. Rhei Co., 2½ gr. }	h.s.	
Hyd. Tannat., 1 to 4 gr....	381		{ Ext. Tarax., 2½ gr. }		
Hydrastin, $\frac{3}{4}$ & 1 gr. l b.d. ...	384		Rust = Pil Aloes et Myrrh ...		113
Hyoscinæ HBr., 1-150 gr. ...	390		Saponis Co. (20% Opium), 2 to		
Hyoscyaminæ, 1-100 gr., 1 hourly	394		4 gr. ...		506
Ichthyol, Ammon. 2½ gr. Lith. &			Scammon. Co., 4-8 gr. ...		622
Soda (of either 1½ gr.), 4 to 12			Scilla Co., 4 to 8 gr. ...		724
daily ...	396		Sodii Arsenat., 1-32, 1-64 gr. ...		148
Iodoformi, $\frac{1}{2}$ to 3 gr.			„ Cacodyl., $\frac{1}{2}$ gr. ...		151
Ipecac. c. Scilla (3% Opium), 4			„ Oleatis, 2 and 4 gr....		618
to 8 gr. ...	428		Sparteum Sulph., $\frac{1}{4}$ gr. ...		646
Ipecac. c. Uriginea 4-8 gr....	738		Spender, N.H.W.=Ferri Sulph.		
Ipecac. (Salol etd.) ...	426		2 gr., Ext. Aloes 1 gr., Ext.		
Iridin, 2 gr., 1 h.s. ...	429		Bellad. $\frac{1}{2}$ gr.		
Laxativæ Co., U.S. ...	115		Strophanthi, Tinct. 2, 4 and		
Lecithin $\frac{1}{2}$ gr. ...	437		8 m., 1 to 3 ...		651
Lithii Guaiacatis, 5 gr....	439		Stryoh., 1-100 to 1-25 gr. ...		652
Meth. Blue, $\frac{1}{2}$, 1, 2 gr....	249		Sulphatum ...		207
Monckton, 145; Morison ...	746		Tereb. Chi., 3 gr., 4 tis hor		728
Morphinæ HCl. Sulph, $\frac{1}{4}$ gr. 457			“Third { Pil.-Hyd. 1 gr. }		
et seq.			Night”= { and Col. c. }		
Naphthol β -, 3-5 gr. ...	461		Hyos. 4 gr. }		
Naphthalini, 3 gr. ...	462		Thyroglandin, 1 gr. ...		833
Neuralgie ...	195		Triplex, 1 to 3 ...		113
Nitroglycerini, See Tabellæ.			Trium Phosphatum ...		332
Opii Pulv., $\frac{1}{2}$ and 1 gr. U.S. 1 gr.			Uriginea Co., 4-8 gr. ...		738
Pepsin, 2 and 3 gr. ...	525		Valerian Co. S.H. = Trium		
{ Pepsin gr. 1, Quin. Sulph. gr. }			Valerianatum ...		578
{ 1, Strych. $\frac{1}{30}$, gr. Ext. Tarax. gr }			Zinci c. Bellad., 1 or 2 ...		684
{ 2.—Sir W. Gowers. }			„ Phosph., $\frac{1}{2}$ gr. 1 t.d. ...		531
Phosphori, 2%, 1 to 2 gr....	529		{ „ Valer., 1 gr., }		
„ (Martindale), 1-100 1-50			{ Pil. Asaf. Co., 2 gr. }		679
and 1-30 gr., 1 p.c....	529		Zn. Valer. Co., N.H.W. = Zn.		
„ c Ferro ...	530		Valer., 1½ gr., Asaf., 2 gr.,		
„ „ Ferro et Nuc Vom. 530			Ext. Bellad. 1-12 gr.		
„ „ Ferro, Quin. et Strych 530			Zittmann's L.L. :—		
„ „ Nuc. Vomic. ...	530		{ Hyd. Subchlor., 2 gr. }		
„ „ Quin. ...	530		{ Ext. Col. Co., 5 gr. }		
„ „ Strych. (et Ferro, 530)	530		{ Ex. Hyos., 2 gr. }		
Pois Liq 2 gr. 1 or 2 ...	554		Pimento ...		719
Picrotoxini, 1-100 to 1-30 gr., h.s. 538			Pine Apple Essence ...		93
„ Atrop. et Agaricin ...	538		„ Creosote, 289; Cure ...		546
Pilocarpinæ Nit. 1-20 to $\frac{1}{2}$ gr. ...	432		Pinenes ...		546
“Pink” ...	748		Pinheroin, 1 dr. ...		549
Plumbi c. Opio 2-4 gr. ...	506		Pink Pills ...		748, 751
Plummer's, 4 to 8 gr. ...	379		Pink Root, Indian ...		726
Podoph. Bellad. et Capsic. ...	558		Pinol, 548; Pinta ...		907
Pocophyllin 1-30 to 1 gr....	557		Pinus Canadensis, 719; Maritima,		
„ Co. 1 or 2 h.s....	557		528; Pinaster, 546; Pumilio,		
„ et Quin. c. cib. ...	558		548; Siberica, 548; Strobis,		
Potassii Bichrom., $\frac{1}{10}$ gr. ...	559		719; Sylvestris ...		546
„ Iod., 1 gr. ...	564		Piper Angustif. ...		714
„ Permang., 1 to 5 gr. ...	449		„ Long. and Nig. ...		719
Potentin Co. ...	716		„ Methystic. ...		710, 735

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Piperazina, 4-10 gr. or more; Tabs,			Poisons and Pharmacy Act and		
5 gr. ...	550		Schedule, 1903	930	
" Arsenas ...	551		" For antidotes see end, also		
" Benz. ...	551		Drug in question ...		
" Glyceroph., 2 to 5 gr.,	550		'Poisonous' Substances, 37, 57, 58, 79,	932	
" Phosph....	551		Poke Root ...	719	
" Salicyl. ...	551		Pollantin, Liq. and Pdr. ...	719	
Piperidine ...	553		Pollard's Staining Method...	915	
" Acid Tart, 15 gr ...	553		Polonium, 595; Atomic Wt. ...	596	
" Gnaiacolate, 5 to 30 gr.	294		Polygala ...	725	
" -p-Sulpham. Benz., 5 gr.	553		Polyporus Officinalis ...	689	
Piperin, 1 to 10 gr. ...	719		Polysaccharides ...	471	
Piperonal, 708; Pipsisewa ...	701		Polyvalent Sera ...	754	
Piscidia ...	719		Pomatium Antipsoricum ...	659	
Pistacia Lentisc, 714; Terebinth	728		Pomade Max... ..	216	
Pistoia Powders ...	719		Pomegranate, Bark... ..	524	
Pitch, Burgundy ...	554		Pommade aux Concomb....	703	
Pitchblende ...	590, 675		Pond's Extract ...	356	
Pittfield's Stains ...	915		Ponos, 904; Poppy Capsules	502	
Pituitary Gland 821; Extract, ½			Populus Populin, 1 to 4 gr.	720	
to 1 Cc. ...	822		Portable Inhaler ...	451	
Pituitrin, 823; Pituri ...	454		Positive Phase ...	802 et seq.	
Pityriasis Versicolor, 907; Piutino	659		Potash Solution Alc. Anal.	562	
Pix Burgundica ...	554		Potassa Caustica ...	562	
" Carbonis Preparata ...	242		" c. Calce ...	635	
" Liquida, 2 to 10 gr. ...	553		" Sulphurata, 2-8 gr....	558	
Placentine ...	824		Potassio Aperient (et c. Pot. Sul-		
Plague Serum, 775; Bacilli	905		phoc), 1 dr. ...	565	
" Prophylactic... ..	775		Potass. Acetas, 10-60 gr. ...	558	
Plantago Ovata ...	735		" Arsenis, 30-75 gr....	147	
Planten's Caps ...	546, 696		" Benzoas, 15-20 gr....	559	
Plant's Cigarettes ...	748		" Bicarb., 5-30 gr....	559	
Plasma, Horse ...	818		" Bichrom., 10-1 gr....	559	
Plasmodiophoræ ...	762		" Bisulph. ...	566	
Plasmodium Malariae ...	904		" Bitart, 20 to 60 or 240 gr.	566	
Plasmon Preps. ...	482		" Boro-tart., 20 to 40 gr. ...	567	
Plaster Mulls ...	460		" Bromid., 5-30 gr. ...	191, 559	
" Paris Bandages ...	207		" Cantharidas, 1-400 to 1-200		
Plasters, Rubber, White			gr. hypod. ...	216	
Adhes., 480; v. also ...	218		" Carb., 5 to 20 gr. ...	560	
Plectranthus, 719; Pleurisy Root	693		" Chloras, 5-15 gr....	561	
Plumbi Acet., 1 to 5 gr. ...	556		" Chlorid. ...	561	
" Carb....	556		" Citras, 10-40 gr. ...	561	
" Iodid., 557; Lact....	43		" Eff., 1 dr. ...		
" Nitras ...	556		" Cyanidum (½-1 gr.) ...	562	
" Oleatum ...	487, 489		" Dihydric-phosph....	566	
" Oxidum ...	557		" et Uran Vanad....	675	
Plummer's Pill ...	379		" Ferrocyanidum, 7½ gr.	562, 861	
Pneumobacillus & coccus 763, 903,	905		" Formas, 1-6 to 3 gr. ...	36	
Pneumococcal Vaccine ...	777		" Glyceroph, 3-8 gr....	61	
Pneumococcine ...	662		" Guaiac.-sulphonate, 15 gr.	294	
Podophylli Res. & Indica, ½-1 gr.	557		" Hydroxidum ...	562	
" Rhiz. ...	557, 737		" Solution Alo. Analytical	562	
Podophyllin, ½ to 1 gr. ...	557		" Hypophos., 1 to 6 gr. ...	532	
Podophyllotoxin, ½ to 1 gr.	557, 737		" Iodidum, 5-20 gr....	563	
Points, Alum and Copper... ..	115		" Metabisulphis ...	565	
Poison Bush, 84; Oak, or Ivy	722		" Myronas ...	623	
Poisons, Horticultural, (e.g., Acid.			" Nitras, 5 to 20 gr....	565	
Arsenios, Ac. Carbolic,			" Nitris, ¼ to 1½ gr....	565	
Ac. Hydrocyanic, Cu-			" Osmas, 638; Oleas ..	487	
pri Aceto Arsenis,			" Oxalas Acid ...	54	
Nicotine, Mercuric			" Percarb. ...	561	
Chloride)... ..	932		" Permang., 1 to 3 gr.	447, 856	
" (Ireland) Act ...	933		" Iontophoresis of ...	421	

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Potass. Persulph. ...	...	610	Pulv. Acetanilid Co., 3 to 5 gr. ...	243	
" Phosphas, 1-10 gr....	...	566	" Aloes c. Canella, 3 to 10 gr....	114	
" Salicylas, 5-30 gr....	...	70	" Amygdalæ Co....	123	
" Silicas ...	...	639	" Antimonialis, 3-6 gr....	131	
" Succinas, 5-10 gr....	...	78	" Aromat., 15 gr. ...	686	
" Sulphas, 10 to 40 gr. ...	...	565	" Basilicus, 4 to 8 gr....	379	
" Sulphocarb. 10 gr. ...	...	565	" Bismuthi Co. (et c. Morph.)	189	
" Sulphocyanid., $\frac{3}{4}$ to 3 gr. ...	...	566	" " Opiatus ...	183	
" Tart., $\frac{1}{2}$ to 4 dr....	...	566	" Butææ Sem., 10-20gr. ...	733	
" " Acidus, 20 to 60 or	240 gr. ...	566	" Calcii Fluoridi et Phos-		
" et Sodii Tart., 120—240 gr. ...	613		" phatum, 30 gr. ...	39	
Potass. Tetroxalas ...	...	58	" Calcii Glycerophosph. c.		
Potassio-Cupric Tart. Sol....	...	876	" Lactæ Exsicc. $\frac{1}{2}$ oz. ...	60	
" Mercurilodide ...	368, 886		" Catechu Co., 10-40 gr....	699	
Potassium, Iontophoresis of ...	421		" Cinnamomi Co., 10 to 40 gr....	240	
Potato, Bacteriological ...	920		" Cretæ Aromat., 10 to 60 gr....	506	
Potentin Pilulæ Co., 3 to 6 p.d. ...	716		" " Aromat. c. Opio 10 to		
Potus Imperialis ...	567		" 40 gr. ...	506	
Poudre d' Ipecacuanha Opiacée,			" Doveri, 5 to 15 gr. ...	428	
Max. single 15 gr. ...	425		" Dyspeptic. Co.:Bism. Carb.,		
" de Strophanthine au Cen-			" Sod. Bic., Mag. Carb., aa.		
tième Max. single $\frac{1}{2}$ gr. ...	650		" p. æq., dose 1 drachm.		
Powell's Bulsan, 748; Nurse			" Elaterin Co., 1 to 4 gr. ...	307	
Remedy ...	748		" Glyceroph. Co., 1 to 2 dr. ...	63	
Prana CO ₂ Apparatus ...	28		" Glycyrrhizæ Co., 60 to 120		
Praseodymium, 226; Pravatz			" gr. ...	348, 623	
Syringe, 262; Prayer Beads ...	687		" sine Sacch. ...	348	
Precipitate, White, 363; Red ...	382		" Guaiaci Co., 20-40 gr. ...	658	
Précipité blanc ...	377		" Hydr. c. Creta et Bellad.,		
Precipitin Test for Blood... ..	865		" 5gr. ...	181	
Preface, v; Preservative Solu-			" Hypoph. Co., 1 to 4 gr. ...	534	
tion (Formol., 919) ...	21		" Ipecac. Co., 5 to 15 gr. ...	428	
Preservatives, Boric, etc., 7;			" Jacobi (Antimeqial.) 3 to 6 gr. ...	131	
Formalin ...	169, 839, 890		" Jalapæ Co., 20-60 gr....	434	
Prickly Ash, 730; Pritchard's			" Kaladana Co., 20 to 60 gr....	735	
Powders 748; Producer Gas ...	891		" Kino Co. (5% Opium), 5 to		
Proof Spirit, 98; Propiol Test ...	879		" 20 gr....	506	
Proprietary Medicines ...	740		" Liquiritiæ Co., 60 to 120 gr. ...	348	
Propional, 2 to 8 gr....	677		" Lobeliæ Co. ...	565	
Pre-opsonins, 802; Pro-secretin, 823			" Mag. Hydrox. c. Carb., 1 to		
Prostate Gland 835; Prostokwocha	45		" 2 dr. ...	441	
Protargol and Sterules of... ..	140		" Morph. Co., U.S., 7½ gr. ...	457	
Proteids, ...	471		" Morphine Effervescens ...	456	
Proteins, 472; in urine ...	860		" Opii Co., 2 to 10 gr....	506	
Protopine, ...	707		" Opii et Ipecac. F.I....	428	
Protosalate de Fer, 1 to 5 gr. ...	330		" Papain Co., 5 gr. ...	519	
Protozoa, 761; Protulin, 4 gr. ...	482		" Pectoralis, 60-120gr. ...	348	
Pruni Virginiana Cortex ...	567		" Pil. Coloc. Co. ...	284	
Prunus Armen., 122; <i>Lauroceras.</i> ,			" Potass Chloratis Co. ...	561	
123; Macrophylla, 123; <i>Sero-</i>			" Pot. Nitritis Co., 43¼ gr. ...	566	
<i>tina</i>	123, 567		" Potassii et Sodii Chloridi		
Pseud-aconitine ...	88, 689		" Co., ½ dr. ...	561	
Pseudoconhydrine ...	285		" pro Pedibus ...	117	
Psidium Guajava ...	720		" Quin. Co., 12 gr. ...	577	
Psychotria Ipec. ...	425		" Rhei Co., 20-60 gr....	612	
Pterocarpus, 714; Ptomaines, ...	892		" Rosæ Co. ...	498	
Ptyalin, 5 to 30 gr....	821		" Salicyl. c. Talco ...	69	
Ptychotis Oil, $\frac{1}{2}$ to 3 m. ...	736		" Santonini Co., 5 gr....	616	
Puerperal Fever Serum, ...	779		" Scammonii Co., 10 to 20 gr. ...	622	
Puff Ball 713; Pugh's Stain ...	900		" Sodæ Tart. Eff. ...	613	
Pulegium 720; Pulque ...	720		" Sodii Chloridi Co. (gargle)	631	
Pulverette Powder Pills ...	516		" " Nitritis Co. ...	566	
Pulv. Acidi Borici Co. ...	8		" <i>Tragacanthæ</i> Co., 20 to 60 gr. ...	673	
			" Zinci et Amyli ...	435, 685	

NAME.	DOSE.	PAGE
Pumiline 543; Pumpkin	713
<i>Punica Granatum</i> ,	524
Purgatives, Hypod.	135, 284
Purgen, $\frac{1}{2}$ to 8 gr.	25
Purging Agaric	689
Salt, Tasteless	637
Purinometer; Purins 196, 471, 883	...	883
Purpuric Fever, Malignant	765
Pussy Willow 723; Pyrocyanase	767
Pyoktanin, 255; Pyraloxin	65
Pyorrhæa alveolaris	778
Pyramidon, 5 to 8 gr., and Salt, 8 to 15 gr.	254
Pyranum, 8 to 30 gr.	5
Pyrazolonum-Phenyl-di-methyl. Salicyl.	254
Pyrenol, 8 to 30 gr.	5
Pyrethri Flores and Radix	720
Pyridine, 5 to 10 m.	568
Pyrocatechin 827; Mono-acet., 8gr.	294
Pyrocin, $\frac{1}{2}$ to 3 gr.	880
Pyrogallol, $\frac{1}{2}$ to 1½ gr.	65
Acetate	65
-Bismuth, 2 to 8 gr.	182, 190
Hair Dye	138
Oxidatum	65
Pyroxylic Spirit, 30-60 m.	104
Pyrozylin, 2-1; Pyrozone	387
Quassia, 720; Quassin	721
Quebracho	721
Queen's Root 727; Quercus	721
Quernie Seeds	728
Queues de Cerise	398
Quevenne's Iron	321
Quillaia 721; Quina Wine	748
Quinaseptol, Arg., 138; Quince	703
Quinic Anhydride	651
Quinidin Sulph., 1 to 20 gr.	568
Quinins, 1 to 4 gr.	668
Iontophoresis	421
Quin. Acetyl-Salicyl, 1 to 5 gr.	574
Artenalas	162
Arsenas, 1-8 to $\frac{1}{2}$ gr.	569
Bisulph., 1 to 10 gr.	577
Camphoras, 1 to 10 gr.	519
Citras, 1 to 5 gr.	569
Di-HCl, 1 to 10 gr.	571
Ferri Citras, 5 to 10 gr.	569
Ethylearb., 3-15 gr.	579
Fluorid., 1-20 to $\frac{1}{2}$ gr.	40
Formas, 'Basic' (sub-cut 1 to 3 gr.), 1 to 5 gr. & 'Neutral'	570
Glyceroph, 3 to 8 gr.	61
Hl. and Hl. Acid., 1 to 5 gr.	572, 573
HBr., 1 to 5 gr.	570
Acid., $\frac{1}{2}$ to 2 gr. (hyp.)	570
HCl., 1 to 10 gr.	570
Acid., 1 to 10 gr., $\frac{1}{2}$ to 2 gr. hyp.	571, 774
-Carbamid., 5 to 15 gr.	472
-Sulph., 1 to 10 gr.	572
Hypophos, 1 to 5 gr.	573
Iodas, 1 to 5 gr.	572

NAME.	DOSE.	PAGE
Quin. Iontophoresis	421
Lactas, 1 to 5 gr.	573
Lygosinas, 1 to 3 gr.	573
Nasal D. uche	576
Nucleinas, 1 to 5 gr.	573
Oleatum	4-6
Phosphas, 1 to 6 gr.	573
Phytin., 4 to 8 gr.	534
Salicylas, 2 to 6 gr.	574
Salicyl Acid Ester, 2 to 30 gr.	74
Sulphas (Acidus, 577), 1 to 10 gr.	574
Sulphocarb., 1-8 gr.	578
Tannas, 1 to 4 gr.	578
Valerianas, 1 to 4 gr.	578
and Uran. Chlor., 3 to 6 gr.	675
Urea, 5 to 15 gr.	572
Urethane, $\frac{1}{2}$ -3 gr.	677
Quinoform, 1 to 5 gr.	570
Quinol, $\frac{1}{2}$ to 5 gr.	481, 709
Quinoleum Compound	742
Radiant Heat, 588; Radiology	579
Radium A, B, C, etc.	593
Action of on Bacteria	599
Active deposit from	593
Applicators	604
As a cause of carcinoma	607
Average life of	593
Bromide, 590; Carbonate	590
Characters of	591
Chloride	590
'Cross fire' method	603
Disintegration of	592
Electrical Properties of	591
Electroscope	596
Emanation	597
Extraction of	591
Heat from	597
in Mineral Waters	608
Institute, 606; Nitrate	590
Ointment	609, 748
Production of Hellum by	605
Radio-active Constant	593
Radio-activity, anti,	607
" induced	598
Rays, α , 594; β 596; 'hard' β 603, 604; γ ,	596
Salvo	609, 748
Screens or shields of lead for use with	603, 604
Standard for, 592; Sulphate	560
Tests for Purity	591
Theories of	592
Therapeutic use	599
I. Rays from glass tubes	599
II. Metal tubes & screens	602
III. Spread-surface	603
General references	608
Malignant growths, 600, 602, 759	...	601
Ocular Therapy	601
Rodent Ulcer	600
Wickham op.	603
Ragazzoni's Injection	360, 367
Ragwort, 725; Rami Syrup	193

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Ranunculus Ficaria	609	Room Disinfection ...	... 80, 107, 111	
Raspberry, Dwarf, 722; Rasot	733	Rosa Damascena, 497; <i>Gollica</i> ...	...	722
Ravogli's Liniment	22	Rosaniline HCl., $\frac{1}{2}$ to 4 gr....	...	248
Ray fungus,	897	Roseine 248; Acetate ...	...	248
Ray's Pills, 748; Receptors	763	Rotra, 722; Rottlera ...	...	331
Rectified Spirit	97	Rouge, Jewellers' ...	...	326
Red Bone Marrow	818	Roux's Serum, 771; Roux's Stain	...	901
„ Gum, 2 to 5 gr. 705; Lead	557	Rubber Bandages ...	...	216
„ Neutral, 922; Precipitate	382	„ Dental ...	...	217
„ Root, 711; Sander's Wood	720	„ Glove Substit., ...	...	282
„ Soudan III.	251	Rubidum and Salts, 722; Rubine	...	248
Refrigeration	27	Rubini's Camphor, 2-5 m....	...	210
Regenerative Tablets, 6 p.d.	630	Rubus Chamaemorus, &c ...	...	722
Regulin, 221; Reinsch's Test	143	Rudolphi Moss, 646; Rue... ..	...	723
Relapsing Fever ...	158, 908		Rumex, Sp. Rumicin, 1 to 4 gr. ...	...	723
Remijia Species	237	Rusot, Rasot, $\frac{1}{2}$ to 1 dr. ...	...	733
Renaglandin, 826; Renascin	748	Ruspini's Styptic ...	714, 748	
Rennet, Essence, Tablets...	525	Russ' Electric Diagnostic ...	...	912
Rennin ...	513, 525, 895		Russell's Preparation ...	...	748
Renninogen, 895; Renostyptin	826	Russula delica ...	...	865
Resina	721	Ruta Graveolens ...	...	723
„ Carbolica, R.D.H....	...	23	Rutherford's Table... ..	...	593
„ Copaiba	501	„ Electronic Theory... ..	...	597
„ Podophylli Ind., $\frac{1}{4}$ to 1 gr. 737	...		Rutile, 226; Ryutan ...	...	707
Resinol Ointment, Soap	555	<i>Sabadilla</i> (Cevadilla) ...	...	680
Resorbin	675	Sabal, U.S., 724; Sabina... ..	...	723
Resorcin, 2 to 8 gr.	609	Sabouraud's Pastelles ...	...	535
„ Ichthyol	398	Sabromin, 15 to 45 grs. ...	...	413
„ -monacetate	611	Saccharas Ferricus ...	...	321
„ -phthalein Anhydride	248	Saccharated Ferric Oxide, 10 to	...	
Resorcinol	609	40 gr....	...	326
Respiration, Artificial	119	„ Wheat Phosph... ..	...	534
Retinal Extract, 2 dr.	820	Saccharides, Mono-, Di- ...	...	471
Rhamni Frangulae Cortex...	708	Saccharin (and sol.), $\frac{1}{2}$ to 2 gr. ...	...	613
„ <i>Purshiani</i> , Cortex 3 to 15 gr. 220	...		„ Detection of in Beer, &c. ...	...	613
Rhatany Root	711	„ Tablets $\frac{1}{2}$ gr. ...	...	613
<i>Rhei Radix</i> , 15 to 30 gr.; 3 to 10	...		Saccharomyces Cerevisæ ...	...	224
gr. rep.	611	„ Invertens 50; Sardons ...	...	50
Rheumatin, 15 gr	74	<i>Saccharum Lactis</i> ...	...	711
Rheumatic, anti-serum	779	„ Purificat....	...	613
Rheumatism (v. also Therap.	...		„ Saturni, 1 to 5 gr....	...	556
Index)	779	Saccharure Granulé de Glycero-	...	
Rhigolene, 522; Rhinacanthus	721	phosphate de Calcium 1 to 3 dr. ...	...	63
Rhinoculin, 271; Rhinodyne	825	Sacred Bark, 220; Saffron... ..	...	703
Rhodallin, 625; Rhodinol...	498	Safranine Test ...	...	880
Rhus Aromat., 722; Glabra, Tox. 722	...		Safrol, 20 to 30 m. ...	...	724
Rice's Treatment	748	Sagapenum, 723; Sage ...	...	723
Ricin, Ricinoleic Acid	496	Sahl's Caps ...	...	336, 399
Rideal-Walker Coefficient...	16	St. John's Wort=Hypericum var.	...	
Riegler's Test, 860; Rimini's Test	...	890	(Hypericaceæ)	...	
Ringworm, Staining	906	St. Raphael's Wines ...	...	749
Risicol, 1 to 4 dr.	497	Sajodin, 15 gr., 412; Sakran ...	...	393
Riva Rocci Sphygmom.	872	Salacetin, 71; Sal Acetos ...	...	58
Rob Juniperi, 710; Sambuci	723	Salacetyl, 10 to 30 gr. ...	...	74
Roberts' Albumin Test	862	Sal Alembroth & Injection ...	380, 376	
„ Globulin Test	862	„ Ammoniac = Ammon. Chlor., q.v.	...	
Roborat	406	„ Bromatum Eff., 60 to 120 gr. ...	...	631
Rochelle Salt, 120-240 gr....	...	643	„ Carolinum (& Fact., 20 to 60 gr.)	...	642
Roche's Embrocation	748	„ Emsanum, Fact. 642; Hunyadi	...	
Rodagen, 5 to 10 gm.	835	Janos, Vichy, Wildungense	...	643
Roentgen Rays	579	„ Enixum, 566; Hartini... ..	...	449
Rollo's Remedy	748	„ Limonis ...	...	58
Romanowsky's Stain	870	„ Marinum Artif. ...	...	631
Romer's Pneumo. Serum	778	„ Polychrestum, 30 to 120 gr. ..	...	566

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Salep, 723; Saletin...	...	71	Sapones	...	617
Salicifrice	...	620	Saponification Estimation of Oils	...	486
<i>Salicinum</i> , 5 to 20 gr.	...	74	(<i>P. Off.</i>)	...	620
Salicyl Aldehyde	...	859	Nos. of Fats	...	721, 723
" Glycerin Ester	...	73	Saponin, Sapotoxin	...	737
" Glycol Ester	...	68	Sappan	...	758
" Methoxy-methylester	...	68	Sarcoma and other Tumours	...	620
" Piperaz, 2 to 5 gr.	...	551	Sarcinae, 894; Sarsa-saponin	...	620
" Salicylic Ester	...	69	<i>Sarsa Radix</i> Sarsaparilla...	...	708
Salicylated Collodion	...	283	" Indian	...	724
Salicylic Cream, 1 in 6½	...	69	<i>Sassafras</i> , 723, 736; Pith...	...	57
" Gauze, Lint, Wool, 4%	...	70	Sassy Bark, 315; Sauerin	...	500
Saline Solution, Gelatin	...	335	Savarese's Capsules	...	748
" Normal 628; Tubes of	...	629	Savar's Coca Wine	...	482
Salinigrin	...	723	<i>Savin Oil</i> , 1 m., 723; Savore	...	724
Salipyrin, 15 to 30 gr.	...	254	Saw-Palmetto, ½ to 2 dr.	...	621
Salit (innocent), ½ to 1 dr.	...	67	<i>Scammonia Rad.</i> (<i>Res.</i> , 3-8 gr., 621); 5-10 gr.	...	433, 621
Salix, var 74; Nigra, Discolor	...	723	Scammonin, 1 to 5 gr.	...	621
Salikindohn's Gut	...	21	<i>Scammonium</i> , 5 to 10 gr.	...	780
Salkowski's Ethereal Sulphates	...	834	Scarlatina Serum, 779; Vaccine	...	247
Estimation	...	255	Scarlet R., Scharlachrot	...	931
Salicoll, 10 to 30 gr.	...	76	Schedule of Poisons	...	147
<i>Salol</i> , 5 to 15 gr., 75; c. Camphora, 76; Catheter Oil, 76; Collodion, 76; Emulsion, Mouth Wash, 75; Pill Varnish	...	76, 843	Scheele's Green, 1 to 1-25 gr.	...	284
Salophen, 10 to 30 gr.	...	76	Schierling, Geflecker	...	890
Saloquinine (Salicyl., 15 gr.), 2 to 30 grs.	...	74	Schiff's Formalin Test	...	270
Salt Baths, 631; Salt free diet	...	630	Schleich's Solutions	...	680
Salt of Tartar (Pot. Carb.)	...	560	Schenocaulon Officinale	...	923
Salts, Anti-Catarrhal, etc.	...	23	Schüder's Ppn. of B. typh	...	904
" Sorrel	...	58	Schüffner's Dots	...	682
Saltsurt Beta-Eukain	...	268	Schulze's Macern, Mixture, 565; Reagent	...	903
Saluter, 639; Salve Muls	...	460	Schütz's Stain	...	738
Salve Soap	...	715	<i>Scilla</i> , 1 to 3 gr., 724; <i>Indica</i>	...	504
Salvia, 723; Salvo Petrolia	...	520	Scintiloscope	...	757
Samarakite	...	226	Sclavo's Anthrax Serum	...	645
<i>Sambuci Flores</i> , 723; Sanatogen	...	61	<i>Scoparii Cucumina</i> ; Scoparin	...	724
<i>Sandal Wood Oil</i> , 5-30 m.	...	499	<i>Scopola Carniolica</i> , 724; Japonica	...	389, 724
Sandarack Solution	...	539	Scopolamine	...	390, 391
Sander's Wood, Red	...	720	" <i>II Br.</i> , 1-200 to 1-100 gr.	...	390, 391
Sanguinaria, ¼ to 1 gr.	...	723	" Morphine Anaesthesia	...	391
Sanguis Draconis, 704; Sanguisuga	...	835	Scopomorphine	...	729
Sanitary Towels	...	352, 616	Scordium	...	508
Sanitas and Preps.	...	17, 18, 547	Scotch Paregoric, ½-1 dr.	...	546
Sanmetto, 724; Sansiviera	...	614	Scotch Pine or Fir	...	363
Santalol, Caps. 5 m.	...	499	Scott's Dressing	...	748
" Allophanic Ester	...	500	" Emulsion and Pills	...	725
" Methyl Ester	...	500	Scutellaria (Skull-cap)	...	629
" Salicyl. 5 m.	...	499	Sea Poppy, 707; Sea Salt, Artificial	...	907
" Salicyl-ester of 15 to 30 m.	...	499	631; Sea Tangle, 711; Sea Wrack	...	309
Santalum Rubrum	...	499	Sealed Tubes of Gelatin, 335; Glucose, 338; Saline	...	687
Santal Wood Oil	...	499	Seborrhœa	...	820
Santonica 10 to 60 gr.	...	615	Secale Cornutum, 20-60 gr.	...	919
Santoninoxim	...	616	Secondary List of Drugs	...	183
Santoninum, 2 to 5 gr.	...	615	Secretin Extract	...	643
Emulsion	...	616	Sections, Preparation of	...	748
Santyl, 15 to 30 m.	...	499	" Sadeff," 1 to 2 dr. in aq.	...	643
<i>Sapo Anim.</i> , <i>Dar.</i> , <i>Kalinsu</i> , <i>Moll.</i> ; <i>Moll. p-rolant.</i> ; <i>Virid.</i> 617 <i>et seq.</i>	...	89	<i>Seidlitz Powder</i>	...	748
" Lanolin	...	89	Seeger's Hair Dye	...	748
" Superadipat. (et c. Sulph. et c. Pice)	...	619	Seigel's Syrup	...	643
			Seignet Salt, 120-240 gr.	...	

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Semen Erucae, Sinapis	623	Slippery Elm Bark ...	...	729
Semen Test	918	Smedley's Chilli Paste ...	...	220
Sempervivum, 725; Senecio	725	Smelling Salts, Carbol. ...	...	23
Senegæ Radix	725	Smitacin, 620; Smilax Sarsaparilla ...	...	620
Senna (and Legumes), 10 to 30 gr.	622	Snake Bite, 320; Snake Bite ...	...	783
Septicæmia Serum	779	„ Bite Lancets ...	...	448
Sera, 752; Serpent Venom	783	„ root, Black ...	...	701
Serpentaria Rhizoma	725	„ weed ...	...	319
Serravallo's Tonic	749	Soamin, $\frac{1}{2}$ to 3 grain increased ...	...	153
Serum Agglutination	913, 923	Soap Bark ...	...	721
„ Albumin	860 <i>et seq.</i>	„ Liniment ...	...	619
„ Antianthrax	767	„ Solution, Ethereal ...	...	619
„ Antidiphtheria	769	„ Standard ...	...	887
„ Anti-gonococcus	773	„ and Spirit Lotion ...	...	619
„ Anti-hay fever	719	Soaps, Medicated, &c. ...	...	619 <i>et seq.</i>
„ Antilytic	800	Soda Caustica ...	...	635
„ Antitetanic,	789	„ Chlorinat Liq. ...	...	634
„ Anti Thyroid	834	„ Phenique ...	...	22
„ Bantier, 749; Dysentery	771	„ Tartarata, 2 to 4 dr. ...	...	643
„ Facitium, P. Belg.	629	Sodii Acetas, 15 gr. ...	...	628
„ for Bacterial Culture	920	„ Acetyl-arsanilas, $\frac{1}{2}$ to 3 gr. ...	...	160
„ Globulin	864	„ Acetyl p. - amino - phenyl - arsonas, $\frac{1}{2}$ to 3 gr. ...	...	160
„ Horse	799, 88	„ Amino-phenyl arsonas, $\frac{1}{2}$ to 3 gr. ...	...	153
„ Meningococcic	766	„ Anhydro-Meth.-Cit., 15 to 30 gr. ...	...	109
„ Pneumococcic	773	„ Antimonii Tartaras ...	...	131
„ Polyvalent, 754; Rheumatic	779	„ Arsanilas $\frac{1}{2}$ to 3 gr. incr. ...	...	153
„ Streptococcic	779	„ Arsenas (<i>Off. Exsicc.</i>) 1-40 to 1-10 gr. ...	...	147
„ Trunczek's Inorganic	630	„ „ U.S. + 7H ₂ O av. 1-10 gr. ...	...	148
„ Universal	754	„ „ Exsicc., U. S., av. 1-20 gr. ...	...	148
(see also Antitoxins.)			„ Arsenophenylglycin ...	...	161
Sesame Oil	192, 736	„ Benzoes, 5 to 30 gr. ...	...	5
Sevum Phosphoratum	630	„ Biboras, 5 to 20 gr. ...	...	9
„ Preparatum	530	„ Bicarbonas, 5-30 gr. ...	...	632
Shadeine	749	„ Bisulphas ...	...	640
Sheep Dips (<i>v. also</i> P.J. i./09, 642)	141	„ „ Tabs. for baths ...	...	640
Sheep's Corpuscles	785	„ Bisulphis, 5 to 30 grains ...	...	643
„ Wool	352	„ Bi-uras ...	...	885
Sheeting, Macintosh, 27; Shellac	725	„ Boro-Salicyl., 5 to 45 gr. ...	...	7
Sieco, 475; Side Chain Theory	753	„ „ Tart., 30 gr. ...	...	10
Sidonal 'New' Tabs., $7\frac{1}{2}$ gr. 30 gr.	551	„ Bromid., 5-30 gr. ...	...	191, 631
Sidot's Blende = Zn. Sulph	594	„ Cacodylas, $\frac{1}{2}$ to 1 gr. ...	...	150
Sienna, 326; Silcock's Ointment	366	„ Caffein-Iodid., 2-10 gr. ...	...	200
Silicates, Soda & Potash.	639	„ Carbolas ...	...	22
Silk Sutures, 21; Silkworm Gut	21	„ Carb. (<i>Exsicc.</i> , 3 to 10 gr.), 633; 5 to 30 gr. ...	...	632
Silphion	728	„ Carb. Mono-hyd., U.S., 4 gr. ...	...	633
Silver, German	717	„ Chloras, 10 to 30 gr. ...	...	633
„ Iontophoresis	422	„ Chloridum, 10-60 gr. ...	...	628
„ Nitrate, $\frac{1}{4}$ to $\frac{1}{2}$ gr.	136	„ „ Iontophoresis ...	...	422
„ „ Mitigated	137	„ Cinnamas, 3 to 5 gr. ...	...	29
„ „ Sounds	137	„ Citras, 10 to 60 gr. ...	...	634
„ „ Toughened	137	„ „ Solution Opsonic ...	...	802
„ Oxide, $\frac{1}{2}$ to 2 gr.	138	„ Citro-Tart. Eff. 1-2 dr. ...	...	501
Simaba Cedron; Simaruba; Simulo	725, 726	„ Copaivas, 10 to 30 gr. ...	...	31
Sinalbin, Sinigrin, Sinapis	623, 624	„ Coumaras, ortho, 5 gr. in solution ...	...	32
Singleton's Ointment	749	„ „ c. Novocain, 25 m. ...	...	32
Sirop des cinq Racines	133	„ „ et Adrenalin, 35m. ...	...	32
(See also Syrupus.)					
Skatoxyl	881			
Skin, Tropical Diseases	907			
Skull Cap	725			
Sleeping Sickness	790, 909			
„ „ Organic Arsenic in	149, 155, 792			

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Sodii Cresotinas, 10-30 grs.	...	77	Sodii Sulph., $\frac{1}{4}$ to $\frac{1}{2}$ oz. or 30 to 120 gr. rep. ...	...	641
„ dimethylaminophenyl- arsonas	...	162	„ „ <i>Eff.</i> 60 gr. or <i>q.s.</i>...	...	641
„ Dimethylarsanilas	...	162	„ „ <i>Exsic.</i> $\frac{1}{2}$ to 2 dr....	...	641
„ Dimethylarsin, $\frac{1}{2}$ to 1 gr.	150	„ „ as pill excip....	...	533
„ Dioxidum	...	383	„ „ Acidus	...	610
„ di-Iodo-Methyl-Arsonas, 153,	...	165	„ Sulphidum	...	643
„ et Ammon. Phosph.	...	637	„ „ Iontophoresis	...	423
„ et Mag. Sulph. <i>Eff.</i> , 1 dr. or more	...	641	„ <i>Sulphis</i> , 5 to 20 gr.	...	643
„ et Mag. Sulph. c. Caffeina	...	642	„ „ <i>Exsic. c.</i>	...	643
„ 1 dr. or more	...	642	„ <i>Sulphocarb.</i> , 5 to 15 gr.	...	25
„ Ethylas	...	635	„ Sulphocyanid., 1 to 5 gr.	...	644
„ Fluorid, 1-20 to $\frac{1}{2}$ gr.	...	40	„ Sulpho - Ichthyolas, 10 to 30 gr.	...	396
„ Formas, 1-6 to 3 gr. incr.	...	35	„ Sulphoricinas	...	497
„ Glyceroph., 5-10 gr.	...	61	„ Tart. Neutrale, $\frac{1}{2}$ to 1 oz.	...	614
„ Glyco-cholas, 2-6 gr.	...	644	„ Tauro-cholas, 2 to 8 gr.	...	614
„ „ Solution (Test)	...	735	„ Telluras, $\frac{1}{3}$ to $\frac{3}{4}$ gr....	...	645
„ Hippuras, 5 to 30 gr.	...	6	„ Tetra-iodocacodylas	153,	165
„ Hydroxid.	...	635	„ Tetra-iodofluorescein	...	589
„ Hypobrom. Sol.	...	635	„ <i>Thiosulph.</i> , 10 to 60 gr.	...	81
„ Hypochloris	...	634	„ Triphenyl-rosanalin mono-sulphonas	...	4
„ <i>Hypophosph.</i> , 3-10 gr.	...	532	„ Tungstas Solu. for X-rays	...	586
„ <i>Hyposulph.</i> , 10-60 gr.	...	81	„ Uras Acida	...	885
„ Iodas, $1\frac{1}{2}$ gr. Hyp.	...	41	„ Valerianas, 1-5 gr.	...	679
„ Iodidum, 5 to 20 gr.	...	636	„ Vanadas, $\frac{1}{2}$ gr.	...	729
„ Lactas, 5 to 10 gr.	...	43	„ Sodium...	...	627
„ Metatisulphis, 2 to 5 gr.	...	643	„ Chloride Shells	...	629
„ Methylarsenas, 2-5 to 3 gr.	152,	209	„ -Fluorescein	...	248
„ Molybdas	...	80	„ Theobromine Acet., 10 to 15 gr.	...	664
„ Nitras, 15 gr.	...	636	„ „ Sod. Iodid., $7\frac{1}{2}$ to 15 gr.	...	665
„ Nitrix, 1 to 2 gr.	...	636	„ „ Salicyl., 5 to 15 gr.	...	664
„ Nitrophenyl-propiolas	...	979	Sodomæum, 726; Sodophthalyl	...	25
„ Nitroprussidum	...	858	Solanum	...	726
„ Nucleinas, <i>per os.</i> , $\frac{1}{2}$ to 2 gr.	...	225	Solazzi, 349; Solubas	...	375
„ Oleas, 2 to 4 gr.	...	617,	SOLUBES (see also Ionic Solubes).		
„ o-coumaras, 5 gr. in sol.	...	31	„ Biniodide, 1 in 1 pint = 1 in 1,000	...	370
„ o-cresotinas, 10 to 30 gr.	...	77	„ Boric Acid, 15 gr.	...	8
„ o-nitrophenylpropiol.	...	879	„ Boro-Saline	...	8
„ Palmitas, 617; Perboras	...	10	„ Borax Co.	...	8
„ Permang., 449; Peroxidum	...	393	„ Borax Cocaine Co.	...	8
„ Persulphas, 1 to 3 gr.	...	649	„ Cocaine, 1, $1\frac{1}{2}$, $2\frac{1}{2}$, 5 gr.	...	263
„ Phenol-p-sulphonas, 5 to 15 gr.	...	25	„ Dental	...	23
„ Phenol-sulphoricinas	...	497	„ Eucaine, 1 & 5 gr.	...	270
„ Phenylpropiolas	...	30	„ „ 0.05 c. Sod. Ch. 0.2 Gm.	...	270
„ Phosphas $\frac{1}{4}$ to $\frac{1}{2}$ oz.; 30-120 gr. rep.	...	637	„ Hyd. Cyanid. et Boracis	...	345
„ „ Acidus	...	637	„ Hyd. Oxyce. 0.2 Gm.	...	306
„ „ <i>Eff.</i> , 1 to 3 dr.	...	637	„ Mercuric Potass. I d.	...	370
„ „ <i>Exsic.</i> , 10 gr. to 4 dr.	...	637	„ Perchloride	...	375
„ „ Neutral.	...	637	„ 1 in tumb. = 1 in 4,500.	...	
„ Phosphis	...	636	„ 1 in pint = 1 in 1,000.	...	
„ Potass. Tart., 2-4 dr.	...	643	„ 1 in pint = 1 in 500.	...	
„ Pyrocatechin Acet.	...	294	„ Phenol, 5 & 20 gr.	...	12
„ Pyrophosph., 30 gr.	...	638	„ Plumbi et Opil	...	503
„ Pyrosulphis, 2-5 gr.	...	643	„ Potass. Permang. 5 gr.	...	449
„ Salicylas, 10 to 30 gr.	...	70	„ Protargol, 4.4 gr.	...	141
„ „ Iontophoresis	...	422	„ Sodii Chlorid.	...	631
„ Sesquiphosphas, 30 gr. during a day	...	638	„ Zinci Permang., $\frac{1}{4}$ gr.	...	685
„ Silicas, 639; Stearas	...	617	„ Zinc Sulph. et c. Alum	...	685
„ Succinas, 5 gr.	...	78	„ Zinc Sulphocarb. 2 and 10 gr.	...	26
„ Sulphanilas, 5-15 gr.	...	245			

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
SOLUBES, IONIC		425	Spinal Anæsthesia by Cocaine,		
„ Cocaine HCl., 4'375 gr.			266; Novocaine, 272; Stovaine,		
„ Copper Sulphat., 4'375 gr.			275; Tropacocaine, 267; Dis-		
„ Magnes Sulph., 4'375 gr.			cussion on	276	
„ Potass. Iodid., 4'375 gr.		425	Spinal Cord Ext. (5-20 m.)... ..	819, 820	
„ Quin Ac. HCl., 4'375 gr.			„ Tabs, 2½ gr. ..	820	
„ Sodii Chlorid., 4'375 gr.			Spindle Tree Bark	318	
„ „ Salicyl., 4'375 gr.			Spintharoscope	594	
„ Zinc Sulph., 4'375 gr.			Spirillum, see Spirochaeta.		
Soluble Copaiba		501	Spirit Blue, 4; Spirit Weed	711	
„ Glass		639	<i>Spirit. Acidi Lactici</i>	42	
Solurool, 5 to 10 gr.		831	„ <i>Etheris</i> , 60-90m., 20-40m. rep.	92	
Soluté Digitaline Crist., max.			„ „ Co., 60-90m., 20-40m. rep.	92	
single 5 m.		303	„ „ <i>Nitrosi</i> 60-90 m., 20-40		
„ de Caffeinè pour injection			m. rep.	93	
hypodermique		200	„ Ammon., U.S., 15 m.	122	
„ de Quinine pour injection			„ Aromat., 60-90m., 20-40 m.		
hypodermique		571	rep.	122	
„ de Valérianate d'Ammon-			„ <i>Fetidus</i> , 60-90 m., 20-40 m.		
iaque Comp., 2 to 4 dr.		120	rep.	122	
„ Morphine (HCl.) 20%		456	„ Amygd. Amar., av. 8 m.	123	
„ officinal de Bromoform,			„ Anist, 5 to 20 m.	692	
max. 8 m.		193	„ Antiparalyticus	547	
„ officinale d'Eau Oxygénée ...		385	„ <i>Armoracia</i> Co., 1 to 2 dr.	702	
Solutio Burowi		115	„ Aurantii Co., U.S.	307	
„ Creosoti Co.		291	„ <i>Cajuputi</i> , 10%, 5 to 20 m.		
„ Phenoli		19	„ <i>Camphora</i> , 5 to 20 m.	209	
„ Sodii Citratis		634	„ „ Fort., 2 to 5 m.	210	
Solution hyp. d'Ergotinine, 3 to			„ Capillaris Unna	610	
10 m.		312	„ Card Co.	514	
„ Aluminii Acet.		115	„ <i>Chloroformi</i> , 5-40 m.	235	
„ Coal Tar		242	„ <i>Cinnamomi</i> , 5-20 m.	240	
„ d'Adrenaline		826	„ <i>Coloniensis</i>	103	
Solution Ethyl Nit., 20 to 60 m.		93	„ Creosoti, 1 dr.	290	
„ Methyl Orange		897	„ Dilution Table	98	
„ Potass.-Cup. Tart.		876	„ Dzondii	122	
„ Merc. Iod.		886	„ Frumenti, U.S.	103	
Solutio de Cacodylate de Sodio			„ Gaultheriæ, av. 30 m.	67	
Iodo-mercurico		151	„ Glyceryl Nit., av. 1 m.	466	
„ Iodo Tannico Phosphatado		409	„ Hyd. Biniodidi	367	
Solvent Naphtha		246	„ <i>Juniperi</i> , 20-60 m.	710	
Somatose (and Preps.),		475	„ „ Co., U.S., av. 2 dr.	710	
Somnal, 30 to 45 m.		230	„ <i>Lavandula</i> , 5-20 m.	712	
Somnoform (Caps.)		95	„ <i>Melissæ Compositus</i> , 20-25		
Somnos, 1 to 4 dr.		230	drops	715	
Soothing Ointment... ..		611	„ <i>Mentha Pip.</i> , 5-20 m.	450	
Sorbefacin		343	„ „ Virid., av. 30 m.	450	
Sorbus, 726; Sorghum		726	„ <i>Methylatus</i>	103	
Soudan Red III.		251	„ <i>Myrcia</i>	103	
Sounds, Silver nitrate ctd.		137	„ <i>Myristica</i> , 5-20 m.	716	
Soya		726	„ Nuc. Jugl., 1 to 4 dr.	710	
Soured Milk, Preparation of, 47;			„ Proof	97	
Uses... ..		50	„ <i>Rectificatus</i>	97	
Sozioidol (and Comps.)		403	„ <i>Rosmarini</i>	499	
Spanish or Blistering Fly... ..		213	„ Saponatus, var.	619	
Sparadrap de Thapsia		728	„ Sinapis, P. G. iv,	625	
Sparteinae Sulphas, ¼-1 gr.		646	„ Tenuior	98 et seq.	
Spermaceti, 700; Spermin		823	„ Thymol, 3 to 15 m.	670	
Sphacelotoxin... ..		309	„ Vini Dilutus	98	
Sphagnol Preps.		397	„ <i>Vini Gallici</i>	102	
Sphagnum		646	Spirochaeta Duttoni	909	
Sphygmograph. Varnish... ..		4	„ „ Frambesia	907	
Sphygmomanometers		872	„ „ Obermeieri	906	
Spigelia Marilandica		726	„ „ Pallida	783, 907	

NAME.	DOSE.	PAGE	NAME	DOSE.	PAGE
<i>Spirochaeta</i> Various		909	Sterules, Hypodermic— <i>cont.</i>		
Spirone Inhalant		564	Caffeine Sod. Salicyl, 1 gr. ...		200
Spiroal, 30 m. ext....		68	Calci Format., $\frac{2}{3}$ gr.		36
Spleen Extract, 835; Spondias ...		726	Calc. Glyceroph., 1 gr.		60
Sponges, Surgical 352; to Sterilise		640	Camphor (in oil), $1\frac{1}{2}$ and 3 gr....		209
Spongio Piline		353	„ $\frac{1}{2}$ gr. in Ether 17 m. ...		210
Spot Wing 904; Spotted Fever ...		765	„ 3 gr. & Guaiacol, 2 gr. ...		210
Sprays, 263; Sprue		907	Cocaine HCl., 1-10, $\frac{1}{4}$ and $\frac{1}{2}$ gr. ...		264
Spruce, Hemlock 719; Squaw Root		699	„ 1-3 & Adrenalin, 1-1000		
Stains, various form.	873 et seq.		gr. (Coneph)... ..		264
Standard Soap Solution		887	Codeine Phosph., 1 gr. in 6 m....		278
Standardisation, Physiolog. ...		752	Conephrin		264, 828
Standard Malt Ext. and Oil ...		749	Creosote (in oil), $\frac{2}{3}$ gr. ...		
Staphisagria Oleum & Ung....		726	Digitalin, Pulv. $\frac{1}{10}$ gr.		305
„ <i>Sem.</i> , 1 gr.		726	„ $\frac{1}{10}$ gr. c. Strych. HCl. $1\frac{1}{10}$ gr. ...		305
Staphylococcal Vaccine		780	Dionin., $\frac{1}{2}$ gr.		453
Staphylo. Alb., aur.	780, 907		Enesol, 2 Cc.		149
Star Grass, 690; Starch Powders		435	Ergot Inj., 10 m.		311
Steapsin, 513; Stearin		78	Ergotinine Cit., 1-100 1-200 gr. ...		312
Stearettes, 541; Stear pills ...		541	Eucain. HCl. & Lact. $\frac{1}{4}$ gr. ...		269
Stearn's Headache Cure		749	Fibrocoumarin, 25 m.		32
Stedman's Teething Powders ...		749	„ 25 m. c. Adrenalin, 10 m....		32
Steedman's Soothing Powders ...		749	Guaiacol (in oil), $\frac{2}{3}$ gr.		292
Stegomyia		905	„ Cacodyl., $\frac{2}{3}$ gr.		150
Sterilisation of the Skin		407	Heroin HCl., $\frac{1}{10}$ gr.		459
Sterilla		620	Homatropine HBr., 1-200 gr. ...		
Sterilised Almond Oil, 124; Li-			Hyd. Glycocoll., $\frac{1}{2}$ gr.		2
quid Paraffin, 124; Milk,			„ Iod. Rub., $\frac{1}{2}$ gr. in 8 m. ...		367
478; Olive Oil		124	„ Peptonat, $\frac{1}{2}$ gr.		372
Sterilisers for milk		479	„ & Potass. Hypsulphit., $\frac{1}{2}$ gr. ...		377
„ Steriloid Dressings		353	„ Salicyl-Arsenas, 1 gr. in		
Sterules, Hypodermic,			30 m.		149
647, each containing:—			„ Succinimid. 1-3 gr. c. Co-		
Aconitin Nit., 1-640 gr. ...			caina Nit., $\frac{1}{2}$ gr....		380
Adrenalin Sol. 10-15 m.		829	Hydrastinine HCl., $\frac{1}{4}$ gr.		384
Adrenalin Solution, $1\frac{1}{1000}$ gr.,			Hyoacine HBr., $1\frac{1}{100}$ gr.		390
with Cocaine, $\frac{1}{2}$ gr., <i>vide</i>			Inj. Hydrarg. (Lambkin), 10 m. ...		359
Conephrin.			Iron Citrate, $\frac{2}{3}$ gr.		
Adrovaine (Adrenalin $1\frac{1}{10}$ c.			„ Glyceroph., $\frac{1}{2}$ gr....		61
Stovaine, $\frac{1}{2}$ gr.)... ..		829	„ Lecithin, $\frac{3}{4}$ gr.		437
Adreucaine, $\frac{1}{2}$ Cc.		270	„ c. Guaiacol, $\frac{2}{3}$ gr....		437
Aether, $\frac{1}{2}$ dr.		91	Lecithin <i>var</i> c. Strych.		437
Aq. Dest., 1 dr.		172	Menthol, 1-5 gr.		451
Amyl. Nitrite 17 m., hyp. dose,			Morph. Sulph., $\frac{1}{2}$ and $\frac{1}{4}$ gr. ...		467
1 to 3 m.		128	Morph. $\frac{1}{2}$ c. Atropine Sulph.,		
Antigen (for test)... ..		785	$1\frac{1}{10}$ gr., and other strengths		457
Antimon. Cinnam. Inj. 15, 30 m.,		130	Nucleinic Acid, $\frac{2}{3}$ gr.		225
„ Ox. Inj., 15, 30 m.		130	Pilocarpine Nitrate, 1-10, $\frac{1}{4}$,		
Antipyrin, 4 gr.		253	$\frac{1}{2}$ gr.		432
„ et c. Cocaine, 1-20 gr. ...		253	Potass. Iod., 5 gr.		564
Apomorph. HCl., 1-10 gr. ...		134	Quin. Glyceroph., $\frac{1}{2}$ gr.		61
Arrhenal, $\frac{2}{3}$ gr.		152	„ HBr. Acid, 2 gr.		570
Arsamin, $\frac{1}{2}$ and $\frac{3}{4}$ gr. in 17 m....		154	„ HCl. Acid, 2 gr.		572
Arsenic and Iron = $\frac{1}{2}$ and 1 mgr.			Scopolamine - Morph.		391
As_2O_3 in 17 m.		148	Sod. Cacodyl., $\frac{2}{3}$ gr.		151
„ and Strychnine = 10 m. ...		148	„ Cinnam (Glyc. 30 m.)... ..		30
„ Strychnine & Quinine, 10 m		148	„ Formate, 1-8, $\frac{1}{2}$ gr.		35
Arsenil Iodide $1\frac{1}{10}$ gr.		146	„ o-Coumarate Sol. 25 m. ...		32
Atrop. Sulph., 1-100 gr		169	„ „ c. Novocain 25 m....		32
„ and Strych.		391	„ „ 25 m.		
Blood Corpuscles... ..		785	„ et Adrenalin 10 m. ...		32
Brandy, 1 dr.		102	Stovaine, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{2}{3}$ gr.		274
Cacodylatum Co., 17 m		151	„ c. Dextrin Sol. 1-5 &		
Caffeine Sod. Benz., 1 to 4 gr....		199	2 Cc....		275

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Sterules Hypodermic— <i>cont.</i>			Streptococcus Conglomeratus ...		780
Stovaine, Glucose Solutions 1 Cc.		274	„ Lebenis ...		46
„ Strychnine (various)			Strong & Seligman's Sol., ...		868
„ 1 Cc. ...		275	Strontii Brom. (Exsic., 4-24 gr.)		
Strych. Sulph., 1-100, 1-50 gr. ...		654	5-30 gr. ...		191, 648
Thiosinamin, $\frac{1}{2}$ to 2 gr. 625;			„ Carbonas, 5-30 gr. ...		649
with Antipyrin = 17 m. Inj.		627	„ Cinnamas, 2-5 gr. ...		30
Trypsin, 30 m. et c. Cocaina,			„ Glyceroph., 3-8 gr. ...		61
1-10 gr. ...		517	„ Iodid, 5 to 20 gr. ...		649
Tuberculin Dilutions ...	794 et seq		„ Lactas, 5 to 30 gr. ...		649
Water Distilled ...		172	„ Perboras ...		10
Sterules, Ionic ...		425	„ Salicyl., 5-20 gr. ...		649
Adrenalin ...			<i>Strophanthi Semina</i> ...		649
Cocaine ...			„ Phys. Standardi ed 300 et seq.		651
Copper Sulphate ...			Strophanthin, 1-300 to 1-100 gr. ...		650
Lithium Chloride ...			<i>Strychnina</i> , 1-60 to 1-15 gr. ...		652
Magnes. Sulphate ...			„ Iontophoresis ...		424
Potassium Iodide ...			„ Test for ...		168
„ Permanganate ...		425	Strychninæ Acetas 653; Arsenas,		
Quinine HCl, Acid ...			1-60 to 1-15 gr. 653; Escodylas,		
Silver Nitrate ...			1-30 to $\frac{1}{2}$ gr., 151; Formas, 1-50		
Sodium Chloride ...			gr., 36; Glyceroph., 1/60 to $\frac{1}{10}$		
„ Salicylate ...			gr., 61; HBr., 653; HCl., 653;		
„ Sulphide ...			Nitras, 651; Phosph. Acid.,		
„ Sulph. ...			Sulph. & Sulph. Acid, 1-60 to		
Sterules, Ophthalmic ...		646	1-15 gr., 651; Valserianas, 1-25		
Adrenalin Chlor. ...		829	to 1-10 m. ...		654
Argyrol, 10 and 25% ...		139	Strychnos ...		483
Atrop. Sulph., 1% ...		170	Styptic Colloid 283; Gelatin, 829;		
„ Sulph., 2 gr. with Cocaine			Wool ...		324
(HCl) 10 gr. to oz. ...		170	Stypticin, $\frac{1}{4}$ $\frac{1}{2}$ gr., or if urgent		
Cocaine HCl., 10 gr. to oz. (&			up to 4 gr. ...		483
tube form) ...		264	„ Gauze and Wool ...		464
Dionin, 5% ...		458	Styptol, $\frac{1}{4}$ gr. ...		464
Euphthalmine, 10 gr. to oz. ...		173	Styracol, 5 to 15 gr. ...		294
Fluorescein et Sod. Bic. ...		249	<i>Styrax Prep.</i> , av. U.S. 15 gr. ...		727
Holocaine, 1% ...		270	Sublamin ...		362
Homatropine HBr., 4 gr. (et c.			Sublimate Disinf., 375; Wool ...		375
Cocaina, 10 gr. to oz.) ...		172	Subradium ...		594
Physostigmin. Sulph., 4 gr. to oz.		536	Succinic peroxide, 2 gr. ...		78
„ 1 gr., et c. Cocain,			Succinum 727; Succinyl Choline		3
4 gr. ...		536	<i>Succus Acalypha</i> , 1 to 4 dr. ...		732
Pilocarpine Nit., 0.5% ...		432	„ <i>Adhatode</i> , 1 to 4 dr. ...		732
Protargol, 10 and 25% ...		141	„ Allii, 10 to 30 m. ...		690
Sterules, Large (tube			„ Alterans, 1 dr. ...		727
form) 10 min. Cocaine HCl.,			„ Ari, 1 dr. ...		729
5, 10% ...		264	„ <i>Bellad.</i> , 5 to 15 m. ...		181
Steven's Consumption Cure ...		749	„ Chelidonii, 10-60 m. ...		700
Stibium Sulphurat Rub. ...		129	„ <i>Conii</i> , 1 to 2 dr. ...		288
Still's Diplococcus ...		766, 767	„ Digitalis, 5 to 10 m. ...		302
Stillingia, 30 gr. ...		727	„ Galli, 1 to 2 dr. ...		706
Stockholm Tar, 2 to 10 gr. ...		553	„ <i>Hyoscy.</i> , $\frac{1}{2}$ to 1 dr. ...		392
Stokes' Liniment ...		547	„ Mori, 1 dr. ...		715
Stomach Contents, Exam. ...		893	„ <i>Scoparii</i> , 1 to 2 dr. ...		
„ Tubes, 218, 893; Inflation ...		893	„ <i>Taraxaci</i> 1 to 2 dr. ...		728
Stomagen, 749; Stomoxys ...		790	Sucrose, Sugar ...		613
Stone Root, 702; Storax ...		727	Sudan Red ...		251
Stovaine, $\frac{1}{4}$ to $\frac{1}{2}$, max. 2 gr. 273;			Sugar Coating ...		539
Gargle, Ointment, Pastils, Snuff			„ Grape ...		337
Solution (internal) ...		277	„ Inverted ...		614
<i>Stramonium</i> ...		647	„ of Lead ...		556
Strawberry = <i>Fragaria Vesca</i> L.			„ in Urine ...		875
(Rosaceæ).			„ Whey, Lactic Acid Bacilli		
Streptococcus ...		779, 907, 924	Bouillon ...		55

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Sulfas Aethyl. Acid. c. Spirit...		79	Suppos. Veronal, 4 to 8 gr. ...		678
Sulphates, Ethereal ...		884	Supra-renal Caps., Ext. Dry.		
Sulphaqua Charges ...		659	Liq., Suppos. (et c. Morph., $\frac{1}{2}$		
Sulphonol, 10 to 30 gr. ...		655	to 3 gr.), Inj. (Hyp. and Uterine),		
Sulphonethylmethanum ...		656	Snuff, Spray, Tabellæ, 1 or more		
Sulphonmethanum ...		655	Ung....	752, 824, et seq.	
Sulphur. Lime Depilatory...		207	Supra-renal. ...	826, 827	
Sulphuretted Hydrogen ...		659	Surgical Lubricant ...	19	
Sulphuric Ions, Medical use of.		423	Surgical Soap, 620; Solvent ...	517	
Sulphuric Anhydride ...		80	Surra, 909; Sutherlandia ...	727	
Sulph. Chlor.; Hypochlor...		658	Sutures, vide Catgut ...	20, 21	
" Iodidum ...		658	Swabs, Steriloid, Triang ...	353	
" Lotum ...		657	Sweet gale, 695; Vernal Grass ...	692	
" Precip., Sublim 20 to 60 gr		657	Sydenham's Laudanum, 5 to 20 m.	507	
Sumach, 15 gr. ...		722	Syls, 1 to 2 drachms:—	348, 350	
Sumbul Radiz. Av. 30 gr....		727	Amygd., Anethi, Anisi., Aurant.		
Sundew 704; Sunlight ...		589, 853	Awar., Aurant. Flor., Caroi,		
Suppositories, 659; Hollow, 343:			Caryoph., Cinnam., Fœnicul,		
I.C. Add. 739; Vaginal, U.S. ...		343	Lavand., Limonis, Menth.		
Suppos. Acidi Borici, 3 gr. ...		8	Pip., Menth. Vir., Myrst.,		
" " Carbol., 1gr....		23	Pimentæ, Pini, Rosæ, Sassa,		
" " Tannici, 3gr....		82	Thymi, Vanilla.		
" Adrenalin, 10 m....		829	Sylphium, 728; Symphytum ...	727	
" " c. Formidin, Co-			Symploci Folia ...	727	
" cain & Hamamelis		829	" Racemos, 20 gr. ...	727	
" Aloes ...		115	Syphilis ... 157, 358 et seq., 783, 997		
" Argylol ...		139	" Diagnosis Tests ...	783	
" Aristol, 1 gr. ...		402	" Chemical "	788	
" Atropinæ et Plumbi Iod.			Syringes, 216, 218; Hypodermic...	262	
(Vaginales) C.H.W.			Syrupus ...	614	
" Bellad., $\frac{1}{2}$ gr. ...		181	" Acaciæ ...	672	
" " et Morph., $\frac{1}{4}$ gr....		181	" Acid Hydriodic, 1%,		
" Bismuthi Oxychl., 10 gr.		187	20 to 60 m.	412	
" " Salicyl., 10 gr....		188	" " Citrici ...	441	
" " Subnit., 10 gr.			" Aconiti ...	86	
" Carnis ...		527	" Alli Acet., 1 to 4 dr....	690	
" Chloral, 5 gr. ...		229	" Apomorph. HCl., $\frac{1}{2}$ to 1 dr.	134	
" Chrysarobin, $\frac{1}{2}$ gr. ...		236	" Aromatic., $\frac{1}{2}$ to 1 dr....	307	
" Cocainæ, $\frac{1}{2}$ gr. or more, c.			" Aurantii, $\frac{1}{2}$ to 1 dr....	174	
Morphina, $\frac{1}{2}$ gr. ...		264	" " Floris, $\frac{1}{2}$ to 1 dr.	173	
" Cocainæ Vaginal, 2 gr. ...		264	" Benzaldehyd Hydrocyanic,		
" Collargol (& Co.), $2\frac{1}{2}$ gr.		139	eous, $\frac{1}{2}$ to 1 dr.	587	
" Cubebæ, 10 gr. ...		295	" Calcii et Fe. Laetoph.,		
" Eucalypti 5 gr. ...		705	$\frac{1}{2}$ to 1 dr. ...	44	
" Euphyllin, 5 gr. ...		665	" " Hypoph., 1-4 dr....	531	
" Gallæ, 5 gr., et c. Opio, 1 gr.			" " Lactoph., $\frac{1}{2}$ -1 dr....	43	
" Glycerin ...		343	" Camph. Co., 1 dr. ...	507	
" Hamamelidis Co....		357	" Cuscare Aromat. $\frac{1}{2}$ -2 dr....	221	
" Hamamelin, 1 and 3 gr....		357	" Chloral, $\frac{1}{2}$ to 2 dr. ...	229	
" Hydrargyri ...		360	" Cocainæ, 1 dr. ...	264	
" Ichthyol, 3 gr. ...		396	" Cocillanæ Co., $\frac{1}{2}$ to 1 dr.	702	
" Iodoformi, 1, 3, 5 gr.		401	" Codeinæ, $\frac{1}{2}$ to 2 dr....	279	
" " c. Eucalyp. Oil, 5 m.			" Coffeæ ...	198	
" Morphinæ, $\frac{1}{4}$ -2 gr....		457	" Cyllin, 5 to 60 m. ...	16	
" Nutrient ...		527	" Digitalis ...	302	
" Olei Cinerei ...		363	" Digitoxin, 1 to 4 dr. ...	305	
" Opii, 1 gr. ...			" Dusan, 2-4 dr. ...	44	
" Peptonised Beef ...		527	" Eastoni, $\frac{1}{2}$ to 1 dr. ...	331	
" " Pesar " ...		659	" " Liq. pro, 9-18 m. ...	341	
" Plumbi c. Opio ...		106	" Eucalypti Gum., $\frac{1}{2}$ -1 dr.	705	
" Rauuncali ...		609	" Ferri et Quin. Cit., 1 dr.	569	
" Santonini, 3 gr. ...		616	" " Iodidi, $\frac{1}{2}$ to 1 dr. ...	329	
" Supra-renal (et c. Morph.)		825	" " Phosph., $\frac{1}{2}$ -1 dr. ...	330	
" Trypsin ...		517	" " Phosph. Co., $\frac{1}{2}$ to 2 dr.	330	

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
<i>Syrupus Ferri Phosph. c. Quin et Strych.</i> ('Easton'), $\frac{1}{2}$ to 1 dr. ...		331	<i>Tabellæ, Chocolate Tablets (cont.)</i> —		
" <i>Ficorum</i> , 1 to 4 dr. ...		308	" <i>Exalgin</i> , $\frac{1}{2}$ gr. ...		248
" <i>Formatum Co.</i> , 1-2 dr....		36	" <i>Glonoini</i> , 1-100 gr. ...		468
" <i>Glucosi</i> ...		538	" <i>Glycyrrhizæ, p.r.n.</i> ...		348
" <i>Glyceroph.</i> , 1 to 4 dr....		63	" <i>Mannitol Nit.</i> , 1 gr....		315
" " <i>Co.</i> , 1 to 2 dr....		63	" <i>Menthol</i> , 1-5 gr. ...		452
" " <i>c.Format.</i> 1 dr. ...		63	" <i>Nitroglycerini</i> , 1-600, 1-400, 1-200, 1-100, 1-75, 1-50, 1-25 gr., and 1 mgr., 1 or 2 ...		467
" <i>Hemidesmi</i> , $\frac{1}{2}$ to 1 dr. ...			{ <i>Nitroglyc.</i> , $\frac{1}{100}$ to $\frac{1}{10}$...		468
" <i>Heroin</i> . 1 to 2 dr. ...		459	{ <i>Strych.</i> , $\frac{1}{100}$ to $\frac{1}{10}$...		468
" <i>Hypoph. U.S.</i> , 2 dr. ...		534	" <i>Nitroglyc. Co.</i> , 1 or 2 ...		528
" " <i>Co.</i> , $\frac{1}{2}$ -2 dr. ...		533	" <i>Pepsinæ</i> , 3 gr....		528
" " " <i>Cloudy</i> , 1 to 2 dr. ...		533	" " <i>et Caffeinæ</i> , 1 to 2 after food ...		528
" " <i>Fellows'</i> , 1 to 2 dr....		533	" <i>Quin. Tannat.</i> , 1 gr. ...		578
" <i>Iodo-Tannic.</i> , $\frac{1}{2}$ -2 dr....		408	" <i>Strophanthi Tinct.</i> 4 m. ...		651
" <i>Ipecac.</i> ...		428	" <i>Suprarenal Ext.</i> $\frac{1}{2}$ gr. ...		825
" <i>Kolæ Co.</i> , 1 to 2 dr....		198	" <i>Trinitrini</i> , 1-100 gr. ...		466
" <i>Krameria</i> , U.S., 1 dr....		711	Tablets, Compressed—Tablettæ,		
" <i>Lactucarii</i> , av. 2 dr....		394	660. <i>In demand are:</i>		
" <i>Limonis</i> , $\frac{1}{2}$ to 1 dr. ...		712	(Working Formulæ for 660 <i>et seq.</i>)		
" <i>Maidis Stigmatæ</i> ...		713	<i>Acetanilide</i> , 3 gr., <i>et c. Caffeine</i> , 1 gr 243		
" <i>Mori</i> , 1 dr. ...		715	<i>Aceto-Salicyl. Acid</i> , 5, 8 gr. (and with <i>Phenacetin</i> also <i>Dover Pdr.</i>) ...		73
" <i>Opii</i> , $\frac{1}{2}$ to 1 dr. ...		506	<i>Acid Lactic Bacilli</i> , 6 p.d ...		46
" <i>Picis Liq.</i> , 1 to 2 dr....		554	<i>Acidol</i> , 8 gr. ...		3
" " <i>c. Codeina</i> , $\frac{1}{2}$ to 2 dr. ...		554	" <i>Pepsin</i> , 2 strengths... ..		3
" <i>Pilocarpin et Pot. Brom.</i> , 1 dr. to 1 oz. ...		433	<i>Aconiti</i> =5 m. <i>Tincture</i> ...		87
" <i>Pini Strobi</i> ...		719	<i>Albargin</i> , 3 gr. ...		141
" <i>Pini Pumil.</i> , 1 dr. ...		548	<i>Aloes et Myrrh</i> , 4 gr. ...		113
" <i>Pot. Cyan. c. Morph.</i> , 1 dr. ...		562	" 4 gr. <i>et Ferri</i> 4 gr....		113
" <i>Pruni Virg.</i> , $\frac{1}{2}$ to 1 dr....		567	<i>Aloin</i> , 1-10 and $\frac{1}{2}$ gr., ...		115
" <i>Rami</i> , acc. to age ...		193	" <i>Compound</i> ...		115
" <i>Rhei</i> , $\frac{1}{2}$ to 2 dr. ...		612	<i>Alypin</i> , $\frac{1}{2}$ to 3 $\frac{1}{2}$ gr. ...		271
" " <i>Aromat.</i> , av. 2 dr. ...		612	<i>Ammon. Brom.</i> , 5 & 10 gr. ...		118
" <i>Rhæados</i> , $\frac{1}{2}$ to 1 dr....		739	" <i>Chlor.</i> , 3 & 5 gr. ...		118
" <i>Rosæ</i> , $\frac{1}{2}$ to 1 dr. ...		722	" " 3 c. <i>Borax</i> 2 gr. ...		119
" <i>Rubi</i> , 1 dr. ...		722	" " <i>c. Glyc. Ext.</i> 3 gr. ...		577
" <i>Scilla</i> (& Co. U.S.) 30 to 60 m. ...		724	<i>Quinine and Comp.</i> ...		115
" <i>Senegæ</i> , U.S., 1 dr. ...		725	<i>Anticonstipation</i> ...		115
" <i>Sennæ</i> , $\frac{1}{2}$ to 2 dr. ...		623	<i>Antifebrin</i> , 3 gr. (<i>et c. Caffeine</i> , 1 gr.) ...		243
" <i>Sod. Format.</i> , 2 dr. ...		35	<i>Antipyrine</i> , 2 $\frac{1}{2}$ and 5 gr. (<i>et</i> 3 gr. <i>c. Caffeine</i> , 1 gr.) ...		253
" <i>Sulphatum</i> , 4 dr. ...		207	<i>Antisclerosin</i> , 6 p.d. ...		630
" <i>Tann-Iodo-phosp.</i> , $\frac{1}{2}$ to 2 dr. ...		409	<i>Antiseptic</i> (Thymol, etc.)		
" <i>Thymi</i> , 1 to 4 dr. ...		729	<i>Antityphoid</i> , 640 ; <i>Aphrodine</i>		731
" <i>Tolu.</i> , $\frac{1}{2}$ to 1 dr. ...		694	<i>Apomorphine</i> , 1-100, 1-50 gr. ...		134
" <i>Triplex</i> , 1 to 2 dr. ...		331	<i>Arsamin</i> , 1 gr. ...		155
" <i>Trium Phosph.</i> , 1 to 2 dr. ...		331	{ <i>Arsenic</i> , 1-60 gr. ...		146
" <i>Urginæ</i> , $\frac{1}{2}$ to 1 dr. ...		738	{ <i>Iron Hypoph.</i> , 2 gr. ...		146
" <i>Violæ, ad lib.</i> ...		730	{ <i>Quin. Ac. Sulph.</i> 1 gr. ...		143
" <i>Zingib.</i> , $\frac{1}{2}$ to 1 dr. ...		686	<i>Arsenious Acid</i> , 1-100, 1-50, 1-20 gr. ...		143
<i>Sys Specific</i> , 506; <i>Syzygium</i> ...		710	" " 1-64 gr., with <i>Mercuric Chloride</i> , 1-64 gr ...		145
<i>'T.O.A.'</i> ...		810	<i>Aspirin</i> , 5, 8 and 16 gr. ...		73
Tabellæ, Chocolate Tablets—			<i>Atrop. Sulph.</i> , $\frac{1}{100}$ gr. ...		168
" <i>Antiasthmat.</i> , 1 to 4 t.d. ...		468	<i>Benzoic Co.=Benzoic Acid</i> , $\frac{1}{2}$; <i>Codeine</i> , 1-10; <i>Ipecac.</i> , 1-10; <i>Menthol</i> , 1-10, <i>Red Gum</i> , $\frac{1}{2}$ gr.;		
" <i>Antimonii Sulph.</i> (0.01 G.) ...		129			
" <i>Apomorph.</i> , 1-50, 1-30 gr. ...		134			
" <i>Bismuthi et Pepsin, aa.</i> 3 gr. ...		185, 528			
" <i>Caffeinæ Cit.</i> , 1 gr. ...		199			
" <i>Cocainæ</i> , 1-20 to 1-8 gr. ...		264			
" <i>Digitalin</i> $\frac{1}{10}$ gr., <i>et Nitroglycerin</i> , $\frac{1}{100}$ gr. ...		305			
" <i>Erythrol Nitratis</i> , $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 gr., 1 or 2 ...		314			

NAME.	DOSE.	PAGE
Tablets, Compressed—680—cont.		
<i>For Effervescing Compounds</i>		
<i>see 'Vesceotes.'</i>		
Benzonaphthol, 5 gr.	461
Benzosalic, 8 gr.	74
Benzosol, 5 gr.	293
Betanaphthol, 3 and 5 gr.	461
Bismuth Carb., 5 gr.	183
Salicyl., 5 gr.	183
Subnit., 5 and 10 gr.	189
et Pepsin, aa 3 gr.	185
Pepsin and Charcoal 2 gr. each,		
Bland's Pill, 4 and 8 gr....	...	323
" 4 gr. c. Arsen. $\frac{1}{4}$ gr.	...	145
Boric Acid, 5 gr.	8
Bromipin=9 gr. Pot. Brom.	192
Bromural, 5 gr.	677
Butyl-Chloral c. Gelsem.	195
Caffeine, 1 c. Antipyrin 3 gr.	199
Cit., 2 gr.	199
HBr., 2 gr.	199
" 1 gr. c. Phenacetin,		
4 gr.	199
Calc. Lact., 5 gr.	43
Calc. Sulph., $\frac{1}{4}$, $\frac{1}{2}$, 1 gr....	...	207
Calomel, $\frac{1}{10}$ to 5 gr.	379
Calcosol	553
{ Camphor, $\frac{1}{4}$ gr. }		
{ Quin. Ac. Sulph., 1 gr. }	...	210
Camph. Monobr., 1 gr....	...	211
Carbolic Acid, $\frac{1}{4}$, $\frac{1}{2}$ gr....	...	12
Cascara Ext. 1 to 5 gr....	...	723
Cerebrin, 5 gr.	820
Ceredin = 1 dr. Yeast	224
Chinosol, 5, 8, 15 gr.	247
Chloralamide, 5 gr.	229
Chloral Hyd., 5 and 10 gr.	...	
<i>(to be dissolved)</i>	229
Cholelysin, 619; Chologen	558
Citarin, 15 and 30 gr.	110
Codeine, $\frac{1}{4}$, $\frac{1}{2}$ gr. (& Phosph.,		
$\frac{1}{2}$ gr., 279)	278
Colalin, $\frac{1}{2}$ and $\frac{1}{4}$ gr.	644
Laxative, $1\frac{1}{2}$ gr....	...	645
Collargol, 1 gr.	139
Col. Co. = 4 gr. pill (<i>Off.</i>)		
Comp. Hypophosphites...	...	533
Cotarnin H.Cl., $\frac{1}{4}$ gr.	463
Phthalate, 1gr....	...	464
Didymin, 5 gr.	823
Digipuratum, $1\frac{1}{2}$ gr.	306
Digitoxin, 1-250 gr.	305
Dinner, 568; Diuretin, 5 gr.	665
Dover's Powder, 5 gr.	428
Duodenal Ext. = 5 gr....	...	820
Easton Syrup = $\frac{1}{2}$ & 1 dr. (& c.		
Arsen.)	332
Ergotin, 1, 2 and 3 gr.	311
Eucaine- β , $\frac{1}{10}$ gr.	279
Euconymin, 1-8, $\frac{1}{2}$ gr.	318
Euquinine, 8 gr.	579
Exodin, 0.5 gm.	223
Fæxin Ext., 3 gr.	224
Ferri Arsenas, 1.8 gr.	147

NAME.	DOSE.	PAGE
Tablets, Compressed—660—cont.		
Ferri Carb. Sacch., 5 gr.	322
" Quin. Citr., 3 gr....	...	569
Ferrum Redactum, 2 gr.	112
Formaldehyde Internal	111
Disinfectant	111
$\frac{1}{4}$ gr. c. Sacch. Lact.		
2 gr. internal	112
Formamint...	112
Glandulen, 4 gr.	835
Gland Thyroid Sicc. $1\frac{1}{2}$, 5 gr.	833
Glyceroph., Co.	62
" with Hæmoglobin...	...	62
Grey Powder, $\frac{1}{4}$ to 3 gr.		
Grey Powder 1 gr. and Dover's		
Powder, 1 gr.		
Guaiacol Benz., 5 gr.	293
Carb., 5 gr.	294
Guaiac. & Sulph., aa 3 gr.	355
" " with 2 gr. Quin.		
Salicyl. $\frac{1}{2}$ gr.		
Hedonal, $7\frac{1}{2}$ gr. & 16 gr....	...	678
Helmitol, 5 gr.	552
Hetralin, $7\frac{1}{2}$ gr.	553
Hexamethylenamin, 3, 5, $7\frac{1}{2}$ gr.	...	552
Hopogan, 0.3 gm....	...	383
Hyd. Iodidum Flav., $\frac{1}{8}$ gr.	...	370
" Rub., $\frac{1}{10}$ gr.	...	367
" Vir., $\frac{1}{8}$ gr.	370
Perchlor., $\frac{1}{10}$, $\frac{1}{2}$, $\frac{1}{8}$, &		
$\frac{1}{10}$ gr.	375
Subchlor., $\frac{1}{10}$, $\frac{1}{2}$, $\frac{1}{8}$, $\frac{1}{10}$,		
1, 2, 3, 4, and 5 gr.	...	379
Hydrastine Compound	384
Ichthyol, $2\frac{1}{2}$ gr.	396
Iodipin, 3 gr. of 25%	406
Iodomenin, $7\frac{1}{2}$ gr.	411
Iodothyrin, 5 gr.	833
Ipecac., 1-20, 1-10, $\frac{1}{4}$, 5 gr.	...	426
Iron Carb. Sacch., 5 gr....	...	322
Kermetic, 0.01 Gm.	129
Lactic Acid Bacilli, 6 p.d.	...	48, 56
Lactobacilline	57
Lecithin, $1\frac{1}{2}$ gr.	437
Lithium Carb., 5 gr.	439
Citrate, 5 gr....	...	439
Livingstone Rousers	577
Lycetol, 10 & 16 gr.	551
Magnes Perox	388
Mag. Sulphite, 5 gr.	81
Manganese Diox., 2 gr....	...	446
Marlenbad...	115
Salt, 60 gr.	612
Mercur. Ethyl-diamin	363
Migralgin, 15 gr....	...	201
{ Nitroglycerin, $\frac{1}{10}$ gr. }		
{ Sod. Iodid, 15 gr. }	4 tis	
{ Liq. Arsenical, 2m. }	hor.	
... 467		
Nitropropiol (Sugar Test)	879
Nuclein, 1 gr.	225
Opium Powder, $\frac{1}{4}$, 1 gr....	...	506
Orethit Subst., 5 gr.	823
Orexine Tannate, 4 gr....	...	251
Ovarian Subst., 5 gr.	821

NAME.	DOSE.	PAGE
Tablets, Compressed—660—cont.		
<i>For Effervescent Compounds see Vescettes.</i>		
Ox Bile, keratined, 5 gr....	...	320
Pancreatin and Soda	...	513
Papain, 2 and 5 gr.	...	519
Pelargonium Compound	...	719
Pepsin, 3 gr.	...	528
3 gr. et Caffeinæ, 2 gr....	...	528
Peptonic (Pepsin, Pancreatin, Calcium Lactoph., each 1 gr.)
Phenacetin, 4, 5 and 10 gr., 252;
4 gr., c. with Caffeine, 1 gr.	...	252
2½ gr., and Sulphonal,
2½ gr.	...	252
Phenalgin, 2½ gr.	...	244
Phenolphthalein, ½, 2, 4 gr.	...	25
Comp.	...	25
Pilocarpin. Nit., ½, 1 gr....	...	432
Piperazine, 5 gr.	...	550
Podophyllin, ½ to 1 gr.	...	557
Potass. Bicarb., 5 gr.
Brom., 5, 10 gr.	...	560
Chlor., 5 gr.	...	561
3 gr., c. Ammon.
Chlor. 1 gr., c. Borax, 2 gr.,
et c. Borac et Cocaine	...	561
Iodide, 5 gr....	...	564
Permang., 1, 2, 3 gr....	...	449
Proponal, 7½ gr....	...	677
Pulv. Cretæ Aromat., c. Opio,
5 gr	...	506
Purgen	...	25
Quin. Acetyl-Salicyl., 3 gr.	...	574
HBr., 3 and 5 gr....	...	570
3 gr. c. Phenac., 5 gr.	...	570
HCl., 1 to 5 gr.	...	571
Acid, 1, 3, 5 gr.	...	572
Salicyl., 3 gr.	...	574
Sulph., 1 to 5 gr....	...	576
Acid, ½ to 5 gr.	...	577
Camph., Morph. et
Atrop.	...	577
Red Bone Marrow, 3 gr....	...	818
Regenerative, 6 per diem	...	830
Rennet, 525; Rennin, 1 gr	...	525
Resorecin, 3 gr.	...	610
Rhubarb, Soda and Ginger	...	611
Rodagen	...	835
Saccharin, ½ gr.	...	613
Salicin, 5 gr.	...	75
Salipyrin, 5 gr.	...	254
Salol, 5 gr. 75; Salophen, 3 gr....	...	77
Santonin, 1, 2 & 3 gr.	...	616
Sidonal, New. 7½ gr. each	...	551
Soda Mint (Sod. Bicarb., Am.
Carb., & Mint)
Sodii Acid Sulph.	...	640
Benzoate, 2 gr.	...	5
Bicarb., 5 gr.;
Bisulph for Baths	...	640
Bromid., 5 gr.	...	631
Chlor. et Borac.	...	633
Citras, 5 & 10 gr.	...	478, 634

NAME.	DOSE.	PAGE
Tablets, Compressed—660—cont.		
Sodii Nitris, 2½ gr.	...	636
Salicyl., 3 & 5 gr.	...	71
Soluroil, 4 gr.	...	831
Spinal Cord, 2½ gr.	...	820
Strontium Brom., 5 gr....	...	648
Strophant. Tinct., 2 & 5 m.	...	661
Strych. Sulph., 1-60 to 1-30 gr.	...	654
Strych. c. Nitroglyc. (Tabellæ)	...	468
Stypticin, ¾ gr.	...	463
Styptol ¾ gr.	...	464
Sublamin (poison), 15 gr.	...	363
Sulphonal, 5 gr.	...	656
Sulphur Precip. 5 gr., c Pot.
Acid. Tart., 1 gr.	...	658
Supra-renal 5 gr.	...	825
Syr. Easton = ½ & 1 dr....	...	332
Tannigen, 5 gr.	...	82
Tetronal, 5 gr.	...	656
Theobrom. Sod. Salicyl, 5 gr.	...	665
Thebromine Quebracho	...	665
Theocin, 4 gr. 665; Theocin Sod.
Acet., 4 gr.	...	666
Theophylline, 4 gr.	...	665
Thymic Acid, 4 gr.	...	831
Thymol Carb., 10 gr.	...	671
Thymus Gland, 3 & 5 gr....	...	831
Thyresol, 10 gr.	...	500
Thyroglandin, 2 gr.	...	833
Thyroid Pdr., 1½ & 5 gr....	...	833
Thyro-iodin, 0.3 gm.	...	833
Tinct. Aconit., 5 m.	...	87
Bellad., 2 & 5 m....	...	181
Cannab. = 5 m.	...	212
Nuc. Vom., 5, 10 m.	...	485
Opil., 5 & 10 m.	...	507
Quin. Ammon. = 1 dr	...	577
Comp.	...	577
Trilactine, 3 to 6 p.d.	...	46
Intestina', 3 to 6 p.d.	...	56
Trional, 5 gr.	...	656
Truncsek's Serum	...	630
Tylmarin, 5 gr.	...	33
Uranium Nit., 1 gr	...	675
Urethane, 5 gr.	...	677
Uricedin, 15 gr.	...	440
Urosin, 8 gr.	...	569
Urotropine, 3, 5, & 7½ gr.;
Eff. 4 gr....	...	552
Varium	...	821
Veronal, 5, 7½ and 10 gr.	...	676
Vesalvine, 5 gr.	...	552
Yohimbine HCl., 1-13 gr.	...	731
Zinc Oxide, 2 gr.	...	683
<i>For Effervescent Compounds see Vescettes.</i>		
Tablets, Hypodermic		
(Sterile Capsules of Distilled Water for dissolving, see p. 172.)
<i>Chiefly in demand are:—</i>		
Aconitine Nit., 1 to 2 gr.	...	88
Adrenalin, 1 to 2 gr., c Cocaine
HCl., ½ gr.	...	829

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Tablets, Hypodermic— <i>cont.</i>			<i>Tartar Emetic</i> ...	...	130
Adrovaine (Adrenalin) $\frac{1}{100}$ c.			Diaphoretic, $\frac{1}{4}$ to $\frac{1}{2}$ gr.		
Stovaine $\frac{1}{2}$ gr. ...		829	Emetic, 1 to 2 gr.		
Apomorph. HCl, $\frac{1}{20}$, $\frac{1}{10}$, $\frac{1}{5}$ gr. ...		134	Tartaric Acid, Lead in ...		83
Atropine Sulph., $\frac{1}{300}$ to $\frac{1}{10}$ gr. ...		189	Tartarus B. raxat., 30 gr. ...		10
B-Eucaine, $\frac{1}{10}$ gr. ...		270	Tasteless Purging Salt ...		637
Caffeine Sod. Salicyl., $\frac{1}{2}$ gr. ...		200	Tatcho, 749; Taurine ...		472
Cocaine Hyd., $\frac{1}{10}$ to $\frac{1}{2}$ gr. ...		263	Taxine (Taxus), 1-100 to 1-60 gr. ...		728
Codeine Phosph., $\frac{1}{4}$ gr. ...		279	Taylor's Medicine ...		749
Curare, $\frac{1}{12}$ gr. ...		703	Teetolla Treatment ...		749
Digitalin, $\frac{1}{10}$ gr. ...		305	Teinture d'Aconit max. single 9m.		86
{ Digitalin, $\frac{1}{100}$ gr. ... }			Teleradiography Apparatus ...		550
{ Strychnine HCl, $\frac{1}{10}$ gr. ... }		278	Telfairia ...		728
Ergotinine Cit., $\frac{1}{300}$ to $\frac{1}{100}$ gr. ...		312	Tenaline, 693; Tenax ...		554
Ergotinine $\frac{1}{100}$ gr. ...		312	Tephrosia ...		706
" $\frac{1}{100}$ with Morphine 1/6		312	Terebentum, 5 to 15 m. ...		661
" $\frac{1}{100}$ " Strychnine 1/20		312	Terebentene ...		546
Heroin HCl, $\frac{1}{12}$, $\frac{1}{12}$ gr. ...		459	Terebinthina Canad. ...		728
Homatropine HBr., $\frac{1}{100}$ and			" Chia, 5 to 10 gr. ...		728
$\frac{1}{300}$ gr. ...		172	<i>Terminalia Chebula</i> ...		736
Hyd. Perchlor., $\frac{1}{10}$, $\frac{1}{20}$, & $\frac{1}{30}$ gr. ...		375	Terpineol and Terpinolol ...		663
Hyoscine HBr., $\frac{1}{300}$ to $\frac{1}{12}$ gr. ...		390	Terpini Di-iodiodum, 2 cc. ...		662
Hyoscyamine Sulph., $\frac{1}{100}$, $\frac{1}{50}$ gr. ...		394	Terpinol, 1 to 5 m. 663; Terpinolene		663
Morphine Bimec., 1/8 and $\frac{1}{4}$ gr. ...		457	Terpin. Hydrat., 2 to 6 gr. ...		662
" HCl, 1/8 to 1 gr. ...		457	Terry's, Mrs., Cure ...		747
" Sulph., 1/8 to 1 gr. ...		457	Testiculin 15 to 30 m. ...		823
" c. Atropina ...		457	Tetanus Antitoxin 789; as Wound		
Nitroglycerin, 1/100 and 1/250 gr. ...		463	Dressing, 790; Intra-cerebral ...		790
Novocain, 'A', 'B', 'C', 'E' ...		272	Tetra-iodo-pyrrol, 1-3 gr. ...		403
Physostig. Salicyl., 1/500 gr. ...		536	Tetra-iodo-fluorescein ...		85
Picrotoxin, 1/100 gr. ...			Tetramethylthionine ...		249
Pilocarpine HCl, $\frac{1}{2}$ gr. ...		431	Tetra-oxy-phthalophenon ...		248
" Nit., $\frac{1}{16}$ to $\frac{1}{2}$ gr. ...		432	Tetronal, 10 to 20 gr. ...		656
Quinine HBr., $\frac{1}{2}$ gr. ...		570	Teucrium, 10 to 20 gr. ...		723
" HCl. Acid, 1, 2 and 3 gr. ...		572	Thalleioquin ...		568
Sclerotic Acid, $\frac{1}{2}$ gr. ...		314	Thallium Salts ...		668, 669
Sparteine Sulph., $\frac{1}{2}$ gr. ...		645	Thalline Sulph., 3 to 5 gr. ...		255
Strophanthin, $\frac{1}{10}$ gr. ...		651	Thapsia, 728; Thebaine ...		278, 463
Strychnine Nit., and Sulph.			Theine, 1 to 5 gr. ...		196
$\frac{1}{10}$ to $\frac{1}{20}$ gr. ...		654	Theobroma Ether-Alc. Sol. ...		660
Tropacocaine HCl. $\frac{1}{10}$ gr. ...		267	<i>Theobromatis Ol.</i> , 663; Pasta ...		664
Tyramine $\frac{1}{2}$ gr. ...		313	Theobromine, 1 to 5 gr. 196, 664, 883		
Tablets, Ophthalmic. Vide			" Aceto-Salicyl., 1 to 5 gr. ...		664
Lamellæ.			" Aniso, 5 to 15 gr. ...		665
Tablet Triturates, 661; Tablones		749	" Lithium-Benz., 6-15 gr. ...		666
Tachiol, 135; Tania ...		615	" Natrio-Salicyl. ...		664
Tannacides ...		334, 615	" Quebracho Tabs. ...		665
Taka-diasase, 1 to 5 gr. ...		446	" Sodio-Salicyl. 5-15 gr. ...		664
Talc (and Talc. Purif., U.S.) ...		435	" " Sodio Acetate, 10 to 15		
Tallquist's Scale ...		867	gr. ...		661
Tamarind 1 to 8 dr. ...		727	" " Sodium Formate, 8 to		
Tampons, Gauze, 352; Tamus		727	15 gr. ...		664
Tanacerum, 727; Tang-Kui		705	" " Sodium Iodide $7\frac{1}{2}$ to		
Tannalbin, 8 to 15 gr. ...		82	15 gr. ...		665
Tannigen, 6 to 15 gr. ...		82	" " Iodo-Salicyl., 2 to 10 gr.		665
Tannin, 2 to 5 gr. ...		81	Theocin, 3 to 4 gr. ...		665
" Albumin. ...		82	" Sodium Acetate, 2 to 4 gr. ...		665
" HCl. Test ...		862	Theophylline, 3 to 6 gr. ...		665
Tannoform, 82; Tanocool, 15 gr. ...		82	" Ethylene Diamine		
Tanret's Ergot. Inj., 312; Tansey.		727	(Injected), 6 gr. ...		665
Tar, 2 to 10 gr. ...		563	" Sodium ...		666
Tar Acids, 13; Oils ...		13	" Sod. Acet., 2 to 4 gr. ...		665
Taraxacum (U.S. 120 gr.)		727	Thephorin, 8 to 15 gr. ...		664
" Cocca, $\frac{1}{4}$ oz ...		728	Therapeutic Index ...		1047

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Theraplion, 749 ; Thermiol, 30 ; Thermofuge 343; Thermo-laine 352 ; Thermo-isolators ...	...	512	<i>Tinct. Adhatodæ</i> , 30-60 m....	...	732
Thermometric Equivs. ...	928, 929		" <i>Æsculi Hippoc.</i> , 10 m. ...	...	689
Thermos Flasks ...	512		" <i>Aloes</i> , 1½ to 2 dr., or ½-1 dr. rep. ...	...	114
Thialion, 1 dr. ...	440		" " Co., 1 to 2 dr....	...	114
Thieleman's Koleradraaber, av. 30 m. ...	288		" " P.G. iv. (1 to 5 Alc. 90%) , 5 to 15 m.	...	
Thigenol, 397 ; Thiocol, 15 gr. ...	294		" " et Myrrhæ, 30m. ...	114	
Thioform, 188 ; Thiol, & Preps., ...	397		" <i>Alstoniæ Const.</i> , 5 to 20 m.	691, 732	
Thionin Solution ...	917		" " <i>Schol.</i> , ½ to 1 dr.	691, 732	
Thiopinol, 659 ; Thio-Resorcin ...	611		" <i>Amara</i> , P.G. ...	707	
Thiosinamin, ½ gr. gradually incr. to 2 gr. ...	625		" <i>Androgroph.</i> , ½ to 1 dr.	732	
" Ethyl Iodide (Injected), 3 gr. ...	411		" <i>Anodyna</i> , 5 to 30 m....	507	
" Plaster Mull ...	625		" <i>Anthemidis</i> , 3-10 m....	692	
Tholaform Tabs. ...	112		" <i>Anthoxanthi</i> , 2-6 m....	692	
Thomss' Developers ...	580		" <i>Anticholerica Conradi</i> , dose acc. to age ...	288	
Thomassen's Treatment ...	563		" " <i>Thielemanni</i> , av. 30 m....	288	
Thoma-Zeiss Cytometer ...	867		" <i>Antiperiodica</i> , 1-4 dr....	577	
"Thoriac" ...	667		" <i>Apis Mellif</i> , 1 m. bly.	692	
Thorii Camph. - Sulphonas, Cin- nam., Glycerophosphas, Hy- droxidum, Nitras, Orthococum., 667 ; Lactas Oleas, Quinas, Salicyl., Sulphocarb., etc., ...	668		" <i>Apocyni Cann.</i> , 5 to 60 m. ...	133	
Thorium ...	666 et seq.		" <i>Aristolochiæ</i> , ½-1 dr.	733	
" Emanation ...	668		" <i>Arnica</i> , ½ to 1 dr.	733	
" Meso ...	666		" " <i>Flor.</i> , ½ to 1 dr.	733	
" Pads ...	668		" <i>Aromatica</i> = Cinnam. Co., 1 to 2 dr.	...	
" Radio ...	666		" <i>Asafetida</i> , ½ to 1 dr....	693	
Threadworm ...	615		" <i>Asclepiad.</i> , 5-40 m....	693	
Throphleol, 315 ; Thuja ...	728		" <i>Aurantii</i> , ½ to 1 dr....	174	
Thus Americanum ...	516		" <i>Azadiracta</i> , ½-1 dr....	733	
Thymaglycine, 1 to 2 dr ...	670		" <i>Baptisæ</i> , 5 to 30 m. ...	684	
<i>Thymol</i> , ½ to 2 gr. ...	669, 857		" <i>Bellad.</i> , 5 to 15 m. ...	181	
" Carb. (and Tabs. of), 5-15 gr. ...	335, 671		" <i>Benzoini Co.</i> , 30-60 m ...	4	
" Gauze ...	671		" " <i>Simp.</i> ...	4	
" Iodide = Aristol ...	402		" <i>Berberid.</i> , ½ to 1 dr....	733	
" Sol. (Volckmann's) ...	671, 670		" <i>Boldæ</i> , 10 to 20 m. ...	695	
" Wool ...	671		" <i>Bryoniæ</i> , 1 to 10 m. ...	695	
Thymolin, ...	671		" <i>Buchu</i> , ½ to 1 dr. ...	194	
Thymotal, 5 to 15 gr. ...	671		" <i>Cacti Grandif.</i> , 2-10 m ...	699	
Thymus Gland (Liq. Ext., ¼-2 dr.), 3-10 gr. ...	831		" <i>Calendulæ Flor.</i> , 5 to 20 m.	696	
Thymus Vulgaris ...	669, 729		" <i>Calotropis</i> , ½ to 1 dr....	733	
Thyresol, 4 to 8 gr....	500		" <i>Calumbæ</i> , ½ to 1 dr....	696	
Thyrocol, 5 gr. ...	833		" <i>Cumphi Co.</i> , 30-60 m....	506	
Thyro-glandia, 3 to 5 gr....	833		" <i>Cannabis Ind.</i> , 5-15m....	212	
Thyroid Anti-Serum ...	834		" <i>Cantharidis</i> , 5-15 m., or 2 to 5 m. rep. ...	213, 215	
" <i>Solution</i> , 5-15 m....	832		" <i>Capsici</i> , 5 to 15 m. ...	219	
Thyroidectin, 5 gr. ...	835		" " <i>Æther</i>	219	
<i>Thyroideum Siccum</i> , 3-10gr. ...	833		" " <i>Fortior</i> , 1 to 3 m. ...	219	
Thyro-iodin, 833 ; Tick Fever ...	909		" <i>Cardamomi & Co.</i> , ½ to 1 dr.	697	
Tibbles, 425 ; Tidman's Salt ...	631		" <i>Carminativa</i> , 2-10 m. ...	686	
Tiliæ Flores, Tilleul... ..	348		" <i>Cascara Sag.</i> , 10 to 60 m. ...	223	
Tillman's Dressing ...	353		" <i>Cascarilla</i> , ½ to 1 dr....	698	
<i>Tinct. Aconiti</i> , 5-15 m., or 2-5 m.. rep....	86		" <i>Castorei</i> , ½ to 1 dr. ...	699	
" " (Fleming) 1 to 5 m....	87		" <i>Catechu</i> , ½ to 1 dr....	699	
" " et Iodi ...	87		" <i>Chinæ Co. Whytii</i> ...	239	
" <i>Actææ</i> , 30 to 60 m. ...	701		" <i>Chirate</i> , ½ to 1 dr....	701	
			" <i>Chlorof. Co.</i> , 5-60 m....	235	
			" " et <i>Merphinae Co.</i> , 5-15 m.	235	
			" <i>Cimicifugæ</i> , 30-60 m....	701	
			" <i>Cinchonæ and Co.</i> , ½ to 1 dr.	239	
			" <i>Cinnamomi</i> (Co. P.L., 687), ½ to 1 dr. ...	240	

NAME.	DOSE.	PAGE
<i>Tinct. Cocci</i> , 5 to 15 m.	697
" <i>Colchici Sem.</i> , 5-15 m.	279
" " <i>Flor.</i> Recent, 10 to 30 m.	280
" <i>Collinsoniæ</i> , $\frac{1}{2}$ -2 dr.	702
" <i>Colocyth.</i> , 3-15 m.	284
" <i>Conii</i> , 30 to 60 m.	286
" <i>Convallar.</i> , 5-20 m.	287
" <i>Conrilla</i> , 30-60 m.	702
" <i>Coscini</i> , $\frac{1}{2}$ to 1 dr.	734
" <i>Coto</i> , 10 to 30 m.	288
" <i>Croci</i> , 5 to 15 m.	703
" <i>Cubebæ</i> , $\frac{1}{2}$ to 1 dr.	286
" <i>Cudbear</i>	62
" <i>Digitalis</i> , 5 to 15 m.	302
" " <i>phys. stand.</i> 299, 300, 302	...	302
" <i>Droseræ</i> , 5 to 10 m.	704
" <i>Elaterii Co.</i> , 10 to 30 m.	306
" <i>Ergotæ</i> , 5 to 30 m.	311
" " <i>Ammon.</i> , 30 to 60 m.	313
" <i>Erythrophlœi</i> , 5 to 10 m.	315
" <i>Eucalypti Fol.</i> , 15 to 120 m.	317
" " <i>Gum.</i> , 20 to 40 m.	705
" <i>Euonymi</i> , 10 to 40 m.	319
" <i>Euphorb. Pepli.</i> , 30 to 60 m. <i>in die</i>	319
" <i>Euphorbiæ Pil.</i> , 10 to 30 m.	320
" <i>Ferri Chlorati Aeth.</i>	325
" " <i>Chlor.</i> , av. 8m.	325
" " <i>Perchlor.</i> , 5 to 15 m.	325
" " <i>Pomat.</i> , 15 to 30 m.	328
" <i>Gallæ</i> , $\frac{1}{2}$ to 2 dr.
" <i>Gambir Co.</i> , 1 dr.	699
" <i>Gelsemii</i> , 5 to 15 m.	337
" <i>Gentianæ Co.</i> , $\frac{1}{2}$ -1 dr.	707
" <i>Gossypii Rad.</i> , 1 dr.	354
" <i>Guaiaci</i> , 1 in 10 (Blood Test), 865; U.S., 1 in 5	355
" " <i>Ammon.</i> , 30 to 60 m.	355
" <i>Guaranæ</i> , 30 to 60 m.	356
" <i>Hamam.</i> , 30 to 60 m.	357
" <i>Hydrastis</i> , 30 to 60 m.	385
" <i>Hyoscy.</i> , 30 to 60 m.	392
" " <i>Recent</i>	393
" <i>Ignatiæ</i> , 3 to 20 m.	485
" <i>Iodi</i> , 2 to 5 m.	409
" " <i>Churchill</i>	410
" " <i>Æther.</i> , 410; <i>Decol.</i> , 410; <i>Oleosa</i>	410
" <i>Ipecac.</i> (et <i>Opil.</i> U.S., 8 m., 425), 10 m.	428
" <i>Jaborandi</i> , 30 to 60 m.	431
" <i>Jalapæ</i> (et <i>Co.</i> , 737), 30 to 60 m.	434
" <i>Kaladance</i> , $\frac{1}{2}$ to 1 dr.	735
" <i>Kino</i> , 30 to 60 m.	711
" <i>Kolæ</i> , 20 to 60 m.	197
" <i>Koromiko</i> , $\frac{1}{2}$ to 1 dr.	711
" <i>Krameria</i> , 30 to 60 m.	711
" <i>Lachnanthis</i> , 1 to 10 m.	711
" <i>Lactucarii</i> , av. 30 m.	394
" <i>Lariciæ</i> , 20 to 30 m.
" <i>Lasiophon</i> , 10 to 60 m.	430
" <i>Lusand. Co.</i> , 30 to 60 m.	712
" <i>Laxativa</i> , 20 to 60 m.	223
" <i>Limonis</i> , 30 to 60 m.	712

NAME.	DOSE.	PAGE
<i>Tinct. Lobeliæ</i> , U.S. 15 m. expt., 60 m. emetic	713
" <i>Lobeliæ Æther.</i> , 5 to 15 m.	713
" <i>Lupuli</i> , 30 to 60 m.	713
" <i>Lycopodii</i> , 15 to 60 m.	713
" <i>Menthol Æther.</i>	452
" <i>Monsoniæ</i> 1 to 4 dr.	715
" <i>Moschi</i> , U.S., av. 1 dr.	716
" <i>Myrrhæ</i> , 30 to 60 m.	716
" " <i>et Boracis</i>	716
" <i>Nucis Vom.</i> , 5 to 15 m.	485
" <i>of Life</i>	670
" <i>Oleæ Fol.</i> , 15 to 30 m.	495
" <i>Oliveri Cort.</i> , $\frac{1}{2}$ to 1 dr.	736
" <i>Opii</i> , 20 to 30 m.; 5 to 15 m. rep.	507
" " <i>Ammon.</i> , 30 to 60 m.	508
" " <i>Benz.</i> , $\frac{1}{2}$ -1 dr.	508
" " <i>Camph.</i> , av. 2 dr.	506
" " <i>Crocata</i> , 5 to 20 m.	507
" " <i>Deod.</i> , av. 8 m.	509
" <i>Persionis</i>	62
" <i>Phosphori Co.</i> , 3 to 12 m.	530
" <i>Physostig.</i> , 5 to 15 m.	535
" <i>Phytolac.</i> 3 to 10 m.	719
" <i>Picrorhizæ</i> , $\frac{1}{2}$ to 1 dr.	736
" <i>Podophylli</i> (<i>Indici</i> , 5 to 15 m., 737), 5 to 15 m.	558
" <i>Podopayllin Ammon.</i> , 10 to 20 m.	558
" <i>Pruni Virg.</i> , 30 to 60 m.	568
" <i>Pyrethri</i>	720
" <i>Quassia</i> , 30 to 60 m.	720
" <i>Quebracho</i> , 30 to 60 m.	721
" <i>Quillaizæ</i> , 30 to 60 m.	721
" <i>Quinina</i> , 30 to 60 m.	571
" <i>Quinina Am.</i> , 30 to 60 m.	577
" <i>Rhei Co.</i> , 2 to 4 dr.; $\frac{1}{2}$ -1 dr. rep.	612
" " <i>Aquas.</i> , <i>Vinosa</i> , 1 to 2 dr.	612
" " <i>Aromat.</i> , av. 30 m.	612
" <i>Rhois</i> , 2 to 15 m.	722
" <i>Rumicis</i> , 1 to 10 m.	723
" <i>Sanguinariæ</i> , av. 15 m.	723
" <i>Scillæ</i> , 5 to 15 m.	724
" <i>Scopolæ</i> , 5 to 20 m.	724
" <i>Senecionis</i> , 1 to 2 dr.	725
" <i>Senegæ</i> , 30 to 60 m.	725
" <i>Sennæ Co.</i> , (and <i>Legum.</i>) $\frac{1}{2}$ -1 dr. rep.	623
" <i>Serpentariæ</i> , 30 to 60 m.	725
" <i>Spigeliæ</i> , U.S., 1890
" <i>Stramontii</i> , 5 to 15 m.	647
" <i>Strophanthi</i> , 5 to 15 m.	650
" " <i>Phys. Standard</i> 301,	752
" <i>Sumbul</i> , 30 to 60 m.	727
" <i>Sydenham's</i> , 5 to 20 m.	507
" <i>Tami Communis</i>	727
" <i>Thebaica benz.</i>	506
" <i>Thuja</i> , 2 to 5 m.	728
" <i>Tinosporæ</i> , $\frac{1}{2}$ to 1 dr.	737
" <i>Tolutana</i> , 30 to 60 m.	694
" <i>Urginæ</i> , 5 to 15 m.	738

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
<i>Tinct. Valerianæ</i> , av. 1 dr. ...		678	<i>Trikresol</i> , 13, 17, 18; Formalin... ..		13
„ „ <i>Ammon.</i> , ½-1 dr. ...		678, 738	<i>Trilactine Liq.</i> Special for injection		52, 772
„ „ <i>Aeth.</i> , Austr. ...		678	„ <i>Milk</i> , 47; Medicated ..		58
„ <i>Veratri Viridis</i> , 5 to 15 m. ...		680	„ <i>Pigment</i>		52
„ <i>Verbasci</i> , 20 to 60 m. ...		730	„ <i>Tablets</i> 3 to 6 <i>p. d.</i> ...		46
„ <i>Warburgii</i> , 1 to 4 dr. ...		577	„ „ <i>Intestinal</i>		56
„ <i>Zingib.</i> , 30 to 60 m. ...		687	<i>Trilene</i>		749
„ „ 5 to 20 m. Fort., '85		686	<i>Trimethylbenzene</i>		20
<i>Tincturæ</i> , 671; Dispensing of ...		671	<i>Trime:hybenzoxypiperidine HCl.</i>		168
<i>Tinctures</i> , Aqueous		671	<i>Trimethylglyceoil</i>		2
„ „ <i>Ethereal</i> 91, 182, 219, 410,		452	<i>Trinitrin</i> , 1-200 to 1-10 gr. ...		465
<i>Tinea</i> , 906; <i>Barbæ</i>		907	„ <i>Solution of</i> , ½ to 2 m. ...		466
„ <i>Circinata</i> , 903; <i>Tonsurans</i> ...		906	„ <i>Tabellæ</i> , 1/100 gr.		466
<i>Tinospora</i>		737	<i>Trinitrocellulose</i>		281
<i>Tiodine</i> (Injection, 3 gr.)		411	<i>Trinitroglycerin</i> , 10 to 10 gr. ...		465
<i>Tisane de Polygala</i> , 725; various		398	<i>Trinitrophenol</i>		64
<i>Titanium</i> , 226; <i>Toad Flax</i>		699	<i>Triolein</i> , <i>Palmitin</i> , <i>Stearin</i> ...		617
<i>Tobacco</i> , 717; <i>Toddalia</i>		737	<i>Trional</i> , 10 to 30 gr....		656
<i>Toisen's Solution</i>		968	<i>Trioxymethylene</i>		111
<i>Tolu</i> , 694; <i>Toluol</i>		246	<i>Triphenylosanilin</i>		4
<i>Toluol-azo-toluol-azo-B-Naphthol</i>		247	<i>Triple Stain</i> , <i>Ehrlich's</i>		873
<i>Tongs</i> , 1 to 2 dr 729; <i>Tonquin Bean</i>		289	<i>Triticum</i> , 732; <i>Triturations</i> ...		673
<i>Tooth Extraction</i>		261	<i>Trochisc</i> (Medicated Lozenges),		
<i>Tooth Paste</i> , 'Formosyl'		620	F. with Fruit Paste, G. with		
<i>Torfbeere</i>		722	gum basis, i.e., 'Pastils' or		
<i>Toris Root Compound</i>		749	'Jujubes'; S. with sugar, R.		
<i>Touch Wood</i> , 691; <i>Tow</i>		353	with Rose, T. with Tolu: ...		674
<i>Towels</i> , Sanitary Moss		646	<i>Acid Benzoici</i> , ½ gr., S. and F.,		
„ <i>Steriloid</i>		353	1½ gr. (Stimulant Voice),		
<i>Towle's Pills</i> , 749; <i>Towns' Specif-</i>			T.H. ½ gr. (marked		
<i>fic</i>		182	B.A.)		5
<i>Townsend's Sarsaparilla</i>		742	„ <i>Benzoici Co. T.H.</i> (Benzoic		
<i>Toxicodendrol</i>		722	Acid, Codeine, Cocaine,		
<i>Toxicophles</i> 84; <i>Toxins</i> ... 753 <i>et seq.</i>			Ipecac, Menthol & Red		
<i>Trachylobium</i>		714	Gum) (marked C.B.A.)		
<i>Tragacantha</i> , 2 to 10 gr.		672	„ <i>Carbolici</i> , T., 1 gr., T.H. (S.)		
<i>Transfusion Apparatus</i> , 218; <i>Prep.</i>		630	(marked C.A.)		23
<i>Traumatic Balsam</i> , ½-1 dr.		4	„ <i>Citrici</i> , <i>ad libitum</i>		
<i>Traumaticin</i>		236	„ <i>Tannici</i> , F., ½ gr. and G.,		
<i>Traumatol</i> 403; <i>Treba</i>		721	<i>p.r.n.</i>		
<i>Trench's Remedy</i>		749	„ <i>Tannici</i> , F. 1½ gr., T.H.		
<i>Treponema Pallida</i>		783, 907	(marked T.)		
<i>Triamidophenol HCl. Developer.</i>			„ <i>Tannici et Capsici</i> , F., <i>p.r.n.</i>		
—P.J.i./07, 429			<i>Aconiti</i> , F., <i>Tinct.</i> ½ m. 1 every		
<i>Tribromophenol</i> , ½ to 2 gr. ...		26	½ hour		87
„ „ <i>Bismuth</i> , 5 to 20 gr. ...		26	<i>Althææ</i> (Guimauve) <i>ad lib.</i>		
<i>Tribrom-Tert.-Butyl-Alcohol</i> ...		193	<i>Ammonii Bromidi</i> 1 gr. (G) ...		118
<i>Tribulus var.</i>		707	<i>Ammon. Chlor.</i> , F. 2 gr....		118
<i>Trichlorbutyl- Glycol</i> , 5 to 20 gr.		194	„ „ c. <i>Glycyrrh.</i> , 3 gr. ...		118
<i>Trichlorethyl. Glycol</i> , 5 to 20 gr.		227	<i>Ammon. Chlor. Co.</i>		
„ <i>Dipropenyl Ether</i>		230	<i>Antacidi</i> (Sir W. Roberts)		
<i>Tri-chlor-iso-propyl Alc.</i>		228	{ <i>Calcii Carb.</i> , 3½ gr. }		
<i>Trichloromethane</i> , 1 to 5 m. ...		230	{ <i>Mag. Carb.</i> , 2½ gr. }		
<i>Trichlorphenol</i>		26	{ <i>Sodii Chlor.</i> , 1 gr. }		
<i>Trichlor-Tert.-Butyl-Alc.</i> , 5 to 24			<i>Antimonii Co. Eff.</i> , C.L.T.E., 1 <i>t.d.</i>		
gr.		195	<i>Bismuthi Co.</i> , R., 2 gr. ...		189
<i>Trichophyton</i> , 907; <i>Tricocephalus</i>		898	<i>Boracis</i> , F., 3 gr., T.H. (marked		
<i>Triferrin</i> , 15 gr. <i>in d.</i> , 327; <i>Trifer-</i>			B.O.), 3 hor.		
<i>rol</i> , ½ oz.		327	<i>Boracis et Potass. Chlor.</i> , F.,		
<i>Trifolia Fibrina</i> , 715; <i>Trigemin</i> ,			3 hor.		
12 gr.		254	<i>Brompton Blacks</i>		348
<i>Trigonella</i> , 706; <i>Tri-iodomethane</i>		398	<i>Camphoræ</i> , 2 gr., S., <i>p.r.n.</i> ...		210
<i>Tri-iodophenol Bismuth</i>		26	„ <i>Salicyl. Comp. t.d.</i> ...		211

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
<i>Trochisci—cont.</i>			<i>Trochisci—cont.</i>		
Capsici, S., <i>p.r.n.</i>			Santonini, S., 1 gr. <i>h.s.</i> ...		616
Carbonis S. 12 gr., 1 or 2 <i>p.c.</i>			Sedativi, F., 3 to 6 <i>p.d.</i> ...		508
Cascara gr. 2½ c. Menth.			Sodii Bicarb. R., 3 gr. <i>p.c.</i>		
Pip. F., 1 or 2 ...		223	Sodii et Zingib. S., <i>p.c.</i>		
Catechu, S. 1 gr., F. 2 gr.			„ Chlorat., 3 gr. 3 to 6 <i>p.d.</i> ...		633
T.H. (marked C.T.),...		699, 734	Sulphuris, 5 gr., 1-6 <i>p.d.</i> ...		658
Chlorodyne 4 m., S. '85			Terebene, 1 m., S.		
Cocain.HCl. S. 1-12 gr., T.H., F.			Tolutani S.		
1-10 (marked H.C.) G. 1-10 ...		264	Tussis, 4 or 5 <i>p.d.</i> ...		429
Codein., 1-8 gr., S., 4 or 5 <i>p.d.</i> ...		278	„ Brompton...		348
Cubebæ, F., ½ gr., T.H.		295	Zingib., S., <i>ad lib.</i>		
Digestive (Rhei, Zing., Cardam.)			Trommer's Elixir ...		749
Eucalypti Gum., F., 1 gr.		705	Tropacocaine HCl. ...		267
„ Co., F., 1 gr.		705	Tropæoline OO ...		897
„ OL 1 m. G.			Tropic Acid & Tropine ...		166
Ferri Redacti, S., 1 gr., 1 or 2...		321	Tropidine, 166; Tropine Mandelate		167
Gambir, U.S., 1 gr. = Catechu			Trunccek's Serum ...		630
Gelatini; Glycerini, G.			Truxilline, 260; Trypanosomiasis		155, 790
Glycyrrhizæ (et Anisi)...		248	Trypan, red ...		158
„ et Opii, U.S., ½ gr.			Trypanosan ...		161
Guaiaci, 2 gr., T.H.F., and S.,			Trypsin Treatment ...		516, 758
<i>p.r.n.</i>			„ in faeces, Detection of ...		518
„ Resinæ, F., 3 gr.		355	Trypsogen ...		514
Gummi Rub.c. Cocainæ ½ (G.)			Tryptic, Anti-Index ...		762
Hyd. Subchlor. S., ½, 1, 2 gr.			Tsetse Fly, 790, 910; Tuberal ...		812
Ipecac., F., ¼ gr., also S., 1 gr.,			Tubercle Bacillus ...		703, 910
2 or 3 <i>p.d.</i> ...		429	„ Bacilli Emulsion, Bovine		
Kino, F., 2 gr., 1 <i>p.r.n.</i> ...		711	„ 'B.E.' ...		811
Krameria, 2 gr. et Cocaine			„ Serum Agglutination Test ..		815
1-10 gr. G., <i>p.r.n.</i>			Tuberculin, Beranek's ...		812
Krameria, F., Ext. 1 gr., G. 2 gr.,			„ By mouth (T.R.) ...		797
F.(T.H.) 3 gr. (U.S., 1 gr.); et			„ Denys' ...		799
Cocainæ, ½ gr., F. ...		711	„ Diagnostic ...		793
Lavandulæ, S., <i>ad lib.</i>			„ 'I.R., 811; Jacob's ...		812
Lysolform, G. ...		111	„ Kochii, P.G. 'Old' ...		793
Magnesia, 5 gr., S., 2 4 <i>p.d.</i>			„ Marechal's ...		812
Menth. Pip. (et Fort.).			„ Marmorek's ...		816
Menthol, S., ¼ G., 1-20, 1-10,			„ New ...		795
1-8, ¼ gr.			„ New Bovine (New T.R.)		798, 811
„ 1-20, and Cocaine, 1-20 gr., G.			„ New Koch (Bacilli Emulsion)		811
¼, and Eucalyp., 1 m., G.			„ 'O' ...		795
Morphinæ, T., 1-36 gr., 4 or 5 <i>p.d.</i>		457	„ Ointment (Moro) ...		814
„ 1-36 gr., et Ipecac., 1-12 gr.,			„ Old ...		793
T., 4 or 5 <i>p.d.</i> ...		457	„ Old (Bovine) ...		795
„ 1-40 gr., & Emetin, 1-80			„ Ophthalmic Reaction ...		812
gr., S., 4 or 5 <i>p.d.</i> ...		429, 47	„ Original-Alt. ...		810
Nitroglycerini, vide Tabellæ.			„ Perlsucht B.E. ...		811
Opli, S., Ext. 1-10 gr., 2 to 6 <i>p.d.</i>		508	„ Perlsucht 'O' ...		810
Orthosform, 2 gr., T. H.			„ „ Resid. ...		798
Papain, ½ gr., S., and 1-5 gr.		519	„ 'P.T.O.' ...		810
„ c. Cocainæ, 1-10 gr., S. ...		519	„ 'P.T.R.' ...		798, 811
Paregoric, S., 2 to 6 <i>p.d.</i>			„ R. or T.R. (New) and Sterile		
Potassii Chloratis, R., 3 gr. (U.S.			Dilutions. German dosage,		
2 gr. <i>p.r.n.</i>); also F., 3 gr., T.H.		561	795; English ...		797
„ et Boracis, 1½ gr. each T.H.			„ References, General, 798 et seq.		
(marked P.B.) ...		561	T.R. ...		795
„ Chlor. et Glyc. G., 3 gr. <i>p.r.n.</i>			„ T.R. (Bovine) and References		798
„ Nitratis, S., 3 gr. 3 to 6 <i>p.d.</i>			„ 'T.O.A.' ...		810
„ Tart. Acid., F., 3 gr. 3 to			„ T.R. Mixed Bovine and Hum.		
6 <i>p.d.</i>			797, 798		
Pyrethri, F., 1 gr., 3 to 6 <i>p.d.</i>			„ Vaccination (Von Pirquet)...		814
Rhei, Zingib. et Cardam.			„ Vacuum (Hum. and Bov.)...		810
Rosæ; S., <i>ad libitum</i>			Tubercuol ...		811

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Tuberculosis, Autoinoculation in		801	Ung. <i>Belladonnæ</i> ...		182
„ Graduated labour in		801	„ <i>B. Naphthol Co.</i> ...		481
„ Relation between Human			„ <i>Bismuthi Oxychl.</i> ...		187
and other ...		796	„ <i>Oxyiodid</i> ...		187
Tuberculo-Opson. Index, 802 <i>et seq.</i>			„ <i>Bism. Subgall.</i> ...		190
Tuberculozyne ...		749	„ <i>Brooke's</i> ...		489
Tubes, Glass of Ethyl Chloride ...		95	„ <i>Cadmii Iodidi</i> , 1 in 8		
Glucose, 333; see also 'Sealed			„ <i>Calcis Chlorinat.</i> ...		207
Tubes,'			„ <i>Iodat</i> ...		40
Tucker's Asthma Cure ...		750	„ <i>Cantharidin c. Hyd. Co.</i> ...		216
Tuffer's Solution ...		275	„ <i>Cantharidis</i> (P.G. Veterinary		
Tulase and Tulase-lactin ...		811	216), 213, 215		
Tulip Extract ...		729	„ <i>Capsici</i> , ...		220
Tumours, Malignant ...		758	„ <i>Oleo-res.</i> ...		219
Tung Oil, 713; Turf Moss ...		646	„ <i>Caseini</i> ...		482
Turck's Caps. and Bottle ...		893	„ <i>Cetacei</i> , 1 in 5 ...		700
Turnera <i>var.</i> ...		298	„ <i>Chrysarobini</i> (& Co.) ...		236
Turpentine Oil, 10 m. to 4 dr. ...		546	„ <i>Cinereum</i> ...		379
Turpeth Mineral ...		380	„ <i>Cocainæ</i> , 4% ...		259
<i>Turpethum</i> , 5 to 20 gr. ...		737	„ <i>Conii</i> , 286; <i>Crédé</i> ...		140
Tylmarin, 5 to 10 gr. ...		32	„ <i>Oreosoti</i> , 1 in 10, 290; <i>Forte</i>		291
„ Dusting Powder ...		33	„ <i>Cucumeris</i> ...		703
<i>Typhophoræ Fol.</i> , 1/4 to 2 gr. ...		737	„ <i>Capri Citratis</i> ...		296
Typhoid Agglutometer ...		914	„ <i>Oleatis</i> ...		487
„ Ant., Tablets ...		640	„ <i>Cyllin Comp.</i> , St. J.H. ...		18
„ <i>Bacillus</i> ...		816, 913	„ <i>c. Acid. Sal.</i> , ...		10
„ Carriers ...		816	„ <i>Dermatol</i> ...		150
„ <i>Widal's Test</i> ...		913	„ <i>Diachyli</i> ...		490
„ Serum & Vaccine ...		816	„ <i>Carbolisat</i> ...		490
Tyramine, 1/2 gr. hyp. ...		312	„ <i>Durum, Alb. et Flav.</i> ...		89
Tyrosin, 516, 164; Tyrotoxicon ...		892	„ <i>Eucainæ</i> , 10% ...		270
Uffelmann's Lactic Test ...		895	„ <i>Eucalypti</i> (et c. Ac. Bor. ...		317
Uhlenhuth's Precipitins ...		865	„ <i>Gallæ</i> , 1 in 5 ...		706
Ulexine, 1-20 to 1-5 gr. ...		704	„ <i>c. Opio</i> (7-5%) ...		508
Ulmarene (Caps. 8 min.) ...		68	„ <i>Glyc. Plumbi Subac.</i> ...		342
Ulmus Campestr. and Fulv. ...		729	„ <i>Guaiacol</i> ...		292
Ultra Violet Rays ...		589	„ <i>Gynocardia</i> ...		491, 736
Unguenta. ...		674, 739	„ <i>Hamamelidis</i> ...		358
Unguentum, U.S. = Cera Alba 1,			„ <i>Hyd.</i> ...		363
Adeps Benz. 4			„ <i>Dil.</i> ...		363
Ung. Acid Borici, 1, 2, 3 ...		8	„ <i>Ammon</i> (Dil. 364) ...		363, 364
„ „ <i>Borici</i> (U.S. 8) ...		8	„ <i>Co.</i> , 2 in 5 ...		363
„ „ <i>Carbol.</i> , 4% ...		23	„ <i>et Pot. Iodid.</i> ...		369
„ „ „ <i>Co. V. H. C.</i> ...		372	„ <i>et Zinci Cy.</i> , 1 or 2% ...		366
„ „ „ <i>c. Cocaina</i> ...		24	„ <i>Iodidi Rub.</i> ...		367
„ „ „ „ <i>Hyd. Perch.</i> ...		24	„ <i>Mitins</i> ...		363
„ „ „ „ <i>Menthol</i> ...		24	„ <i>Nitrat</i> 371; <i>Dil.</i> ...		372
„ „ „ <i>Pheno-Borici</i> ...		9	„ <i>Oleatis</i> ...		488
„ „ „ <i>Picrici</i> , 1 to 3% ...		64	„ „ <i>Co.</i> ...		489
„ „ „ <i>Salicyl.</i> , 2% ...		69	„ „ <i>Ox. Flavi</i> ...		381
„ „ „ „ <i>Terebinth.</i> ...		68	„ „ „ <i>c. Atrop.</i> ...		171
„ „ „ „ <i>Tannic, c. Opio</i> ...		82	„ „ „ „ <i>c. Physostig.</i> ...		538
„ „ „ <i>Aconitina</i> , 2% ...		88	„ „ „ „ <i>Rubri</i> ...		382
„ „ „ <i>Adipis Lanæ</i> ...		89	„ „ „ „ <i>et Canth.</i> ...		216
„ „ „ <i>Adrenalin</i> ...		829	„ „ „ <i>Subchlor.</i> ...		379
„ „ „ <i>Amyl Salicyl. Co.</i> ...		67	„ „ „ <i>Sulph. Flav.</i> ...		380
„ „ „ „ „ ...		186	„ <i>Hyoscina</i> ...		389
„ „ „ „ <i>Aquæ Rosæ</i> ...		498	„ <i>Ichthyol et Co.</i> ...		396
„ „ „ „ <i>Araroba</i> , 236; <i>Argyrol</i> ...		139	„ „ „ <i>Rosat.</i> ...		396
„ „ „ „ <i>Aristol.</i> ...		402	„ „ „ <i>Iodi.</i> , 1 in 25 ...		410
„ „ „ „ <i>Atropina</i> , 2% ...		171	„ „ „ „ <i>Intinctum</i> ...		410
„ „ „ „ „ <i>c. Acid. Boric.</i> ...		171	„ „ „ „ <i>Iodoformi</i> , 401; <i>c. Atrop.</i> ...		171
„ „ „ „ „ <i>Cocaina</i> ...		171	„ „ „ „ <i>Iodothyrene</i> ...		833
„ „ „ „ „ <i>Bals. Peruv.</i> ...		694	„ „ „ „ <i>Iohydryn</i> , 25% ...		412

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Ung. Ipecac. et Crotonis	429	Unicorn Root, False ...	...	708
„ Kaolin et Co....	...	434	Units, Immunity ...	...	769
„ Lano. Anhydros. et Hydras.	...	88	Unna's Jelly, 672; Paste...	...	683
„ Lano-boric Camph.	9	Upper Milk ...	...	476
„ Lanolini, 89; Leniens	89	Uranii Nitras, 1/2 to 5 gr....	...	675
„ Metallorum, G. H.	372	„ et Quin. Chlor., 3 to 6 gr.	...	675
„ Methyl Salicyl. Co	68	„ Salicyl., 5 to 20 gr....	...	675
„ Mylabridis	736	Uranium ...	590 et seq.,	675
„ Myrobalani, also c. Opio	736	„ Disintegration of ...	...	592
„ Naphthol Co.	461	„ Helium from ...	...	599
„ Neapolitanum...	363	„ Nitrate Solution... ..	...	882
„ Olei Cadini	555	„ Pot. Sulph. ...	...	590
„ et Sulph.	555	„ Production of Ra. by ...	...	594
„ Ol. Cedri Atlant	699	Ursari, 1-20 to 1/2 gr....	...	703
„ Opil, 508; Paraffini...	521	Urea, 10 to 60 gr. ...	...	675
„ Pheno-boric	9	„ Estimation of ...	...	884
„ Phenolis, U.S.	23	„ Quinine, 5 to 15 gr....	...	572
„ Physostigminæ	536	Ureometer ...	...	636
„ Picis Liq.	545	Ureometers ...	...	884
„ et Acidi. Salicyl	242	Urethane, 10 to 60 gr. ...	...	677
„ Picrotoxini	538	Urethral Bougies ...	...	190
„ Pilocarpinæ	432	Urginea ...	...	738
„ Plumbi Acetatis, 1 in 25	...	25	Uricedin, 1 to 2 dr. ...	...	440
„ Paraffi. Ung.	556	Urine, 858; Acetone in, 858; Acidity	...	of, 885; Albumin tests for (see also
„ „ Carb.	556	devisers' names), 860; Alkalinity	...	of, 885; Albumoses in, 860, 863;
„ „ c. Calamita	435	of, 885; Albumoses in, 860, 863;	...	Ammonia in, 882; Benzoyl-
„ „ Iodidi	557	glycocoll in, 881; Bile Pigments	...	and Salts in, 864; Blood in, 865;
„ „ Oleatis	490	β-Oxybutyric Acid in, 859;	...	Chlorides in, 874; Cholesterin
„ Potassæ Sulph.	558	in, 864; Chondro-albumin in,	...	860; Creatinine in, 874; Cystin
„ Potassii Iodidi 1 in 10	...	364	in, 875; Diacetic Acid in, 859;	...	Fibrin in, 860; Freezing Point,
„ pro Eczema	364	871; Glucose in, 875; Glycerin	...	in, 830; Heptose, 880; Hippuric
„ Prophylaxis	609	in, 881; Indican in, 881;	...	Isomaltose, 880; Lactose, 880;
„ Rannæ. Ficarizæ...	721	Lævulose, 880; Maltose in, 880;	...	Mucus in, 860; Nitrogen in, 881;
„ Resinæ	611	Nucleo-albumin in, 860; Para-	...	globulin in, 860; Pentoses in,
„ Resorcini (and Co.)...	380	880; Peptones in, 883; Phos-	...	phates in, 882; Proteins in, 860;
„ Rubrum, N.H.W.	382	Proteolytic products in, 860;	...	Purins in, 883; Salicyl Alde-
„ „ c. Canth....	...	723	hyde in, 859; Serum Albumin	...	in, 861; Serum Globulin in, 860,
„ Rusci Co.	555	862; Serum Proteins, 860;	...	Skatoxyl in, 881; Sp. Gr. of,
„ Salol c. Cocaina,	674	858; Sterile for Bacterial Cul-	...	ture, 921; Sugar in, 875; Sul-
„ Simplex (Ph Ned, 410)	726	phates, 883; Sulphates, Ethereal,	...	884; Taurochol Albumin in, 860;
„ Staphisagrie	216	Tubercle Bacilli in, to stain, 912;	...	Tyrosin in, 864; Urea in, esti-
„ Stimulans	277	mation of, 884; Uric Acid in,	...	estimation, 884; Urobilin in ...
„ Stovain c. Adrenalin...	648	864	...	Urine Test Case ...
„ Stramonii, U.S.	463	551	...	Uritone, 5 to 15 gr. ...
„ Stypticin, 2 to 10%	727	864	...	Uroerythrin ...
„ Styrcis	658	313	...	Urohypertensine ...
„ Sulph., 658; c. Hyd.	658	...	...	...
„ Sulph. Hypochlor....	...	658	...	...	...
„ „ Iodidi	658	...	...	...
„ Sulphuris Zinc. et Kaolin	658	...	...	...
„ „ Naphthol Salicylatum	...	658	...	...	...
„ Suprarenal	825	...	...	...
„ Thorii Oleatis	638	...	...	...
„ Thymol (and Co.)	671	...	...	...
„ Triacidum	24	...	...	...
„ Vaselini Plumbic	490	...	...	...
„ Veratrinæ, 2%	681	...	...	...
„ Zinci, 15%	683	...	...	...
„ „ c. Acid Salicyl...	683	...	...	...
„ „ Oleatis	490	...	...	...
„ „ Permang.	686	...	...	...
„ „ Peroxidi	389	...	...	...
„ „ Stearat....	...	686	...	...	...

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Uropherin, 5 to 15 gr. and			Vapor Acidi Carbolici, 24; Ac.		
Uropherin 'B'		696	Carbol.Comp. Lees, 24; Ammon.,		
Urosin Tablets, 8 gr.		569	Chlor., 119; Creosoti, 291; Cu-		
Urotropine ('New' 552), 5 to			bebæc. Limone, 295; Eucalyp.		
15 gr.		551	& Co., 317; Guaiscol Co., 292;		
Urtica Dioica		34	Iodi Ætherealis, 412; Olei		
Uva Ursi Infusum		692	Pini Sylvest., 548; Terebeni,		
Uviol Light		589	662; Thymol		671
Vaccine Lymph, Lancets, etc. ...		817	Varalettes, 750; Varenetz ...		45
Vaccines		752	Varium		821
" Preparation		805	Varnish Iodoform, 402; Micro. ...		714
" Acne, 5 to 20 mill.		767	Vars Pills		750
" Asthma		758	Vaseline (Oil, or Liq. 521) ...		520
" Catarrh, Nasal, Tracheal		763	Vaselin. Acidi Borici		9
" Cerobro-spinal Meningitis,			" Atropinæ		171
2 to 5 mill.		765	" Cocainæ, 1 to 10%		259
" Cholera		767	" Iodoformi		403
" Coli, 10-25 mill., incr. ...		768	" Liquide		521
" Common Cold, 75-250 mill.		763	" Official Fr. Cx.		540
" Doses of (Table)		755	Vaselin. Zinci Oxidi, 683; Vasenol		523
" Dysentery		771	Va-oconstrictine		826
" Friedländer B., 75-500 mill.		764	Vasodilators 468, <i>see also</i> Therap.		
" Gonococcal, 25 to 50 mill.			Ind.		
incr.		772	Vasogen and Comps.		523
" Immunising Power of ...		757	Vasoliments, 524; Veal Peptones		473
" Influenza, 10 to 50 mill.,			Vegetable Mercury		557
incr.		773	Venetian Red, 328; Venice Turp.		549
" Malta Fever		775	Veno's Preps.		750
" Micrococcus Catarrhalis,			Veratri Virid. Rad., 1 to 5 gr. ...		680
50-500 mill.		764	Veratrina, $\frac{7}{10}$ to $\frac{1}{10}$ gr.		680
" Neoformans (Micrococcus)		763	Veratrinæ Oleatum		681
" Per os.	765, 797,	800	Verbascum, 730; Verbena, 730;		
" Plague		776	Verdigris, 298; Vermilion ...		382
" Pneumococcal, 25 to 50			Vermín Killers:—		
mill., incr.		777	Battle's, Butler's, also Gibson's		
" Rheumatic		779	contain Strychnine.		
" Staphylococcal, 100 mill.,			Hammond's & Simpson's Rat		
incr.		780	Paste contain Arsenic.		
" Streptococcal, 10-25 mill.,			Vernisol		336
incr.		780	Vernissum Glyco-Gelatin ...		684
" (conglomera-			Veronal, 5 to 10 gr.		675
tus) 780, 783		783	Sodium, 5 to 15 gr.		676
" Strepto Rheumaticus ...		779	Veronica var.		711
" Table of		755	Vervain		730
" Tuberculin		793	Vesalvine, 5 to 15 gr.		551
" Typhoid, 50 to 1,000 mill.		816	" Efferv., 1 dr.		552
Vaccination Act		817	'Vescettes' (Effervescent Com-		
Vaccinium Myrtillus		717	pressed) 681:—		
Vacuum Tuberculin		810	Caffeine Cit. (and Base, 3 gr.)		199
" Vessels		512	Carlsbad		642
Valentine's Meat Juice		474	Lithium Cit., 3, 5 gr.		439
Valeriana Rhiz.		678	" Hippurate, 5 gr.		439
" Indic.		738	Mag. Sulph., 30 gr.		443
Valerianic Diethylamide, 2 gr. ...		679	Piperazine, 5 gr.		550
" -iso-amyl Ester		679	Potass. Chlor., 3 gr.		
Validol, 10 to 15 m.		452	Citrate, 15 gr.		562
" Camphorate		452	Sodio-Mag. Sulph., 641; et c.		
Valsol, 524; Valyl, 2 gr.		679	Caffeine		642
Vana, 750; Vanadine		729	Sodium Phosph., 30 gr. ...		637
Van Ermengem's Stains		915	" Salicy., 5 gr.		71
Van Gieson's Stain		874	" Sulphate, 30 gr.		
Vanillin		729	Strontium Brom., 10 gr. ...		649
Van Swieten's Liquor		373	Vesipyrin, 15 gr., 73; Vibrona ...		750
" Vlek's Remedies		750	Viburnum Prunif., V. Opulus		385, 738

NAME.	DOSE.	PAGE	NAME.	DOSE.	PAGE
Vichy Water Bath	632	Water, Ammonia tree, 886 ;		
Vienna Mixture	233	Analysis, 886 ; Bacteriolog. Ex.,		
Vigoral, 750 ; Vilixir	750	922 ; Dropwort, 718 ; Gas, 891 ;		
Vinca Major, 730 ; Vinegar	1	Glass, 639 ; Germander, 729 ;		
Vin. Album, U.S.	103	Hardness, 887 ; Hemlock, 701 ;		
„ <i>Antimonial</i> , 10-30 m.	...	131	London, 887 ; Peaty, 887 ;		
„ „ <i>emetic</i> , 2 to 4 dr.	...	131	Pennywort, 708 ; -proof Sheetting,		
„ <i>Cascara</i> , $\frac{1}{2}$ to 1 oz....	...	223	217 ; Softeners, 618 ; Soluble		
„ <i>China</i> (et <i>Ferrat.</i>), 1 to 4 dr.	...	239	Blue, 4 ; Sterilising Tablets 640 ;		
„ <i>Cocæ</i> , 2 to 4 dr.	...	257	We sh. ...	887	
„ <i>Colchici</i> , 10 to 30 m....	...	280	Waters, Mineral ...	836	
„ <i>Condurango</i> , $\frac{1}{2}$ to 1 oz....	...	284	<i>Wattle Bark</i> ...	732	
„ de l'Hotel-Dieu	302	Wax, Bees, 699 ; Carnauba, 927 ;		
„ <i>Digitale Comp.</i>	302	„ <i>Dental</i> , 521 ; Japan, ...	927	
„ <i>Diureticum</i> , $\frac{1}{2}$ to 1 oz....	...	710	Weichselbaum's <i>Diplococ.</i> ...	765	
„ <i>Emetinæ</i> , 5 to 40 m.	...	429	Weidhaas Institute ...	751	
„ <i>Ergotæ</i> , U.S., av. 2 dr.	...	311	Weights and Measures ...	xxiv.	
„ <i>Ferri</i> , 1 to 4 dr.	...	326	„ <i>Atomic</i> ...	925	
„ „ <i>Amar.</i> , U.S., 2dr.	...	327	Welch's Pills, 751 ; Werbitzki's		
„ „ <i>Citratis</i> , 1-4 dr.	...	326	Stain ...	916	
„ „ <i>Glyceroph.</i> , $\frac{1}{2}$ to 2 oz.	...	61	Wheat Phosphates, Sacch....	534	
„ <i>Glyceroph.</i> , $\frac{1}{2}$ to 2 oz.	...	63	Whelpton's Pills ...	751	
„ <i>Ipecacuanha</i>			Whey for Bact. Culture ...	921	
{ 10 to 30 m. expt. ... }	...	428	Whey Powder ...	480	
{ 4 to 6 dr. <i>emetic</i> ... }	...		Whisky, 103 ; White Precipitate	363	
„ <i>Kolæ</i>	198	Whitehead's Varnish ...	401	
„ <i>Opii</i> , 10 to 30 m.	...	507	Whooping Cough Bacillus ...	917	
„ „ <i>Crocat.</i> , 5-20 m.	...	507	Whortleberry ...	717	
„ <i>Pepsinæ</i> , 1 to 2 dr.	...	523	Widal's Reaction ...	913	
„ <i>Quinina</i> , 4 to 8 dr.	...	571	Wild Cherry Bark ...	123, 567	
„ <i>Quinquina Officin.</i>	239	Willcox on Gastric Contents ...	894	
„ <i>Regno</i>	750	Williams' Pink Pills ...	751	
„ <i>Rhei</i> , '85, 1 to 2 dr.	...		Willemite ...	192 et seq.	
„ <i>Rotra</i> , 8 ounces	722	Willow, Black or Pussy ...	723	
„ <i>Rubrum</i> , U.S.	103	Wilson's <i>Erasmus</i> —Hair Lotion		
„ <i>Tann-Iodo-Phosph.</i> , $\frac{1}{2}$ to			and Oint., 121, 216 ; Wincarnis	742	
2 oz.	409	Wines, Composition (see also P.		
„ <i>Trousseau</i>	304	Helv.) ...	103	
„ <i>Uran</i>	751	<i>Wintergreen Oil</i> ...	67, 736	
Vinsip, 751 ; Vioform	403	Witch Hazel (Plasters, 358) ...	356	
<i>Viola Odorata</i> (and <i>Tricolor</i>), 30			Wöhler's Urea Synthesis ...	675	
to 60 gr.	730	Wollenbeere ..	722	
<i>Violet</i> , <i>Gentian</i> , <i>Anilin</i>	917	Wonderberry, 726 ; Woodcock's		
<i>Viper's Bogloss</i>	704	Pills ...	751	
<i>Virol</i> , 751, 819 ; <i>Viscosimeters</i>	872	Wooden Tongue ...	897	
<i>Viscum Album</i>	870	Wood Naphtha ...	104	
<i>Vismervin</i>	751	„ <i>Oil</i> , $\frac{1}{2}$ to 2 dr., 693 ; Spirit	104	
<i>Vitali's Reaction</i>	168	„ <i>Wool</i> , and Dressings ...	550	
„ <i>Bile Test</i>	864	Woodward's Gripe Water ...	751	
<i>Vitellin</i>	139	Wool Absorbent, 351, 353 ; Animal		
<i>Vitis Alba</i>	605	352 ; Blue, 377 ; Fat, 88 ; Hama-		
<i>Vinifera</i>	103	melis, 357 ; Lambs, 88, 352 ;		
<i>Vlemincx's Solution</i>	207	Mercuric Iodide, 368 ; Non-		
<i>Voice Tablets</i> ...	561,	633	absorbent, 353 ; Perchloride ...	375	
<i>Volekman's Thymol Sol.</i>	671	Worms, 615 ; see also Therap. Ind.		
<i>Volhard's HCl. Estim.</i>	895	Wormseed American = <i>Chenopo-</i>		
<i>Volt</i> , 417 ; <i>Von Pirquet's Test</i>	814	dium, <i>q.v.</i>		
<i>Wahoo Bark</i>	318	„ (Levant) ...	615	
<i>Walnut Hair Dye</i>	710	Wortabel Treatment ...	376	
<i>Warburg's Tincture</i> , 1-4 dr.	...	577	<i>Wourara</i> , 1-20 to $\frac{1}{2}$ gr. ...	703	
<i>Warner's Safe Cure</i> , 751 ; <i>Warwick</i>			<i>Wright's Leishman Stain</i> ...	870	
<i>Purifier</i>	643	„ <i>Tube for Opsonic Work</i>	804	
<i>Wassermann's Reaction</i> and			<i>Wurmsamen</i> ...	615	
various modifications	783	<i>Wyeth's Beef Juice</i> , $\frac{1}{2}$ -1dr.	474	

NAME	DOSE.	PAGE	NAME.	DOSE.	PAGE
Xanthaline	469	Zinc Oxychlor., etc. ...	...	683
Xanthine, 196, 883; Dimethyl- Xanthine	664, 665	„ Points ... ..	...	686
Xanthoxylum, U.S.	730	„ and Starch Powder ...	...	435, 684
Xaxa, 71; Xaxaquin, 1-5 gr.	574	„ Varnish... ..	...	684
Xeroform, 5 to 2 gr., 26; Gauze, 10%...	26	Zinci Acetas, 1 to 2 gr. ...	...	681
X. L. All Vaporiers...	717	„ Bromid., 2-5 gr. ...	191, 682	
'X' Rays, 579; Calculi diagnosis, 582; Dermatitis, 586; Develop- ers, 580; Diagnosis, 581; Dosage, 585; Examination of Stomach, 586; Exophthalmic goitre, for, 585; Exposures, 580; Gynæcol- ogy, in, 583; Localiser, 584; Lupus, for, 584; Malignant growths, for, 583; Measure- ment of current, 585; Ocular Therapy, for, 584; Ringworm, for, 584; Rodent Ulcer, for, 584; Shields, 580; Skiagraphs, 581; Treatment, 582; Tubes, 579; Tube Villard's,	586	„ Carbonas ... ..	...	681
Xylene, 246; Xylenel, 16; Xylol Balsam	728	„ Chloridum ... ..	...	682
Yanгонine, 710; Yaws	907	„ Citras, 3 to 12 gr. ...	...	683
Yeast, 1/2 to 1 oz., Extracts	224	„ Cyanidum, 1/10-1 gr. ...	...	683
Yellow Fever, 917; Yerba Santa...	731	„ et Hyd. Cyanid. ...	...	366
Yersin's Serum, 776; Yew, 728; Yoghourt	45	„ Iodas ... ..	...	41
Yobimbine HCl., 1-20 to 3-20 gr., 731; Yttrium	226	„ Iodidum, av. 1 gr. ...	...	681
Yonkerman's Tuberculozyne	749	„ Lactas, 1/2 to 3 gr. ...	...	683
Zambeletti's Drops, 5 dr.	148	„ Oleatum	487, 490	
„ Solutions, 5-10 m....	...	148	„ Oxidum (Dusting Powders, 435), 3 to 10 gr. ...	...	683
Zam-Buk	751	„ Perboras ... ..	...	10
Zea Mays, 713, 714; Zedoary	577	„ Permang.	449, 684	
Ziehl-Neelsen's Stain	910	„ Peroxid. (Perhydrol) ...	...	388
Zinc, Arsenic free	681	„ Phenol-para-sulphonas ...	...	25
„ Chloride Solution	682	Zinci Phosphid., 1-20 to 1-3 gr. ...	...	531
„ Cream 683; Gelatin	683	„ et Potass. Cy., 1-10 to 1 gr. ...	...	683
„ Iontophoresis	423	„ Salicyl., 1 to 5 gr. ...	...	685
			„ Silicas (= Willemite) ...	...	592
			„ Stearas, U.S. ... ..	...	686
			„ Sulphanilas ... ..	...	245
			„ Sulphas, 1 to 3 gr. tonic; 10 to 30 gr. emetic ...	...	685
			„ „ Uterine Points... ..	...	686
			„ Sulphide 'Active' ...	594 et seq.	
			„ Sulphocarbolas, ... ..	...	25
			„ Sulpho-ichthyolat ...	...	396
			„ Valerianus, 1-3 gr. ...	...	679
			Zingiber, 5 to 15 gr. ...	...	686
			Zip Ointment... ..	...	751
			Zirconia ... ..	...	226
			Zittmann's Decoctions ...	...	621
			Zotal, 17, 18; Zotos, 751; Zox ...	...	751
			Zwerg Maubeere ... ..	...	722
			Zymin, 1dr., 224; Zymocide ...	...	10
			Zymogen ... ..	...	895

THERAPEUTIC INDEX

OF

DISEASES AND SYMPTOMS.

N.B.—Internal Remedies are in Roman type. Vaccines as a general rule are for hypodermic use. *Remedies for local or external use are in italics in a separate paragraph.*

Where there is only one paragraph the reader should understand the remedies are for internal use unless stated to the contrary.

Some of the Articles **new to this and the last Edition**, to which special attention is directed, are printed in the reverse manner, *i.e.*, Internal Remedies in *italics*, and the ones used externally and locally in Roman letters.

Abortion, Threatened.—Codeina, Hydrastis, Morphina, Opium, Quinine, Sambul, Viburnum prunifolium.

Abscesses, general, to abort.—Aconite, Belladonna, Calcium Sulphide, Veratrum.

Acid. Carbolic, Argenti Nitras, Di-iodo-iso-Propyl Alcohol, Hydrogen Peroxide, Staphylococcal Vaccine, Tincture of Iodine, Unguentum Belladonnæ, Ung. Iodi Intinctum.

Abscesses, Dental. (Local use.)—Boric Acid Lotion, Dental Solubes Hydrogen Peroxide, Iodates, *Lysoform*.

Abscess Liver, Tropical.—*Ipecacuanha, Vaccine of Organism if isolated, Quinine Injections.* Diagnosis of, *vide* Lævulose.

Acidity of Stomach.—Aqua Calcis, Ammonia preps., Bismuth preps., Bisciniod, Calcii Carbonas, Carbo Ligni, Cerium Salts, Cremor Magnesiæ, *Glyc. Bismuth, Eff. Magnesi Carb. or Oxide, Potass Bicarb., Sodii Bicarb.*

An ounce of Almond Oil (internally), q.r., first thing in the morning, repeated before other meals if necessary.—L. ii./09, 1739.

Acidosis (Acid Indigestion) of children. Administer purgative, wash out stomach, then subcutaneous, or better, intravenous infusion of Sodium Bicarbonate Solution, Sodium Lactate or Sodium Citrate *per os*.—(*Vide* B.M.J. li./07, 821.)

Acne.—*Acid Camphoric, Arsenic, Calx Sulphurata, Fæxin, Fæxin Extract, Guaiacol, Hypophosphites, Liquor Auri et Arsenii Bromidi, Liquor Auri et Hydrarg. Bromidi, Ol. Morrhuæ, Phosphorus, Potassii Bromid., Quininæ et Ferri Citras, Sodii Bromid., Sulphur (and with Menthol).*

Acid. Carbolic, Acid. Lactic, Acid. Nitric, stabs., Calamina Lotio, Glycerinum Kaolin, Aceticum, Hydrarg. Perchlorid. Lotio, Ichthyol, Ichthyol-resorcin and Sulcylate, Isolates, Lotio Sulphuris cum Sapone, Quillain Lotion, Ung. Resorcin Co., Acne and Staphylococcal Vaccine, Sulphur Ung., Sulphur Hypochloritis Ung., Sulphur. Iodid. Ung., Thymol Ung., 'X' Rays.

Acne Rosacea. (Local use.)—*Finsen Light and "X" rays.*

Acromegaly.—*Pituitary Extract, Thyroid Extract (guardedly), Potassium Iodide, and a Mercurial Salt (value doubtful except where there is a specific taint).*

Headache of, relieved by *Antipyrrin, Antifebrin, Phenacetin, Exalgin.*

Sweatings of, by *Zinc Oxide, Atropine or Picrotoxin.*—L. i./09, 28.

See also Elephantiasis.

Actinomycosis.—Potassii Iodid., or Sodii Iodid., Salicylates. Thomassen's Iodide Method.

Argent. Colloidale, Iodi Injectio, Sol. Argent. Nit., Injectio 20%, Cupri Sulphas, 'X' Rays.

Addison's Disease.—Preparations of Arsenic, Iron, Phosphorus, and of the Suprarenal Capsules. *Adrenalin hypodermically* may increase blood pressure a little.

Clinical Lecture on, Hale White.—Pr., Feb. '99, 190.

Adenoids.—Cod Liver Oil, Iodine, Iron, *Liq. Ferro-Manganes. Pept. cum Hæmoglobin. Liq. Iodo-Ferro-Manganes. Pept.*, Syrup Iodo-Tannicus.

Ammon. Chlor. Snuff, Glycerin, Liquor Ferri Perchlor., Nasal Injection of Tannic Acid, Nebulæ (q.v.).

Adhesions Fibrous Peritoneal, etc., Thiosinamin Injection (Injectio Thiosinamin et Antipyrin, Fibrolysin).

Ague.—Acid. Salicylic and Salicin, Ammon. Chlorid., Arsenic, Berberina, Chinolinum, Cinchonidinæ Sulphas, Cinchonina, Digitalis, Eucalyptus Globulus, Eupatorium, Hydrastis, Livingston Rousers, Methylene Blue, Phenalgin, Piperina, Quinidinæ Sulph., Quinine Arrhenalate, Quininæ Sulph. and Hydrobrom., Salicylates, Saloquinine, Simaba Cedron, Sodii Hyposulph., Urea, Warburg's Tincture.

Albuminuria.—Acid. Gallic., Amyl Nitris, *Basham's Mixture*, Ferri Cacodylas, Fuchsine, Jaborandi and Pilocarpine, Juniper Oil, Nitroglycerin Ozonic Ether, Strontii Lactas, and purgatives. *Vinum Diureticum, Viscum.*

Alcoholism.—Ammonium Chloride, Arsenic, Atropina, Auri Chlorid., Cactus, Capsicum, Chloral Hydras, Cinchona rubra, Digitalis, Hydrastis, Hyoscine Hydrobromidum, Hyoscyamus, Stramonium, Lupulin, Mistura Antidipsomanica, *Mist. Belladonna, Xanthoxyli et Hyoscyami*, Mistura Ferri Aperiens, Mistura Magnes. Sulph. Co., Nux Vomica, Phosphorus, Picrotoxin, *Pilulæ Capsici Co.*, Quinine Preps., Strychnine, Zinc preps. See also B.M.J. i./05, 951. *Atropine and Strychnine Hypodermically to keep the patient away from drink; Acomorphine if mad drunk.*—L. i./08, 129. r. also L. ii./08, 1316.

Alopecia.—Arsenic, Iron, Pilocarpine, Strychnine, *Thyrocol.*

Ammon. Liquor, Amyl Nitrite with Pilocarpine Hair Lotion, *Cantharides preps., High Frequency current, Hydrargyri Oleas, Hydrargyri Perchlor., Lin. Iodi, Lotio Capillaris, Chrysarobin, Lotio alseami Peruvian, Lotio Excitans, Lotio Resorcini, Lotio Etheris Comp., Baume Fioraventi, Linimentum Hoffmanni, Linimentum Jaborandi, Unguentum Cadini, O. Cadini Aceticum, Oxygen, Petroleum Spirit, Spiritus Acid. Lactic.*

Amenorrhœa—Actæa and Cimicifugin, Aloes, Apiol, Arnica, *Calendula, Cantharides, Canthophyllin, Deves's Mixture, Ergota, Ergot and Apiol Capsules, Elixir Ergotæ cum Ferro, Eupatorii Inf., Gossypii Rad., Cortex, Guaiacum and Apiol, Iron Salts, Manganesii Oxidum, Menyantes, Nickel Phosphas and Sulphas, Ol. Rutæ, Pulegii, Pil. Aloes et Myrrh, Potass. Permang., Pulsatilla, Savin, Senecio, Tanacetum. Thyroid gland.*

Analgesics=Anodynes.—Acetanilide, *Alypin*, Atropine, Belladonna, Butyl Chloral, Camphor, Cannabis, Chloretone, Cocaine, Codeine, Conium, *Eucaine, Gelsemium, Hyoscyamus, Hyoscine, Hypnal, Lupulus, Morphine, Opium, Orthoform, Phenacetin, Phenazone, Stovaine.*

Anæmia.—Alginoid Iron, *Arsamin*, Arsenic, Arsen-Hæmol, *Arsenoferratoze, Bromo-Hæmol, Cacodylates, Calcii et Ferri Glycerophosphas, Calcii Fluoridum, Calcii Hypophosph., Calcii Phosph., Capsula Cruoris, Cholesterin, Elix. Gent. Acida, Elix. Hæmoglobin, Ferri Bromid., Ferri Perchlorid. Liquor, Ferri Hypophosph., Ferri Iodidum, Ferri Oxalas, Ferri Perchlorid., Food Preparations (new, various), Glycerol Glycerophosphatum, Ferri Phosph., Ferri Sulph., Ferrum Dialysat., Ferrum Redactum, Glycerol Glycerophosphatum cum Medulla rubra, Hæmoglobin preps. and Capsules, Hæmatogen, Hydrogen Peroxide, *Lecithin Elixir and Emulsion, Levico Water (mild and strong), Liquor Ferri Albuminati, Liquor Ferri Peptonati, Liquor Ferro-Manganesii Peptonat, Liq. Iodo-Ferro-Manganes. Pept., Liq. Ferro-Manganes. Pept. cum Hæmoglobin. Magnesii Peroxidum, Malt-olive, Manganese Citrate, Marrubin, Malted Glycerophosphates, Nucleinic Acid, Phosphor., Pil. Ferri Carb., Pil. Ferri Sulph., Quinine preps., Quinin et Ferri Chlor., Siccæ, Sodii Hypophosphis, Strychninæ Cacodylas, Syr. Iodo-Tannicus, Syrupus Tann-Iodo Phosphoratus, Syrupus Trium Phosphatum, Tinctura Ferri Pomata, Trilactine, Vinum Tann-Iodo Phosphoratus.**

Anæmia, Pernicious.—It is stated that Iron is an absolute poison—the liver already contains excess to draw upon—but arsenic does good.—B.M.J. i./07, 72.

Assumed protozoal in character, large doses of Quinine, Antimony, Mercury should be tried.—Dixon. Pr. Feb. /09, 248.

Anæsthetics by inhalation.—A.C.E., Æther, Æthyl Bromid., C.E., Æthyl Chlorid., and with Nitrous Oxide, Æthyl Iodid., Anestile, Chloroform (and with Oxygen), Nitrous Oxide, Somnoform.

Anæsthetics, Local.—*Æther, Acid. Carbolic, Adren-ol* (throat spray), *Adreucaine, Æthyl Chlorid., Alypin, Anestile, Anæsthesine, Cocaine, Cocaine Ionised, Eucaïne, Eudrenine, Erythrophlæinæ Hydrochloridum, Eusemin, Holocaine, Ice, Menthol, Methyl Chloride, Novocain, Orthoform, 'New' Orthoform, Quinine, Stovaine, Tropacocaine, and Tropacocaine Infiltration and Spinal Injection, Morphine and Scopolamine Infiltration, Magnesium Sulphate Intraspinal Injection, Stovaine with Dextrin* (Tyrrell Gray) also with Strychnine (Jonnesco).

Anal Fissures. (*Local use.*)—*B-lladonna Ointment, Carbolic Acid, Escalin Suppos., Glycerin Aloes, Ichthyol, Iodoform Suppositories, Ung. Conii.*

Aneurism.—*Aconite, Amyl Nitris (?), Calcii Chlorid., Digitalis, Ergotina, Morphine, Nitroglycerin (?), Potassii Iodidum, Veratrum.*

Gelatin Injection.

Angina Pectoris.—*Acocanthera* (with caution), *Aconite, Æther, Æthyl Iodid., Alcohol, Amyl Nitris, Arsenic, Barium Chloride, Cactus, Digitalis, Digitalin cum Nitroglycerin, Tabellæ, Brythrol Nitrat. Tabellæ, Hoffmann's Anodyne, Hydrogen Perox., Ibogaine, Isobutyl Nitris, Mannitol Nitrate tablets, Morphina inj. hypod., Nitroglycerini Liquor and Tabellæ, Phenazone, Sodii Nitris, Sod. Theobromine—Sodium Iodide, Theobromine, Theobromine Aceto-Salicyl., Theobromine Sodium Salicylate, Theophylline Sodium Acetate, Trilactine. High Freq. Current* (*local use*).

Angina, Pain of.—*Amyl Nitrite. Carbonic Snow.*

Ankylostomiasis (caused by *Ankylostomum duodenale*).—*Eucalyptus Oil, Filix Mas, Pelletierine, Podophyllin, Terpene, Thymol* (not suitable for the old or very young—*L. i./os, 102, Thymol Carbonate.*

Ankylosis. (*Local use.*)—Chlorine from Sodium Chloride, also other drugs, by ionisation, *q.v.*

Anorexia.—*Calumba, Capsicum, Cascarilla, Chimaphila, Chiratta, Cinchona preps., Gentian, Ignatia, Nux Vomica, Orange, Orexine Tannate, Quassia, Quinine, Strychnine, Syr. Kolae Comp.*

Anthrax.—*Acid. Carbolic, Blepharis Capensis, Calcii Sulphid., Camphor Injection, Ichthalbin, Iodi. Tinct. Inject. (q.v.), Phosphorus, Selavo's Serum.*

Aluminii Acetas (fomentations), *Carbolic Acid, Creolin and Cyanide dressings Iodoform.*

Anthelmintics.—See Worms.

Antidotes.—See Chapter; they are also fully referred to in the text; see also list of Emetics.

Antipyretics. See Fever.

Antiseptics for Hands, Instruments, etc. (See also Chapter on.)—*Acid. Boric, Carbolic, Alcohol, Cera Alba in Carbon Tetrachlor., Clove Oil, Formalin Gelatin, Hyd. Biniod, Hyd. Perchlor., Izal, Listerine, Lysoform, Trikreol.*

Antiseptics for Wounds.—*Acid. Boric. Lotio and Ung., Acid Carbolic. Lotio and Ung., Acid. Salicylic. Lotio and Ung., Alcohol 75% (steriliser of skin), Alembroth gauze, Alsol, Aluminii Acet. Lotio, Aristol, Benzoin. Co. Tinct., Chartazine, Collodium, Dermatol, Epidermin, Euophen, Hydrurg. Biniod., Hydrurg. Perchlor. Lotio, Hydronaphthol Glycerinum Iodoformi, Ichthargan, Iodoform, Iodoformi Emuls., Iodoform Wool and Ung., Iodol, Itrol, Izal, Kresolum, Lanoline, Iq. Hydrogen. Perozidi., Listerine, Loretin, Lysoform, Mercurio-Zinc Cyanide, Perchloride Solubes, Petrolei Cerat., Potass. Permang., Resorcin, Salol, Salufer, Sanitary Wood Wool Wadding, Sunoform, Sozal, Sphagnum, Thymol, Traumatol, Trikresol, Zinci Chlorid., Zinci Sulphatis Lotio, Zinci Sulphis, Cheattie's Paste, Metakalin, Iodic Acid, and Iodates. Rubber Glove Substitute, Iodoform Bone Plugging, Vioform, Echthol, Zinc Ions. See also Dressings Sterilised. For relative values of some of the above see Chapter on.*

Antiseptics, Intestinal.—*Acid. Boric, Acid. Carbolic, Acid Iodic, Koumiss, Benzonsulphthol, Biscinod, Bismuth Salicylate, Bismutose, Ichthyol, Ichthoform, Mercurials, Formidin, Myrtillus, Naphthalene, Naphthol, Phenol-Bismuth, Quinine Acetyl Salicyl., Quinine Salicylate, Salacetol, Salol, Sodii Hyposulphis, Sulpho-carbolates, Trilactine, Tyllmarin.*

Many of these drugs may be prescribed for local action in Stearpills, Stearettes and Formagules, *q.v.*

Antiseptics for the Mouth. Formalin Tablets (Internal).

Antiseptics, Urinary.—Benzoic and Boric Acids, *Borovertin*, Salol, Hexamethylenetetramine, Methylene Blue, see also Cystitis, *Acid Iodic* and *Iodates*, *Tylmarin*.

Zinc Sulphanilas (urethral injection).

Antispasmodics.—See **Asthma**, **Convulsions** and **Epilepsy**.

Aortic Disease.—Ammon. Carb., Ferri Iodid., Ferri Perchlor. Iodides, Nux Vomica, Sodii Salicyl, *Tab. Nitro-glycerin et Sodii Iodid. cum Arsen.*—See also

Angina Pectoris.

Aphonia.—See **Voice**, **Loss of**.

Apthæ.—Bismuth preparations, Potass. Chloras, Mineral Acids, Quinine preps., Sodii Chloras, Iodoform, Pastils, Pepsin, *Sodii Sulphis. Tab. Formalin* to suck.

Acid. Boric, Acid. Sulphuros, Alumen, Borax, and Glys. of, Iodol, Lotio Nigra et Glycerini, part. æq., Potass. Permang., Sodii Chlorinat. Liquor.

Appendicitis.—Combined use of Belladonna and Salicylates (see p. 181).

Purgative e.g., Castor Oil or Calomel 2 gr.; Ice bag, Magnesia, Bismuth Subnitrate; Mercurial Ointment to the flank, Codeine if pain excessive, diet and regulation of bowels.—Robin's treatment outlined c.f., M.P. March 6, '07, p. 262. *Glycerin Bellad. and hot fomentation alternately.* Move the bowels not before the 4th or 5th day and not until the 7th if abscess forming, when Calomel and a saline aperient should be given if necessary. Saline mixture with Hyoscyamus, on no account Opium.—See also B.M.J. ii./07, 68. For incipient, *Elixir Agrimon. Co. Trilactine.*

Appendicitis, Threatened.—Enemata of Asafoetida Compound (q.v).

A record of 34 cases in general practice.—Pr. Mar./09, 391.

Treatment of relapsing, recurrent and chronic appendicitis.—Pr. Mar./09, 405.

Why and how to preserve the appendix.—Keetly, L. i./09, 1.

'Rest, starvation and Morphine' will probably clear up the typical mild case in two or three days.—L. ii./08, 1138.

Arterial Tension, Raised.—Aconite, Antimonial preparations, Potass. Iodidum, Pulv. Sodii Nitritis Comp., Veratrum Viride.—See also **Arteriosclerosis**, **Blood Pressure** and **Vasodilators**.

Arterial Tension, Lowered.—Pituitary Gland Preparations raise tension of the blood vessels.—See **Cardiac Tonics**.

Arteriosclerosis.—Adrenalin, *Antisclerosin, Regenerative Tablets*, Benzoates, Citrates, Peptone, *Sajodin*, Sodium Hyposulphite, Sodium and Magnesium Sulphates, *Syrupus Iodo-Tannicus*, Iodolysin (Inj.) Thyroid preps. *Trilactine*; Depressor Agents, e.g., Chloral Hydrate, Hippurates, Potassium Iodide, *Nitrites*. For pre-sclerosis Diuretics, finally Theobromine and Digitalis.

Theories regarding.—J. Cowan. Pr. Nov./09, 614.

Arthritis.—See **Gout** and **Rheumatism**.

Arthritis Deformans.—Iodine Ionised.

Ascaries.—See **Worms**.

Asthma.—Æthyl Iodid., Ammon. Brom., Amyl Nitris, Anilin Sulphate, Antimony, Arsenic, Belladonna, Bromides, Caffeine, Cannabis, Cannabin Tannas, Chloral Hydras, Chloroform, Coca and Cocaine Salicylas, Codeine, Erythrol Nitras, Euphorbia Peplus, Euphorbia pilulifera, Grindelia, Hydrarg. Subchlorid, Hyoscine, Isobutyl Nitris, Jaborandi, Lobelia Tinct. Menthol and Tinct. Ætherea, *Mannitol, Nitro-glycerin, Paraldehyde, Physostigma, Pilocarpine*. Potass. Iodidum, Pyramiden, *Rutæ Confectio*, Sodii Nitris, Stramonium, *Strontii Iodid., Tabellæ Antiasthmaticæ*. An emetic may afford great relief.—B.M.J. i./09, 538.

Acid. Sulphuros, Vapor, Adrenalin (?) c.f. B.M.J. ii./08, 1852. Ammonii Bromidi Vapor, Arsenical Cigarettes, Chloroform Vapor, Coca or Eucalyptus leaves smoked, Compound Asthma Fluid (as spray), Cubeb Cigarettes, Nim smoking (in India), Himrod's Cure by fumes, Ozonic Inhaler, Potass. Nit. fumes, Pulvis Lobelia Co., Pyridine, Stramonium or Tobacco fumes, Syr. Pilocarp. et Pot. Brom., Vapor Conine.

Management of (Auld).—See B.M.J. ii./08, 1852.

Balanitis. (Local use.)—Lotions of Lead Acetate, Zinc Salts, Phenol Argent. preparations, Tannin, or Zinc Oxide Powder.

Basedow's Disease.—See **Exophthalmic Goitre**.

Bed Sores. (Local use.)—*Acid. Tannic. Glycerin, Alcohol, Argent. Nit. in Nitrous Ether solution, Brandy, Glycerin, Glycerin. Aloes, Iodoform Gossyp. and Ung., Peruv. Bals., Tannin, Iodoform and Starch Powder, Resorcin.*

Beri-Beri.—*Phaseolus*, Strychnine. For routine treatment, v.p. 893.

Bile, Deficiency of.—Ammon. Chloride, Bismuth and Opium, Chirata, *Colalin*, Hepatic Stimulants and Antiseptics, e.g., *Elix. Gentian Acidum*, Salol Hydrarg., cum Cretâ, Pancreatised Milk, Sodii Glycocolas. Sodii Phosph. Efferves., Sodii Sulph. Efferves., Sodii Salicylas, Taraxacum.

Bilharzial Disease.—Methylene Blue. Wortabel Treatment, q.v.

Biliary Concretions.—See Gall Stones.

Biliousness.—Calomel, Chirata, *Colalin*, *Elixir Gentian Acid.*, Euonymin, Iridin, Leptandrin, Podophyllin, Sanguinarin, Seidlitz Powders, Sodii Phosph. Efferves., Sodii Sulph. Efferves., Sodio-Magnes. Sulph. Eff., *Taraxacum Cocoa*.

Bites and Stings (Insects, Mosquitoes, &c.). (*Local use.*)—*Ammonia*, *Blepharis Capensis*, Cocaine, *Eucalypt. Ol.* (to ward off), Formalin rubbed in, Hydrogen Peroxide, Lysoform, Moskitin, Onion Juice, Phenol, Sodii Bicarb., *Spiritus Chloroformi*, Thymol, Vinegar. Citronella Oil with Carbolic Acid good in warding off mosquitoes. See also Snake Bites. Mosquitoes to kill in room. v.pp. 773, 774.

Jelly Fish Stings.—See Liquor Plumbi Fortis.

Scorpion Stings.—See Snake Bite Lancets.

Blackwater Fever.—Eff. Saline, Intravenously Sodium Chloride, Quinine Digitalis, Strychnine, v. also p. 758.

Bladder.—See Albuminuria and Cystitis.

Bleeding of Gums.—*Magnes. Lactas*. See also Gums Inflamed and Spongy.

Blepharitis.—See Conjunctivitis.

Blistering Applications.—*Acetum*, *Collodium*, *Emplastrum* and *Liniment of Cantharides*, *Capsicum preparations*.

Blood Pressure, to Reduce, —

(i.) **Heart Depressants.**—Aconite, Arsenic, Mercury, Potass. Salts, Quinine, Salicylic Acid, Veratrum Viride.

(ii.) **Vasodilators.**—Amyl Nitrite and Nitrites, Arsenic, Mercury, Quinine, Salicylic Acid.—B.M.J. ii./06, 1455.—See also Vaso-dilators and Angina.

(iii.) **Purgatives.**

Blood to increase coagulability of, see List, p. 202.

Boils and Carbuncles.—Alkalis, Arsenic, Bismuth, Calcii Lactas, Acid Sulph. Dil., Calx Sulphurata, Ferri Perchlorid., Hypophosphites, *Todates*, Fæxin. Nuclein, Sulphides, Sulphurous Waters, Syr. or Pil. Sulphatum, *Trilactine*, Yeast, Streptococcal or Staphylococcal Vaccine.

Argent. Nit., *Belladonna Glycerin*, (as pigment and on poultices), *Carbolated Camphor*, Cataplasma Salicyl. Co., *Collodium*, *Fermenti Cutiplasma*, Hydrog. Perox., Glyc. Acid. Carbolic, Borated Hydrog. Perox., Iodo-Acetone, *Linimentum Atropinae*, Lysoform, Methysal Balm, *Opil. Ext.*, Pot. Permang. Pencils, Sphagnol, Thorii Oleat. Ung., Radium.

Brain, Softening of.—Bromides, Digitalis, Diuretics, Hypophosphites, Iron Salts, Morrhuæ Ol., Phosphorus.

Brain. Sudden Cerebral Lesions.—If gouty—*Lithia*, Potash with some diuretic, Nitrous Ether and Spirit of Juniper to which some Digitalis may be added—more if thrombosis is suspected than if hæmorrhage is probable. If thrombosis be present, reduce blood coagulability, e.g., by lemon juice. For hæmorrhage chalk in a little suitable acid, q.s. to dissolve, to increase the tendency to clotting. *Calcium Lactate* or *Chloride* best if procurable in time. Arsenic hypodermically, e.g., $\frac{1}{4}$ gr. Sodii Arsen. in a little water.—Gowers, B.M.J. ii./07, 3.

Breast, Inflammation of.—All Antipyretics, *Belladonna Ext. Glycerin*, and *Linim.*, *Phytolacca*.

Breath, Fetid.—*Acid. Salicylic*, Calcii Permang., Camphora, Cremor Magnes., *Craosoli Vapor*, Lysoform Mouth-Wash, Myrrh with Borax Tincture, Formalin Tablets to suck, *Thymaglycin*.

Bright's Disease.—Alkalis, Antipyrine, Auri Chlorid., Cannabis, Digitalis Diuretin, Elaterium, Hydrastis, Iodo-Caffeine, Iodo-Theobromine, Jaborandi and Pilocarpine, Nitroglycerin, Potass. Iodid., *Scoparii Succus*, *Vinum Diureticum*.

Diet.—(1) Limitation of amount of fluid to $1\frac{1}{2}$ litres per diem. (2) Milk Diet $2\frac{1}{2}$ to 3 pints per diem. (3) Lacto-vegetarian diet e.g. 2 litres milk, 250 Gm. Rice, 250 Gm. Grapes, 750 Cc Vals or Vichy Water. (4) Chloride-poor diet e.g. Milk, Cream, Rice and Water. This rapidly increased Sodium

Chloride output in a case of acute nephritis. (5) Nitrogen-poor-diet suited to various forms of acute nephritis.—Pr. Aug./09,155.

Bromidrosis.—Potassium Permanganate Wash. See also Perspiration, Offensive.

Bronchiectasis.—Creosote Inhaler. See also Bronchitis.

Bronchitis, Acute.—Aconite, Ethyl Iodide, Ammon. Acet. Liquor, Antimony, Apocodeinæ Hydrochlorid., Atropine Methyl Bromide, Codeia Jelly, Glycopharm., Guaiacose, Ipecacuanha, Ol. Cedri Atlantic. Oxygen, Squill preparations.

Vapor Benzoin, Camphor or Eucalyptus, Counter Irritation. Ol. Succini.

Bronchitis, Chronic.—Acid. Nit. dil. and Inhalations, Allium preps., Ammon. Carb., Ammon. Chlorid., Apomorph. Hydrochl., Benzoates and Benzoin. Tinct., *Cyper Rotund. Caps. or Mist.*, Cimicifuga, Codeina Cough Jelly, Creosote, Dionin, Eucalyptus Oil, Euphorbia, Grindelia, Heroin, Ipecacuanha, Morphine preps., Morrhuæ Ol., Piscidia, Potass. Cyanidum, Prunus Virginiana, Pulsatilla, Scilla, Senega, Inf. Polygalæ Compositum, Syrup. Picis cum Codeina, Syrupus Picis Liquidæ, Thiocol, Tar, Terpene Di-iodide, Terebenum purum, Terpin Hydrate, Terpinol, Tolu Balsam. Vaccine of Organism present e.g. *Pneum. Vaccine*.

Antimony and Opium, Tinct. Camph. Co., with Ipecacuanha. If much bronchial spasm and tough expectoration give decalcifying agents—Potass. or Sod. Cit. Later tonics.—See article, B.M.J. i./08,909.

Vapores.—Acid. Carbolic., Acid. Sulphuros, Benzoini, Camphoræ, Creosoti, Cyllin, Terebeni, Iodi; Croton Ol. Linim., Iodi Linim., Ethyl Iodide, Guaiacol, Nebulæ, q.v. Oxygen inhaled.

Broncho-pneumonia and capillary bronchitis in infants. Mist. Paraldehyde and Potass. Iodid. Whiskey in small doses.

Bruises. (Local use.)—Arnica Tinct. (well diluted), Calendula, Hamamelis, Hydrastis Tinctura, Lot. Plumbi et Opii, Hazel Foam.

Burns and Scalds. (Local use.)—Acid. Boric Ung., Acid. Picric and Wool, Actol, Airol, Aristol, Calamin. Cerat., Chartazine, Chloretone 10% Ointment, Cocainæ Ceratum, Dermatol, Epidermin, Europhen, Fæxin poultice, Glycerin as an application (good), Glyceritum Vitelli, Hyd. et Zinc Cyanid. Ung., Ichthyol, Iodoform, Lanolin, Lin. Ol. cum Aqua Calcis, Mollin, Thymol. Ung., Vaseline, Zinci Oleat. Ung., Zinci Ung. Hazel Foam, Volckmann's Solution, Zinc Peroxid. Picric Acid strongly recommended. Oils not advised (Navy).—B.M.J. ii./07,524.

Thorough antiseptic cleansing of the affected part and thereafter dusting with equal parts of Boric Acid and Bismuth Carbonate (not nitrate).—L. i./09,38.

Bubo. (Local use.)—Chlori Aqua, Hydrarg. Oleat., and cum Morphina, Hydrarg Ung., Hydrogen. Peroxid.

Calculi, Biliary.—Alkalis, Ox Bile, Oleic Acid, Sodii Benzoas, Sodii Bicarb., Sodii Glycocholas, Sodii Oleas, Soap.

Calculi, Urinary.—Ac. Acetic. Dil. Douche, Alkaline Carbonates, Ammon. Benz. and Phosph., Aqua destillata, Calcis Aqua, Lithium preps., Mineral Acids (for Phosphatic), Pichi, Piperazina, Potass. Citras, Sodii Benz. and Hippuras, Sodii Phos. Acid, Triticum, Uricedin.

Detection of by 'X' Rays, q.v.

Cancer.—Alnus Glutinosa, Arsamin, Arsenic preps., Calx Sulphurata, Chelidonium, Chloral Hydras and Opium preps. (as sedatives), Cinnamic Aldehyde Caps., Condurango, Mist. Terebinth. Chiæ, Cancer bush, Canceroïn, Elixir Antimonii Cinnamicum, Ext. Violæ Liq., Liq. Violæ Glucosidi, Sodii Cinnamas, Tylmarin, Pulv. Tylmarin et Antim., Trilactine.

Acetone, Acid. Acetic Glacial, Acid. Arsenious, Acid. Carbolic. (caustic), Acid. Carbolic. Glycerin, Acid. Chromic., Acid. Lactic, Acid. Nitric Fumans, Acid. Sulph. Fumans, Acid. Salicylic. cum Oleo, Anæsthesin, Coley's Fluid, Cupri Oleatis, Emplastrum, Ovules and Bougies, Fibrocoumarin and Comps., Finser Light, Formalin plugging and injection Fulgurations, Hydrarg. Nit. Acid., Liq., Hydrog. Perox. (in inoperable uterine), Injectio Antimonii, Inject. Antimonii Cinnamica, Iodipin, Iodoform, Liquor Acido-Chromo-Aceto-Osmic, Local application of Arsenic (Trunecek), London Paste, Methyl Violet, Michel's Paste, Morphine, Morphine Oleat., Pyoktanin, Quininæ Hydrochloridi Injectio, Liquor Potassii et Sodii Hypochloritum, Potass. Bichromas injected, Quininæ Salicylas, Radium, Resorcin, Vienna Paste, Viola Odorata 'X' Rays, Zinci

Chlorid. and Pasta, Doyen's Serum, Iodic Acid, Sodium Orthocoumarate, Sodii Phosphas Acid. with Hydrochloric Acid, Symphytum Cataplasma, Thoriac Comps., Thyroideectomy, Ung. Thorii Oleat., Uranium Salts.

Drage's recent results and opinions on the medical treatment with Cinna-mates. Coumarates, Tylmarin, v. pp. 30—33.

As Nuclein is essential for rapid cellular mitosis it is suggested to eliminate it from the food entirely, or to alter its composition by replacing the Nitrogen by Antimony, Arsenic, &c.—B.M.J. ii./07, 1206.

Cocaine. Cancer sufferers tolerate large doses—diagnostic? *Vide idem.*

For Diagnosis, *vide pp.* 760, 762.

Cardiac Dyspnoea. (*Local use.*)—Carbonic Snow.

Cardiac Mitral Stenosis.—Oxygen inhalation. Decalcification of the blood.

Cardiac Tonics.—*Acocanthera* (with caution), Adonidin, Adonis Vernalis, Adrenalin, Barii Chloridum, Caffeina, Carpine, Convallaria, e.g., Glyco-gelatin Pastil, Coronillæ Extractum, *Digitalone*, Digalen, Digitalis, Erythrophloeum, *Hydriodic Acid, Ibogaine*, Nitroglycerin, Oxy-sparteinae Hydrochloridum, *Pituitary Extract*, Scilla, Sparteinae Sulphas, Strophanthus (*Strophanthin has been used intravenously*), Strychnina, *Thyroid Extract*, Uropherin, Veratrum Viride.

Caries.—Calcii Chlorid., Calcii Hypophosph., Calcii Phosph., Hæmol, Saccharated Wheat Phosphates, Calcium Iodate.

Caries, Dental.—Calcii Sulphidum (for Pyorrhœa).

Arsenical Paste, Dental Solubes, Lanolin and Cocaine, Paramonochlorphenol. Lotio Acidi Citrici et Phenolis, Salol or Lysoform Mouth Wash, Resina Carbolica, See also Dentistry, local applications.

Cataract, to prevent Senile.—Iodides, Mercurials, Sarsaparilla; Tonics,—Quinine and Iron, Strychnine.

Catarrh Bronchial.—See Bronchitis.

Catarrh, Gastro-intestinal.—Alkalis, Ammoni, Chloride, Betol, *Bisciniod*, Bismuth preps., as Bismuthi, Benzoes, *Bismuth Nucleinas*, Oxy-Bromide, Salicylas, Sulpho-Carbolas, Sulpho-Cyanid., Phosphas, Bismutose, Caffeine, Calcinol, Collinsonia Canadensis, Eucalyptus Globulus, *Ferri Ammon Cit, Helba*, Hydrastis, Hydrocyanic Acid, Leptandra, *Mist Catarrhalis*, Opium, Potassii Bichromas, Potassium Iodide, Salines, Salol, Tylmarin, *Trilactine Tablets*, Milk and Medicated Milk.

Catarrh, Nasal.—Aconite, Ammon. Chlor., Arsenic, Camphor, Cinnam. Ol, Cubebs, *Glycophorm, Linctus Pini. Terp. et Heroin*, Pilula Atropinae Quininae et Arsenici, *Pyramidon*, Quinine, Tab. Quin. Camph. Morph. et Atrop. *Troch. Camph. Salicyl. Co.*

Acid. Carbolic, or Acid Tannic, Buginarium, Adrenol, Alum Spray, Anti-catarrhal salts, Bismuth. Co. Pulv., Borated Hydrog. Perox., Camphor inhalation, Carbolicised Smelling Salts, Comp. Asthma Fluid, Dobell's Solution, Ethyl Iodide inhaled, Eucalypti Oleum, Guttæ Chlorof. Menthol Co., Iodoformi Buginarium, Liq. Alum. Format, Menthol Inhalation, Injection, Wool and Snuff, Menthol and Camphor Inhalation, Ozonic Inhaler, Potass. Permang. as Nasal douche (very dilute) and some retained with plugs, Pyocyanase, Resorcin as Nebula, Sozoiodol, Supra-renal Extract, Thymaglycin, Ung. Belladonnae, Ung. Morphinae cum Acid Tannic. Common Cold and other Vaccines, Zinc Ions. Several good methods of treatment of common colds.—B.M.J. i./08, 957.

Nothing so efficient as a fine spray of Formalin Solution, $\frac{1}{4}$ to $\frac{1}{2}$ %, applied early.—Tilley.

Catarrh, Uterine.—*Acid. Carbolic. Glycerin., Boracis Glycerin., Camphorated Carbolie Acid, Iodoform. Gosyp. and Pessus, Plumbi Subacet. Glycerin., Opii et Amyli Enema, Ung. Adrenalin, Ovules (see List), Zinc Sulph. Uterine Pencils, and with Alum.*

Catarrh, Vesical.—See Cystitis.

Cathartics.—See Constipation.

Caustics.—Copper Salts, Nitric Acid, *Pasta Londinense, Potassa Fusa, Silver Salts, Sodium Ethylate, Vienna Paste, Zinc Chloride.*

Cerebro-Spinal Fever.—Antipyrin, Phenacetin, Opium, Vaccine Treatment, *Culomel and a counter irritant, e.g., Liq. Iodi or Liq. Epispastic, over the cervical spine. Flexner's Serum.* See article, p. 765.

Soamin has been injected intravenously.

Chancres, Soft.—*Acid. Dichlor-Acetic, Acid. Nitric, Fumans, Acid. Sulph. Fumans, Aïrol, Aristol, Bismuth Benzoate, Hydrarg. Flav Lotio, Hydrarg. Nig. Lotio, Hydrarg. Subchlor., Hydrog. Perox., Iodic Acid, Iodol, Iodoform Pulv. and Ung., Liq. Carb. detergens, Plumbi Acet. Lotio, Resorcin.*

Chapped Skin.—*Acid. Boric. Ung., Camphor Ball, Ceratum Petrolei, Collodium, Glycerin. cum Aquâ Rosæ, Hazel Foam, Vaseline, Cucumeris Ung., Lanolin, Mollin, Thorii Oleat. Ung., Ung. Phenoboric, Zinc Cream, Zinc Oleate.*

Chilblains.—*Calcii Chloridum, Calcii Iodidum, Calc. Lactas.*

Acid. Boric. Ung., Acid. Camphoric, Acid. Carb. Ung., Aconit. Linim., Balsam Locatelli (even if broken), Bellad. Lin., and Linim. Co., Cajuput Ol., Calcis Chlorinat. Ung., Capsici Linim., Collodium Iodi., Eucalypti Ol. Ung., Glycerini Plumbi Subacet. Ung., Hazel Foam, Hydrogen Peroxide Solution, Iodi Tinct. Decolor., Iodi Ung., Iodoform Wool and Ung., Oleanodyne, Pasta Ichthyol et Ol. Tereb., Plumbi Subacet. Glycerin, Picric Acid Solution, Tamus Communis, Thorii Oleat. Ung. Tinct. Capsici fort. Cause of, v. p. 204.

Chloasma.—See Freckles.

Chlorosis.—*Arsenic, Arsenic and Iron Injection and Drops, Canniferrin, Ferratin, Ferri Amara Mist., Ferri Aper. Mist., Ferri Bromid., Ferri Carb. Pil. (Bland), Ferri Carb. Sacch., Ferri Co. Mist., Ferri Dialysat. Liq., Ferri Perchlorid. Tinct., Ferri Sulph. Pil., Ferro-Somatose, Hæmogallol, Hæmol, Hypophosphites, Lacto-Somatose, Levico Water, mild and strong, Manganese Citrate, Manganesii Oxidum, Marrubin, Mistura Ferri Arsenicalis, Myrrh et Aloes Pil., Nickel Salts, Peroxides, Phosphorus, Santonin, Sodii Persulphas, Somatose, Tinct. Martis., Tinctura Ferri Pomata, Tri-lactine, Vanadates.*

Diminish fluids in the body by Caffeine, Magnes. Sulph., Zinc Sulph. c.f.—B.M.J. ii./og, 1668. v.p. 197.

Cholera.—*Antitoxin of Haffkine, Atropine injection, Camphora, Chloromorphiæ Liq., Copper Salts, Coto and Cotoin, Cresol Salicylas, Helba, Hydrarg. cum Creta, Hydrarg. Subchlorid. cum Opio, Hydrog. Perox., Hypod. injections of Quinine Hydrochlorosulphate and Carbamide, Izal Caps., Menthol (for vomiting of), Morphina, Ol. Allii Essent., Opium, Paracotoine, Plumbi cum Opio Pil., Resorcin, Salol, Sedeff, Sulphurous Acid, Tinctura Capsici or Cayenne in Brandy in emergency, Tinctura Chloroformi Co., Tribromophenol-Bismuth, Tyllmarin.*

Tannin rectal injection, Saline Solution rectal injection.

Calotropis Pills as prophylactic.

Cholelithiasis.—See Gall Stones.

Chordee.—*Aconite, Belladonna, Bromides, Camphora Cannabis, Canthar. Tinct. (one minim hourly), Chloral Hydras, Hyoscine, Hyoseyamine, Morphine inj. hypod., Opii Suppos.*

Chorea.—*Acid Aceto-Salicylic, Actæa, Antimonial preps., Antipyrine, Arsenic, all Bromides, Brometone, Cacodylates, Cannabis and Chloral, Calcii Chlorid., Camphor Monobrom., Cephalopin, Formates, Chloral Hydras, Cimicifugin, Codeine, Conium and Conine Hydrobrom., Ferri Bromid., Ergot, Chlore-tone, (L. ii./o8,725.) Ferri Phosph., Gelsemium preps., Iodides, Mag. Sulph. Morrhuæ Ol., Phosphorus, Physostigma and Physostigmine, Salicylic Acid, Sodium Salicylate, Strychnine, Valerianates, Zinci Bromid. Sulphas and Oxidum.*

Cicatricial Tissue.—*Iodolysin, Thiosinamin, Fibrolysin, Inj. Thiosinamin et Antipyrin—all by injection.*

Cirrhosis of Liver.—*Ammon. Chlorid., Iodides, Acid Nitro-hydrochloric, Liver Extract, Sodium Phosphate.*

Cold, Common.—See Catarrh, Nasal.

Colic, Hepatic and Renal.—*Opium, Morphine, Belladonna (in large doses). Amyl Nitrite, Chloroform, or Ether inhalation.*

Colic, Intestinal.—*Æther, Anethi Aqua, Belladonna, Calcis Aqua (for infants), Cajuput. Ol., Camphora, Cannabis, Chloroform, Chloromorphiæ Liq., Elizir Gentianæ Acidum, Menth. Pip. Ol., Morphine preps., Opium preps., Tinctura Carninativa, Bromides, Chloral, Hyoseyamus, Peppermint, Ruta, Valerian.*

Colitis.—*Bismuth Salicylate, Hydrastis, Methylene Blue, Naphthalene, Naphthalene Tetrachloride, Salicylates, Salol, Trilactine. B. Coli Vaccine.*

Saline and Boric Enemata, Copper Sulphate injection, Oils, Thymaglycin.

Colitis, Ulcerative.—*Anti-dysenteric Serum, Ipecac., Methylene Blue, Silver also Copper and Zinc ionised. Treatment, Allchin.—L.i./og, 393. (Local use).—Argyrol.*

Enema Bismuth.—*Subgallat. Ol. Morrhuæ c. Creosot. {Emulsio Sulphuris injected through an artificial anus.*

Collapse and Fainting.—Æther inj. hypod., Æther. Spt., and Spt. Co., Alcohol, Ammon. Arom. Spt., Ammon. Vapor, Amyl Nitris., Brandy Sterules, *Camphor Inject.*, Capsules Aromat, Ammonia, Digitalis Tinct. and Inj. Hypod. 20 m., *Erythrol Nit. Tabs.*, Mannitol Nit. Tabs., Nitro-glycerin Tablets, *Regenerative Tablets.*

Colour Blindness.—Calcium Lactate is stated to have benefitted.—B.M.J. ii./09,315.

Comedones—Glycerinum Kaolin Aceticum, Iodates, Phenol, *Calx Sulphurata*, *Fowler's Solution*, *Ichthyol*, *Resorcin*.

Conjunctivitis. (*Locally*).—*Acid. Boric.*, *Alsol*, *Alumen*, *Argenti Acetas*, *Argenti Fluoridum*, *Argenti Nitras*, *Argyrol*, *Belladonna*, *Bismuth Oxyiodogallas* (gonorrhœal), *Boroglyceride*, *Borax*, *Collyrium Adstringens Luteum*, *Cuprocitrol*, *Hydrarg. cum Morphinâ Oleat*, *Hydrarg. Oxid. Flav. Ung.*, *Hydrastinin Lotion*, *Hydrogen Peroxide*, *Hydro-quinone*, *Iodol*, *Nargol*, *Opii Vinum*, *Protargol*, *Resorcin*, *Thioform*, *Zinc. Acetat. vel.*, *Sulph. Lotio*, *Zinc Ions*.

Conjunctivitis, Diphtheritic (*Local use*).—*Formaldehyde*, *Hydrog. Perox.*, *Hydroquinone*, *Iodol*, *Quininæ Sulph. Lotio.*, *Resorcin*, *Methylene Blue*.

Constipation.

(1) *Laxatives*:—*Agar*, *Aloes*, *Aloin*, *Cascara* (Capsules, Elixir, Jelly, *Mistura Laxativa*, Pastils,) *Castor Oil* (useful with Glycerin p. æq.), *Maricol* or other Castor Oil Powder, *Embic Myrobalans*, *Elixir* and *Syrupus Ficorum*, *Flax Seed*, *Guaiacum* and *Sulphur Tablets*, '*Hindu Dates*,' *Laxol.*, *Levurine*, *Manna*, *Mist. Cascara Co.*, *Mucogène*, *Ol. Ricini Aromat.*, *Paraffinum Molle*, *Tablets Phenolphthalein* and *Phenolphthalein Co.*, *Pil. Cascara Co.*, *Pulv. Glycyrrhizæ Co.*, *Rhamnus Frangula*, *Rhubarb preps.* of, *Senna* (*Elixir*, *Conf.*) *Sodii Hyposulphitis*, *Sulphuris Conf.*, *Tamar Indien*, *Tinctura Laxativa*, *Trilactine Tabs.* or *Milk*, *Zymin*.

(2) (a) *Secretion Stimulants*.—*Ammonium Chloride*, *Aqua Aperients*, *Jalap* and preps., *Magnesium Chloride* and *Citrate*, *Marlenbad Salt Tablets*, *Saline Aperient Waters*, *Seidlitz Powders*, *Sodio—Magnes. Sulph. Eff.*, *Sodii Phosph. Eff.*, *Sodii Sulph. Eff.* (b) *Hepatic Stimulants*.—*Aloes*, *Colocynth* and preps., *Ipecacuanha*, *Iridin*, *Jalap*, *Mist. Hepatica*, *Podophyllin*, *Rhubarb*, *Sodii Glycocholas*, *Sodii Sulph.*, *Taraxacum Cocoa*, *Elixir Gentianæ Acidum*. (c) *Cholagogues*.—*Blue Pill*, *Calomel*, *Euonymin*, *Grey Powder*, *Leptandra*, *Magnesium Chloride*, *Pilulæ Laxantes*, *Scammony (Pil. Conf.)*, *Stillingia*, *Taraxacum preps.*

(3) *Peristaltis, Excitants of*:—*Ignatia*, *Nux Vomica*, *Strychnine*.

(4) *Spasm Relievers*.—*Asafetida*, *Belladonna*, *Bromides*, *Chloral*, *Hyoscyamus preps.*, *Peppermint*, *Valerian*.

(5) *Nerve Tonics*.—*Arsenical preps.*, *Caffeine*, *Sodii Glycerophosphas*, *Zinc. Valerianas*.

Enemata (*vide monograph*), and *Trilactine*, *Glycerin*, *Injection* and *Suppositories, Inject.* *Fel Bovini*, *Gauze Tampons coated with Soap* are used.

Hypodermic Purgatives. *Apocodeine*, *Colocynthin*, *Physostigmine*.

See also B.M.J. ii./08,1079.

Convulsions.—*Æthusa*, *Amyl Nitris*, *Anæsthetics*, *Bromalin*, *Camphor*, *Monobrom.*, *Chloral*, *Chloroform*, *Conium*, *Morphine preps.*, *Moschus*, *Podophyllin*, *Potass Acetas*, *Potassii Bromid.*, *Rubidium Bromide*, *Rue*, *enema of*—(for infantile), *Santonin*, *Sodii Bromid.*, *Sodii Nitris*, *Syr. Pilocarpin et Potass. Brom.*

Chloral Suppositories.

Convulsions, Puerperal.—*Amyl Nitrite Capsules*, *Anæsthetics*, *Chloral Hydras*, *Chloroform*, *Morphine*, *Musk*, *Nitro-glycerin*, *Pilocarpine*, *Veratrum Viride*, *Thyroid Ext. hypodermically* (B.M.J. ii./08,1670), *Sodium Acetate Injection* ½ drachm to the pint (*ibid.*)

Cornea, Inflammation, and Ulcers of. (*Local use.*)—*Atropine*, *Belladonna*, *Boric Acid Lotion*, *Cocain*, *Hydroch. Liqueur*, *Daturine*, *Duboisine*, *Eserine*, *Fluorescein* and *Uranin* (*diagnostic*), *Holocaine Hydrochloride*, *Hydroquinone*, *Hydrarg. Oxid. Flav. Ung.*, *Hydrarg. Subchlorid.*, *Infusum Abri*, *Pilocarpine*, *Quinine Lotion*.

Corns. (*Local use.*)—*Acetic Acid (glacial)*, *Carbolic Acid*, *Collodium Cullosum*, *Cupri Oleas*, *Fowler's Solution of Arsenic*, *Papaw*, *Formalin*, *Lin. Iodi.*, *Ung. Iodi Intinctum*, *Iodum Oleatum*, *Salicylic Ions*, *Thorii Oleat. Ung.*

Corns, Soft. (*Local use.*)—*Durine*, *Silver Nitrate Solution* 1 in 3 applied every 4 or 5 days.

Coryza.—See Catarrh, Nasal, and Hay Fever.

Cough.—Acid. Hydrobromic, Acid. Hydrocyanic, Adrenol, Belladonna, *Camphor and Creosote inhaled*, Camph. Co. Tinct., Chloral Hydras, Codeina, Conium, *Cynoglossum*, Dionin, Elixir Pectorale, *Elix Pini Ternin et Heroin*, *Gee's Linctus*, Gelsemium, Glycaphorm, Glycoheroin, Guttæ Rosæ, Helenin, Heroin, Hyoscyamus, Hypnal, *Lichenoids*, Linctus Camphor. Comp., *Linctus Expectorans* (Antimonii), Linct. Menthol, Linct. Morph. Comp., Linct. Morph. Hydrocyanicus, Pastilli Pectorales, Ozonic Inhalers, Liq. Pectoralis, Marrubium, Mist. Tussi Rub., Morphine Linctus, Morphine Troch., Morphine et Ipecac. Troch., Opium preps., Pastilli varii, q.v., Picis Liq. Pil., Prunus Virginiana, Rami Syrup, Sandal Wood Oil, Spirit of Chloroform, Syrup Coeillanæ Comp., Syrup. Pini Pumilionis, Syr. Thymi c. Heroin, Tab. Formalin to suck, Tabellæ Glycyrrhizæ, Terpin Hydrate, Terebentum, Terpinol, Troch. Tussis, Tinct. Benzoin Co., Vapor Acid Carbolici Co. (phthisical cough).—Lees.

Cretinism.—Thyroid Preparations.

Cystitis.—Acid Camphoricum, Acid Lactic, Aconite, Alkalies, Ammonium Benzoate, Antiosin, Alphon, Arbutin, Arenaria rubra, Arrhovin, Betol, Belladonna, Benzoates, Boric Acid, Borovertin, Buchu, Cannabis Indica, Collinsonia Canadensis, Copaiba, Eucalyptus Globulus, Glycosal, Gokhru, Helmitol, Hetraline, Hexamethylenetetramine, Hydrastis, Juniper, Kava Kava, Liquor Potassæ, *Magnesi Borocitras*, Pareira, Pichi, Saccharinum, Salacetol, Salol, Santyl, Sorghum, Triticum repens, Uva Ursi, *B. Coli Vaccine*.

Argenti Fluoridum and Nitræ, Argyrol, Cocaine Lactate, *Creolin Solution*, Formicin, Lysoform, Salicylle Ions, Sozal, Zinc Sulphanilas.

Cystitis, chronic.—Ammonium Benzoate, Buchu, *Cinnamates*, Grindelia, *Hydrog. Perox.* (5 to 10 vol.) Juniper, Pareira, Salol, Sandal Wood, *Santalol*, Uva Ursi.

Croup, False.—See Laryngismus Stridulus.

Deafness.—Fibrolysin, Pilocarpine. See also Earache.

Debility.—Alcohol, Arsenic preps., Bone Marrow Extract, Bovril, Calcii Hypophosph. Syrup, Calcii Phosph., *Calc. Glyceroph. c. Lacte Essicc.*, Capsulæ Cruoris, *Capsulæ Valerianat. Comp.*, Cinchona preps., *Coptis Teeta*, Elixir Gentianæ Acidum, Eupatorium, Ferratin, Fluoroform, Formates (Inorganic and of Quinine), Glycero-phosphates, *Glycerole of Hypophosphites*, Hæmoglobin Capsules and other preps., *Histogenol*, Hypophosphites, Iron Salts, Levico Water, Liq. Pepsinæ et Caffeinæ, Maize Oil, Maltum, Malted Glycero-phosphates, Maltollvin, Marrubin, Malt Ext. c. Hæmoglobin, c. Pancreatin, c. Hypophosph., &c., Malt Ext. cum Syr. Ferri Phosph., Milk, dried (varieties), Morrhuæ Ol., Phosphorus, Pil. Potentin Co. Phytin, Pulv. Glycero-phosph. Co., Quassia, Quinine preps., Sodium Cacodylate, Somatose, Strychnine, Salts, e.g., *Cacodylat and Formate (new)*, Syrup Ferri Phosphat. cum Quinina et Strychnina, *Syr. Formatum Comp.*, *Syr. Kolæ Comp.*, *Syrupus glycerophosphatum cum Formatibus*, Tinct. Oleæ Fol., Helba, Tylmarin, Trilactine. See also Anæmia.

Delirium Tremens, and see Alcoholism.—Ammon. Carb., Apomorphine, Auri Chlorid., Bromides, Camphora Monobromata, Capsicum, Chloral, Digitalis, Hyoscyne, Hyoscyamine, Opium preps., Phosphorus, Quinine preps., Sodium Chloride Injections, Strychnine, Sulphonal, Valerianates,

Treatment of delirium tremens.—Hospital ex C.D. i./10, 123.

Dengue Fever.—Sodium Salicylate, Salicin, Potassium Iodide, Phenacetin and Caffeine. No drug is specific.

Dentistry. (Local use).—Adreucaine, Alcohol Sandarachi, *Baldock's Paste*—Borated Hydrogen Peroxide, Cinnamon Paste, Cocaine Lanolin, Cocaine, Menthol-Phenol, Codrenine, Collutorium Alkalinum, Collutorium Astringens, Collutorium Formalin, and with Creolin, *Copal Solution*, Dental Anæsthetic, Dental Compo, Dentalone, Dental Rubber, Dental Wax, Emplastrum Capsici, *Eucaïne Lactate*, Erythrophleine, *Fletcher's Artificial Dentine*, Gossypium Arseniosum, *Hydrogen Peroxide*, Iodoform Paste, Lysoform Mouth Wash, Tooth Paste, and Dental Dressing, *Mercury Amalgam*, *Pasta Arsenicalis*, Zinc Oxychloride, Zinc Oxyphosphate, Zinc Oxysulphate.

For suspended animation after anæsthetics.—Amyl Nitrite Capsules. Vide also Chloroform, &c.

Dermatitis 'X Ray' (Local use).—Boric Acid Ointment, Radlum. Vide page 536.

Keratosis accompanying,—Carbonic Snow.

Diabetes Insiptidus.—Arsenic, Adrenalin, Belladonna, Ergot, Gallic Acid, Lithium Salts, Lithion, Opium, *Rhus Aromatica*.

Diabetes Mellitus.—Acid. Gallic, Acid. Lactic., Alkalis, Arsenic Bron., Aspirin, Cacodylates, *Chimaphila*, Codeina, Codeinæ Pil. Co., Convallaria, *Cremor Magnesiæ*, Croosotum, *Diabeteserine*, *Faxin Ext.*, Dulcin, *Duodenal Extract*, Eucalypt fol. inf., Glaciium Luteum, Gold Salts, *Glycerin*, Glycerophosphates, Hexamethylene tetramine, Hydrogen Peroxide, Iron Salts, Jaborandi, Jambul, Lævulose, *Lecithin Elixir and Emulsion*, Levarine, Magnes. and Sodium Peroxides, Morphina, Nuclein, Opium, Oxygen, Ozonic Ether, Pancreatin, Phosphorus, Potassium Chlorate, Saccharin, Elixir and Tabellæ of, Salol, *Sedeff*, Sodii Arsenias, Sodium Chloride intravenously, Sodii Citraæ, Sodii Phosphas, Sodii Salicylas, Supra-renal gland, Thymol, Thyroid gland, Trypsin, Uranii Nitras, Yeast.

Phenazone with Aspirin 5 grains each, reduces night calls to micturition and relieves thirst and burning sensation.—B.M.J. ii./07, 1054. q.v. for full account of diabetes in the tropics.

Coma of:—

Alkaline drinks freely as routine treatment, also Sodium Carbonate (not Bicarbonate) 40 Gm. per litre intravenously if coma sets in.—Treatise on.—M.P. Mar. 20, 1907, p. 307.

For the thirst of—*Pastillus Acidi Citrici* c. Limone, *Spondias Mongifera*.

Purging treatment by natural aperient water, followed by drinking water or thin drinks—said to restore to health and remove all symptoms.—L. i./09, 202.

Diarrhœa.—Acid. Camphoric, Acid. Carbolic., Acid. Gallic., Acid. Hydrochloric Dil., Acid. Lactic., Acid. Sulph. Dil. and Aromat., *Agaricus albus* and *Agaricin*, *Albumen Water*, *Allmatein*, *Anthemidis Tinct.*, *Anthemis*, *Benzonaphthol*, *Bisciniod*, *Bismuthi et Cerii Salicylas*, *Bismuthi Salicylas*, Tannas and other preps., *Cajuput Oil*, *Calcii Carb.*, *Calcii Salicylas*, *Calcis Aqua*, *Camphora*, *Catechu*, *Cinnamon*, *Cloves*, *Conradi's Drops*, *Coto*, *Cotoin*, *Crêtæ Arom. Pulv.*, and cum Opio, *Cupri Sulph.*, *Cupri Sulphocarb.*, *Cyllin Syrup*, *Eucalyptus Gum.*, *Liq. Ferri Pernitrat.*, *Ferri Salicylas*, *Fortoin*, *Guaiasanol*, *Hæmatoxylin*, *Honthin*, *Hydrarg. Perchlor.* in small doses, *Mist. Antiseptica*, U.C.H., for infants, (*Mistura Diarrhœa*, Board of Health), *Monsonia*, *Naphthalin*, *Naphthol*, *Opium preps.*, *Plumbi Acet.*, *Pulv. Ipecac. Co.*, *Pulv. Kino Co.*, *Quercus*, *Quininæ Salicylas*, *Resorcin*, *Rhus Glabra Ext. Liq.*, *Ricini Ol. and Aromaticum*, *Sedeff*, *Salacetol*, *Sassafras*, *Sodii Phosphas*, *Thieleman's Mixture*, *Tribromophenol-Bismuth*, *Sodii Sulphas* (Infantile) q.v., *Trilactine Tablets or Milk*, *Vin. Coto-Pepsin*, *Zinc Sulphocarbonate*.

Acid. Tannic. Suppos., et cum Opio, *Amyli Enema*, et cum Opio, *Gallæ Suppos.* et cum Opio, *Tannin rectal injection*, *Turpentine Stupes*. See also Dysentery, *infra*.

Diarrhœa of Phthisis.—*Pneumococcine*, *Coto*.

Diphtheria.—Acid. Salicylic., *Aconite*, *Antitoxin*, *Ferri Perchlorid.*, *Hydrogen Peroxide*, *Sodii Benzoas*, *Sodii Chloras*, *Sodii Hyposulphis*, *Strychnine preps.* for paralysis when a sequela, *Tribromophenol*. Normal Saline (in grave toxæmic states).

Acid. Benzoic. Nebula, *Acid. Carbolic. Glycerin. and Nebula*, *Acid. Lactic. Nebula*, *Acid. Sulphuros. Nebula*, *Chlori Gargarisma*, *Collargol*, *Copper Ionisation* (chronic diphtheria of the ear), *Eucalypti Ol. and Vapor*, *Formol Spray*, *Hydrogen Peroxide*, *Hydroquinone*, *Iodic Acid*, *Iodised Phenol* (Pigment, Gargle and Inhalation), *Iodol pigment*, *Loeffler's pigment*, *Menthol pigment*, *Naphthol cum Camphora*, *Nebula Acid Malic*, *Ozonic Ether*, *Papayotin*, *Pyocyanae*, *Resorcin*, *Sodii Benzoatis Nebula*, *Sodii Chlorinat. Liqueur*, *Toluol*.

Diphtheritic Infections of the Skin.—Zinc Ions.

Dipsomania.—See Alcoholism.

Disinfectants.—See Chapter on.

Diuretics.—See Dropsy Renal.

Dropsy, Cardiac.—*Acocanthera* (with caution), *Adonidin*, *Agurin*, *Apocynum preps.*, *Asparagin*, *Baillie's Pill*, *Barium Salts*, *Caffeine*, *Chimaphila*, *Convallaria majalis*, *Delphina*, *Digitalin*, *Digitalis*, *Elaeterium*, *Erythrophloeum*, *Iodo-Caffeine*, *Pyoktanin*, *Strophanthus*, *Theobromine-Aceto-Salicyl*, *Theophylline*, *Theophylline Sodium Acetate*, *Veratrum Viride*.

Tapping and subsequent injection of Adrenalin.—B.M.J. ii./09, 537.

Dropsy, Hepatic.—Ammon. Benzoas, Ammon. Chlorid., *Copaibæ Bals.*, *Cytisin*, *Hydrarg. Pil.*, *Hydrarg. Subchlorid.*, *Sodii Bicar.*, *Sparteine Sulphas*, *Taraxacum*, *Chimaphila*.

Dropsy, Renal.—Apocynum Cannabinum, Buchu, Caffeina, Copaiba, Digitalis, Diuretin, Delphin, Elaterium, Gin, Hemidesmus, Hydrarg. Pil., Hydroxycaffeine, Iodo-Caffeine, Iodo-Theobromine, Jalapa, Moringa, Pilocarpine, Potass. Acet., Potass. Tart.-Acida, Potassii Iodid., Potass. Nit., Scilla, Scoparius, Sodii Iodid., Theobromine-Aceto-Salicyl, Theobromine-Sodium Format., Theocin, Theophylline, Theophylline Sodium Acet., Vinum Diureticum.

Dupuytren's Contraction.—Chlorine ions from Sodium Chloride, Fibrolysin, Injectio Thiosinamin et Antipyrin.

Dysentery.—Alum, *Antidysenteric Sera*, Argenti Nitras (Rectal Injection), Bala Fructus, Bismuthi et Cerii Salicylas, Bisciniod, Calcii Salicylas, Calotropis, Cannabis, Cassia Beareana, Calomel, &c. (the evacuant method), Crocq's Pill, Cupri Sulphocarb., Cynoglossum, Cyperi Caps., or Mist., Dec. Simaruba et Punic Granat., Elix. Agrimon Co., Eucalypti Gum., Fæxin, Guarana, Hæmatoxylon, Hamamelis, Helba, Hydrarg. Perchlorid., Hydrot. Perox., well diluted as enema, Hysteronica, Ipecacuanha (e.g., in 'Stearettes' or 'Formagules' to avoid vomiting), Ipecacuanha sine Emetina, Ipecac. Co. Pulv., Kosam Seeds, Magnesium and Sodium Sulphates, *Monsonia Ovata* (said to be specific for Tropical Dysentery (see also L. ii./06.1496), Naphthalene, Opium, Plumbi Acetas, Salicylic Acid by Rectal Injection, Sedeff, Simaruba, Tannin, Trilactine, Terebenum purum, Terebinth. Ol., and Stupes of, Yeast.

Ether and Caffeine hypodermically for cases of tropical dysentery when patient in extremis.

Enemata of Quinine, or Silver Nitrate or Copper Sulphate each 1 in 1000 for chronic cases.—B.M.J. ii./07.1068. See also Sandwith.—L. ii./07.1589.

Dysentery—Treatment of Sporadic, Endemic (or Amœbic), and Epidemic (or bacillary).—Brooke, 198.

Dysmenorrhœa.—Actæa, Æther Spt. cum Opii. Tinct., Amyl Nitris, Anemonin, Antipyrine, Apiol, Belladonna Suppository, Butyl Chloral, Camphor, Cannabis and Cannabin Tannas, Cannabis and Chloral, Castor, Cimicifugin, Elixir Ergot c. Ferro, Gelsemium preps., Gossypii Rad. Cort., Mist. *Dysmenorrhœica*, Mist. Morphin. Phenazon Co., of W.W.W., Oleum Velerianæ, Opium, Ovules Morphine, and others, Piscidia, Potass. Bromid., Pulsatilla, Salix nigra, Saw Palmetto, Serpentaria, Sodii Salicylas, Styptol, Stypticin, Syr. Iodo-Tannicus, Valerian, Viburnum prunifolium.

Dyspepsia.—Acid Carbolic, Perle and Pil., Acid Nit. Dil., Acid Hydroch. Dil., Acidol, Aloes and Aloin, Ammon. Carb., Ammon. Chloridum, Arsenic, Atropine Methyl-Bromide, Bisciniod, Bismuth, Benzoas, Carb., Oxy-Bromid., Oxychlorid., Subnit. Phosphas, Sulphocarb., and Sulphic, Calcii Peroxid., Capsicum, Cerii Oxalas, Charbon Naphtholé, Condurango, Creosote, Creosoti Valerianas, Dioscordium, Emblic Myrobalans, Elixir Gentianæ Acid., Eupatorium, Fæxin (believed to act as direct anti-bacterial agent), Gentiana, Gingerin, Gold Salts, Helba, Hydrarg. cum Creta, Hydrastis, Hydrocyanic Acid, Hysteronica, Invert Sugar, Lecithin Elixir and Emulsion, Leptandra, Liquor Pepsinæ et Caffeinæ, Liq. and Tabellæ Papain et Iridin, Magnesia Cream, Magnesi Hydroxidum cum Carbone, Monsonia Nux Vomica, Oleum Velerianæ, Pancreatin, Papain Glycerin, Acid., Peptonising Powders, Pepsin, Pepsin Jelly, Pepsin and Bismuth Tablets, Podophyllin, Potass. Bichromas, Quassin, Quinine preps., Rhei Rad., Rumicin, Sal Polychrestum, Sanguinarin, Sedeff, Serpentry, Sodii Bicarb., Sodii Hypo-sulphis, Sodii Sulphocarb., Sodii Taurocholas, Sodium Citrate for adding to Milk, Spirit Meliss. Comp., Strontii Bromidum, Strontii Lactas, Tinct. Rhei Aquos, Trilactine, Troch. Antacidi., Pulv. Dyspeptic. Co. See also Address on.—L. i./06.1590.

Dyspnœa.—Æther Spt., Æthyl Iodid., Alcohol, Ammon. Carb., Amyl Nitris, Erythrol Nitrate tablets, Euphorbia Peplus, *Ibogaïne*, Lobelia, Morphine, Nitroglycerin, Ozonic Ether, Quebracho and Aspidospermine, Sodii Nitris, Strychnine.

Ecarache. (Local use.)—Adren-ol, Atropine Liquor or Oleatum (diluted), Chloroformi Vapor, Cocaina cum Oleo, Glyc. Acid Carbolic 6 grains to ounce, slightly warmed, 2 or 3 drops, Guttæ Spiritus c Formalin, Menthol-Paraffin Capsules, Morphine Oleatum (diluted), Opii Tinct. cum Oleo Olivæ, Ung. Lano-boric Camphorat. See also Nebulæ.

Eclampsia (and see *Convulsions*). Veratrum Viride.—Full treatise on the rationale of its administration.—B.M.J. ii./08.811.

Eczema.—Arsenic preps., Bromocoll, Calcii Iodid., Calcii Laotas (for œdema, redness and itching) Cupri Sulphas, Iron Salts, Morrhæa Ol., Phosphorus, Sodii Carb., Sulphides, Sulphur, Trilactine Tabs. and Milk), Vaccine Staphylococcic,

Acid. Boric., *Acid Camphoric.*, *Lotio and Ung.*, *Acid Carbolic Lotio and Ung.*, *Acid Salicylic Ung. and Ol.*, *Acid Picric. Solutio* $\frac{1}{2}$ to 1% and *Ol.*, *Alkaline lotions*, *Argent. Nitrat. Sol.* (particularly for mucous surfaces of anus, vulva, etc.), *Aristol.*, *Balsamum Lanolinatum*, *Bismuth Nit. Glycerin*, *Chinosol Collargol*, *Calamina Lotio*, (et *Oleosa*) *Calcis Aqua*, *Calcis Linim.*, *Chrysarobini Ung. (weak)*, *Creolin*, *Dermatol.*, *Diachyli Ung.*, *Dymal*, *Europphen*, *Formalin*, *Moist* (for dry condition), *Formosyl*, *Griserin*, *Huile de Cade*, *Hydrogen Perox.*, *Icthalbin*, *Ichthylol and Collodion and paste of*, *Iodates*, *Kaolin Ung.*, *Lanolin*, *Lotio Nigra*, *Lotio Plumbi Lactat.*, *Lysoform dusting powder*, *Methylene Blue*, *Mollin.*, *Myelocene*, *Naftalan*, *Naphthol*, *Pellanthum preps.*, *Phenoloid Disinfectant (diluted)*, *Pusol*, *Radium*, *Resorcin*, *Sphagnol*, *Tar*, *Thigenol*, *Thio-resorcin*, *Thiol*, *Thymol*, *Tumenol*, *Ung. Hydrarg. Ammon.*, and ditto *Dil.*, also *Ung. Hyd. Nit. Dil. Ung Hyd. Oz. Flav.*, *Ung. Picis Liq.* and tight close bandages (for chronic dry), *Unguentum pro Eczema*, *Ung. Thorii Oleatis*, *Ung. Rumicis*, *Ung. Rusci Co.*, *Vaccine Staphylococcic*, *Vlemineckx's Solution*, 'X' rays and Finsen Light, *Zinci Boras*, *Zinci Cremor*, *Zinc Ions* (pustular eczema), *Zinci Oleat. Pulv. and Ung.*, *Zinci Ung.* See also L.i./05,1725.

Elephantiasis.—Arsamin, Pituitary Extract.

Emetics.—Apomorphine $\frac{1}{10}$ grain inject. hypod., Antim. Tart. 1 to 2 grains, and Vinum 2 to 4 drachms, Emetine $\frac{1}{10}$ to $\frac{1}{8}$ grain, Ipecac. 30 grains, and Vinum 4 to 6 drachms, Mustard a tablespoonful, Sodii Chloridum a tablespoonful, Zinci Sulphas 20 to 30 grains. See also Poison Chapter.

Empyema.—Hydrogen Peroxide for washing the pleura (10%), *Streptococcal*, and *Pneumo. Vaccine*.

Emphysema.—Iodides and Iodine preparations. If patient too stout add Thyroid to the Iodine. If excess of lime in the blood, Sodium or Potassium Citrate or Lemonade Purgative. Keep bowels open with Sodii Sulph. —B.M.J. 1./08,909.

Endocarditis.—Aconite, Belladonna, Caffeina, Collargol, Coronilla Ext., Digitalis, Fæxio, *Ferric Chloride*, Nuclein and Anti-Streptococcic Serum and *Vaccine*, Pituitary Extract, *Pneumo. Vaccine*, *Veratrum*.

Belladonna Plaster, *Blisters*, *Ice Bag*.

Endometritis.—Injectio Formalin, Copper Sulphate (and Ionised) also Zinc Ions, *Local use of Churchill's Iodine Tinct.*

Enteritis.—See Gastro-enteritis.

Enuresis.—Atropine, Belladonna, Ergot, Hyoscine, Hyoscyamus with Sodium Bromide, *Hexamethylenetetramine*, Lycopodium, Potassii Citras, Rhus Tox. Thyroid Extract. —L. 1/09 1245.

See also Incontinence of Urine.

Epididymitis.—Aconite, Antimonial Wine, Iodides, Saline Purgatives.

Ice, *Iodine*, *Guaiacol*, *Iohydryn*, *Iodum Oleat.*, *Lin. Potassii Iodid.*, *Ung. Iodi Intinctum*. Heat with moisture, Mercury, and Belladonna Ointments.

Epilepsy.—Adonis, Æthyleni Bromid., Ammon. Bromid., Amyleni Hydras, Amyl Nitris, Antifebrin, Argent. Cyanid. or Nit., Arsenic, Arsen. Brom., Atropine, Auri Bromid. and Chlorid., Belladonna, Borax, Bromalin, Bromal-Hydras, *Brometone*, Brominol, Bromipiu, Bromocoll, Bromoglidin, Calcium Bromide, Camphora Monobromata, Cannabis, Chloral, *Gnipsine*, Hydrargyri Biniodidum, Isopral, Liquor Auri et Arsenii Bromid. and Liquor Auri et Hydrarg. Bromid., Magnesium Bromide, Manganese Bromide, Mistura Brominol cum Nuce Vomica, *Morphine Methyl Brom.*, *Nickel Bromide*, Nitroglycerin Tablets or Liquor, Neuronal, Ozonic Ether, Pierotoxin, Potass. Bromid., Pot. Nitris, Rubidium Ammonium Bromide, Rubidium Bromide, Santonin, Sodii Bromid., Sodii Nitris, *Solanum Carolinense*, Strontii Bromid., Valerianates, Verbena, *Viscum album*, Zinci Bromid., Citras, Lactas and Sulphas.

Treatment of epilepsy. —L. 1/10,355.

Epistaxis.—Acid. Gallic., Aconite, Acetanilide, Calcium Chloride and Elixir, Digitalis, Ergot inject. hypod., Erigeron Oil, Ferro-Alumen, Ferri Perchlorid. Hamamelis, Terebinth. Oleum.

Acid. Tannic., Adrenalin, Alumen, Cotarnin, Ferri et Quinina Chloridum, *Ice*, Hamamelis, Hydrogen Peroxide, *Liquor Ferri Perchlor.*, Matico, Styptic Colloid.

Erysipelas.—Aconite, Aconitina and Granules of, Antifebrin, Antistreptococcic Serum, Belladonna, Digitalis, Ergot, Fæxin, Fæxin Extract, Ferri Perchlorid., Nuclein, Veratrum viride, *Streptococcal Vaccine*.

Acid. Picric. Pigment, *Acid. Sulphuros.* Lotio, Amylum, Amyli Glycerin.

Argent. Nit., *Belladonnæ Glycerin.*, *Calaminæ Lotio*, *Cocainæ Ceratum*, *Collodium*, *Colarnin Ointment*, *Creosotum et Amylum*, *Gossyp. Acid. Boric.*, *Hydrogen Peroxide Diluted and Borated*, *Iodi Pigment*, *Iodi Tinct. injected (q.v.)*, *Iodates*, *Iodum Oleatum*, *Ung. Iodi Intinctum*, *Iohydrin*, *Oleogen Comps.*, *Pasta Plumbi cum Cupro*.

Erythema.—*Febrifuge Salines*, *Aconite*, *Anthemis*, *Calcii Lactas*, *Salicin*, *Salicylates*, *Salol*, *Trilactine*.

Amyli Glycerin., *Anthemid. Infus.*, *Diachyli Ung.*, *Hazel Foam preps.*, *Kaolin and Lotio. or Ung.*, *Papav. Infus.*, *Plumbi Subacet. Lotio.*, *Vaseline*, *Zinci Oxid. and Ung.*, *Ung. Thorii Oleat.*, *High Frequency Current*, *Pellanthum preps.*

Exhaustion.—*Nervous and Muscular.*—*Oxygen Inhalation*. *Amyl Nitrite Capsule*, *Stimulants*. *Coca preps.* *Coca Wine*. *C.f.* other headings, *e.g.*, *Anæmia*, *Collapse and Fainting*, *Debility*, *Food*, *Hæmorrhage*, *Nervous debility*, etc.

Exophthalmic Goitre.—*Antithyroid Serum*. *Arsenic with Mercury Tablets*, *Belladonna*, *Calcium Salts*, *Digitalis*, *Duboisine*, *Iodine preps.*, *Iron Salts*, *Pituitary Ext.*, *Potass Iodid.*, *Quinine preps.*, *Rodagen*, *Sparteine*, *Suprarenal Extract*, *Sodii Phosph.*, *Thymus Gland*, *Thyroidectin*.

Tinct. Iodi. Oleosa, *Ung. Iodi*, *Ung. Iodi Intinctum*, and *Iohydrin*. *X. Rays*.
In exophthalmic goitre *Calcium Index* is low *c.f.* *Calcii Chlorid* and *B.M.J.* ii./c9,592.

Eye. Pupil, Contractors of.—*Arecoline in 1% solution*, *Jaborandi* and *Pilocarpine*, *Opium* and *Morphine*, *Physostigma*, *Physostigmine*.

Eye: Pupil, Dilators of.—*Atropine Salicylate and Sulphate*, *Atropine-Methyl Bromide*, *Belladonna*, *Cocaine*, *Daturine*, *Duboisine*, *Ephedrine*, *Eumydrine*, *Euphthalmine*, *Homatropine* and *Hyoscyne salts*, *Hyoscyamine*, *Mydrine*, *Nicotine*, *Oleum Atropinæ*, *Oleum Homatropinæ*, *Scopolaminæ Hydrobromid.*

Eye: Local Dilator, but Contracts when given internally in suitable doses—*Gelseminine*.

Fainting.—See *Collapse*.

Favus.—See *Parasites, Vegetable, on Skin*.

Fetid Breath.—See *Breath, Fetid*.

Fetid Perspiration.—See *Perspiration, Fetid*.

Fetid Nasal Discharges.—See *Ozæna*.

Fever.—*Acetanilide*, *Acid. Oxy-naphthoic*, *Acidaceto Salicylic*, *Acid. Salicylic*, *Aconite*, *Ammon. Acet. Liq. and Carb.*, *Ammoni. Cit.*, *Aspirophen*, *Antifebrin*, *Antimony*, *Antipyrine*, *Aspirin*, *Bromopyrin*, *Biscuinod*, *Cinchonine*, *Cinchonidinæ Sulph.*, *Digitalis*, *Euphorin*, *Eupyrin*, *Gelsemium*, *Granules d'Aconitine*, *Mist. Arsen. Quin. et Ferri*, *Monobromacetanilide*, *Phenacetin*, *Phenalgin*, *Phenocoll Hydrochlor.*, *Pulvis Quininae Comp.*, *Potassii Boro-tartras*, *Potass. Acet.*, *Chloras and Citras*, *Pilula Antimon. Conii et Quinin.*, *Pyramidon*, *Pyrenol*, *Quinine preps.*, *Quinidinæ Sulph.*, *Quinetum*, *Salicin*, *Salipyrin*, *Sodii Salicylas*, *Thallin*, *Veratrum Viride*, *Warburg's Tincture*, *Tinct. Oleae Fol.* (*Tonic*), *Helba*, *Quinin. Acetyl-Salicylate*.

Filariasis.—*Lodh Extract*.

Fissures of Nipples.—*Acid Boric*, *Acid. Tannic*, *Glycerin.*, *Alcohol*, *Argent. Nit. pigment*, *Cocainæ Hydroch. Liqueur*, *Collodium Flexile*, *Hydrastis Tinct.*, *Plumbi Subacet. Glycerin.*, *Styptic Colloid*, *Tinct. Benzoin Co.*

Fistula in ano (Tuberculous).—*Hydrogen Perox.*, *Inj. Bismuth Subnit.* *Tropacocaine Intra-spinal Inj.* prior to operation. *Zinc ions*.

Flatulence.—*Acid. Carbolic.*, *Acid. Sulphuros.*, *Æther Spt.*, *Asafetida*, *Betol*, *Bismuth preps.*, *Biscuinod*, *Capsicum*, *Carbo Ligni*, *Chloromorphiæ Liqueur*, *Creosote*, *Magnesia preps.*, *Menth. Pip. Ol.*, *Naphthalene*, *Naphthol*, *Nux Vomica*, *Pepsin preps.*, *Sodii Bicarb.*, *Sulpho-carbolates*, *Tinct. Carminativa*, *Zingiberis Tinct.*, *Anise*, *Anethol*, *Cinnamon*, *Cloves*, *Asafetida*, *Caraway*, *Cardamoms*, *Coriander*, *Fennel*, *Myristica*, *Trilactine*, *Diascordium*.

Food Products.—See *Chapter on Nutrimenta. Casein Preparations*.
For Invalids are: *Benger's*, *Enema Nutriens*, *Ferrogel dine*, *Glidine*, *Peptonoids of Beef*, *Pepsin Jelly*, *Pastilli Pepsinæ*, *Nutrient Suppositories*, *Peptonised Milk*, *Peptonised Beef Jelly*, *Pancreatised Farinaceous Food*, *Pancreatised Emulsion of Fat*, *Trilactine*, *Wheat Phosphates*, also *Infant Feeding*.

Freckles.—*Hazel Foam*, *Boric Acid Lotion*, *Corrosive Sublimate Lotion*, *Lactic Acid Lotion*, *Cucumber Ointment*, *Lysoform*, *Mistura Amygdalæ*, *Thorii Oleat. Ung.*, *Ung. Plumbi Carbonatis*.

Furunculosis.—*Vide Boils*.

Gall Stones and Hepatic Colic.—Æther Spt., Amyl Nitris, Amyl Valerianate, Anæsthetics, Bismutose, *Capsul. Sodii Oleat. Comp.*, Chloral Hydras, Chologen, Hexamethylentetramine, Iridin, Magnesium Sulphate, Mercurials, Morphine preps., Nitroglycerin, Perles of Ether and Turpentine, Pil. Sodii Oleat, Podophyllin, Salicylates, Sodium Benzoate, Sodium Glycocholate. Various Mineral Waters, e.g., Carlsbad, &c. An address on. Waterhouse.—L. i./c9, 1301.

Turpentine has been injected through the cystic duct.—B.M.J. ii./08, 1808.

Gangrene.—Nitroglycerin, Amyl Nitris, Sodium Nitrite.

Acid Carbolic, Acid Nitric, Bromine, Creosote, Hydrogen Perox., Iodine Injection (vagina), Saline Injection (vulva).

Gastralgia.—*Acid. Hydrocyanic. Dil., Æther. Spt., Alkalis, Anæsthesine, Belladonna, Bisedia, Bisciniod, Bismuthi Oxy-Bromid., Bismuthi Salicylas, Bromides, Calcis Aqua, Cannabis, Cerii Oxalas, Chloroform, Chloromorphiæ Liq., Coca and Cocaina, Codeina, Creosote, Ginger, Magnesia, Cremor Magnesiæ, Manganesi Oxid., Pepsin, Pepsin Jelly, Sedeff., Senecio, Iodates, Chloretone, Cyanides, Menthol, Nitroglycerin, Trilactine.*

Linim. Sinapis, Ung. Ipecac. et Crotonis.

Gastric Catarrh.—See Catarrh, Gastric.

Gastritis and Enteritis.—Ammon. Chlor., Bismuth preps., Biscinlod, Bismuthi Benzoas, Calcii Permang. and Salicylas, Carminatives and Sedatives, Collargol, Hydrastis, Hydrog. Perox., Sanguinaria, Strontium Salts, Tar Perles, *Trilactine Tablets, Milk, &c. Vide also Catarrh, Gastric.*

Gastric Ulcer.—Argenti Nitras, Morphine, Olive Oil. *Ferri Perchlor. Gelatin, Normal Horse Serum, Glucose, Normal Saline, Injection.*

Hæmatemesis of.—Adrenalin, Beef Peptones.

Glanders.—Mallein, by hypodermic injection. Mercurial Inunctions.

Glands, Enlarged.—Calcii Chlorid., Ferri Iodid. and Iron Salts, *Ferri Cacodylas, Iodum, Morrhuæ Ol., Potass. Iodid., Sodii Iodid, Syrupus Iodo Tannicus.*

Adrenol, Cadmii Iodid. Ung., Hydrarg. Oleat. and Emplast., Iodi Decolor. Tinct., Iodoform, Iod. Linim. and Ung., Iohydryn, Pot. Iodid. Ung.

Glaucoma.—*Physostigminæ Sulph. and Oleum, Pilocarpina, Alkaloidal Oil of Physostigmine, Arecoline.*

Glycosuria.—See Diabetes.

Goitre.—*Acid. Hydrofluoric. Dil., Arsenic, Barii Chloridum, Belladonna, Bromides, Convallaria, Hydrarg. Biniodid., Hydrastis, Iodum, Phosphorus, Potass. Iodid., Quinine Periodide, Sodii Iodid., Syr. Ferri Iodid., Thymus Gland, Thyroid in large doses, Thyroid feeding and preps.*

Acid. Acetic. inj. hypod., Acid. Osmic. inj., Hydrarg. Biniodid. Ung., Hydrarg. Oleat., Hydrarg. Ung., Iodi inj. hypod. T. H., Iodi Linim. and Ung., Cocaine Ionisation 'X' rays.

Goitre is stated to be associated with an organism in the intestine—living in nature in the soil of infected localities (limited in distribution)—conveyed in drinking water, by the soil (calcareous), or (?) may be transferred from man to man by the faeces. There may exist a stage of development outside the body of man, and it may be destroyed by admixture with pure water. It flourishes best where there is a certain degree of moisture. A natural immunity may be developed in prevalent districts. Women suffer more than men. Boiling and filtering impure water do not alone prevent or cure so long as people live on the infected site. It is said to be rapidly cured by intestinal antiseptics—Thymol large doses (30 grains) or Beta Naphthol.—L. ii./06, 1875.

Gonorrhœa.—*Acid. Cubebic., Aconite, Allonoun, Thyresol, Buchu, Camph. Menstruon, Camphosan, Cannabis, Copaiba, Cubebs, Cyperi Caps., Cystopurine, Erigeron Oil, Formanlid, Gonol, Gonosan, Helmitol, Hetraline, Hexamethylenamin, Hydrastis, Kava-Kava, Methylen Blue, Ol. Cedri Atlantic, Pichi, Potassium Salts, Saline Aperients, Salix nigra, Santal preps., Santyl, Santalol, also Santalol-Methyl-Salicyl., Sodium Acid Phosph., Saw Palmetto, Sodii Salicyl. (especially acute posterior urethritis) Uritone, Hydrastis, Uva Ursi, Gonococcus Vaccine, Mineral Waters, e.g. Vittel.*

Acid. Carbolic., Acid. Falcyl 2%, alcoholic solution compresses, Acid. Tannic., Alumnol, Argentamin, Anæsthesin, Argenti Acetas, Fluoridum, Nitras, Argemol, Argonin, Argyrol, Bismuth Oxyiodid., Bougies Urethral, Collapsuben various (see Index), Collargol, Euophen, Glyc. Plumb. Acet. (compresses), Hydrarg. Perchlor., Hydrog. Perox., Iodoformi Cereolus, Iodof. et Eucalypti Cereolus, Iodoformal, Largin, Potass. Permang., Protargol, Resorcin, Trilactine

for injection, *Uritone*, *Wood Wool Bags*, *Zinci Acetas. Chlorid.*, *Permang.*, and *Sulphocarbolas*, *Zinc Sulphanilas*. For female, *Pessaries of Ichthyol. or Iodine*, *Argenti Iodidum*, *Hydrastis*, *Ovules* various, see text, *Griserin*.

Gout.—*Acid Aceto Salicyl.*, *Acid. Quinnic.*, *Acid. Thyminic.*, *Aconite*, *Arsenic Asaprol*, *Aspirin*, *Bromal Hydas.*, *Caffein Tri-iodide*, *Chinotropin*, *Citarin*, *Colchicine Salicylas (Capsules)*, *Colchicum* and *Colchicin*, *Elix. Acid Salicyl. Co.* *Formates*, *Glycerophosphates*, *Guaiacum*, *Hexamethylenamine*, *Tetramine*, *Hydrangea*, *Iodine Tinct.*, *Iodolysin*, *Iron preps.*, *Kava-kava*, *Lappa*, *Lithii Carb.*, *Citras*, *Hippuras*, *Tartras*, *Tartras Acida*, *Litnion*, *Lycetol*, *Lysidine*, *Magnes. et Sodii Sulph.*, *Morphine Injection*, *Hypodermic*, *Phenazon* and with *Codaine*, *Piperazin*, *Glycerophosphate*, *Piperazin* and *Phenocoll Granular Eff.*, *Piperidin*, *Guaiacolas*, *Tartras*, *Pistola Powders*, *Potass. Acet.*, *Cit.*, *Iod.*, *Pot. Chloride* as *Table Salt*, *Sidonal*, *Sodii Bicarb.*, *Benz. Hippuras*, *Iodid.*, *Phosph.*, *Salicyl*, *Sesquiphosp.*, *Taurocholas*, *Syr. Ferri Iodidi*, *Trilactine*, *Tylmarin*, *Urea Quinate*, *Uricedin*, *Uropherin*, *Urosin*, *Ursal*, *Veratrum*.

Amysal, *Borax Solution* locally, *Cade Oil*, *Cocaine Ionisation*, *Chloroform Liniment*. Ionised *Lithium*, *Methysal Balm*, *Nauehim Bath Salts*, *Radium*, "X" Rays are useful. *Salicylic Acid*, also *Iodine Ionised*.

A bacterial toxin is the primary factor. Adequate removal of the intestinal contents at the commencement of attack will reduce the symptoms.—*Luff*.

Granular Eyelids.—See *Ophthalmia arsi*.

Graves' Disease.—See *Exophthalmic Goitre*.

Gums, Inflamed, and Spongy. (*Local use.*)—*Acid. Carbolic.*, *Alumen*, *Anise mouth wash*, *Borated Hydrogen Peroxide*, *Catechu*, *Cocaine*, *Cremor Magnesie*, *Iodi Tinct. and cum Aconiti Tinct.*, *Kramerie Tinct.*, *Listerine*, *Lysiform Mouth Wash*, *Magnes. Lact.*, *Myrrhe et Boracis Tinct.*, *Potass. Chlorat.*, *Pastil*, *Tablet and Troch.*, *Pyrethri Tinct.*, *Sodii Chloras and Troch.*, *Thymaglycine*.

Hæmatemesis.—*Acid. Gallic.*, *Acid. Sulph. Dil.*, *Acid Tannic*, *Adrenalin*, *Alumen*, *Argenti Nitras*, *Ergota*, *Hamamelis*, *Iron Persalts*, *Peptonised Milk*, *Plumbi Acet.*, *Supra-renal Extract*, *Terebinth. Ol.*

Hæmaturia.—*Acid. Gallic.*, *Antimony*, *Camphor*, *Cannabis*, *Erigeron Canadense*, *Ergota*, *Hamamelis*, *Rhus aromatica*, *Terebinth. Ol.*

Vesical Injections of Adrenalin, *Alum*, *Gallic Acid*, *Hamamelis*.

Hæmophilia.—*Calcii Chlorid.* and *Lactas*, *Magnes. Chlorid.*, *Carbonas* and *Lactas*, *Ergot preps.*, *Hamamelis*, *Hydrastis*, *Iron Persalts.*, *Strontii Chlor. Carb.* or *Lact.*, and for surface bleeding see local remedies under *Hæmorrhage*.

Hæmoptysis.—*Acid. Gallic.*, *Acid. Pyrogallic.*, *Acid. Sclerotic.*, *Acid. Sulph. Dil.*, *Alumen*, *Alum. Aceto. Turt.*, *Amyl Nitrite Capsules*, see page 125, *Antipyrin*, *Atropine*, *Bromides*, *Chloral*, *Digitalis*, *Erigeron Canadense*, *Ergota* and *Ergotin*, *Hamamelis*, *Morphine*, *Nitroglycerin*, *Opium*, *Symphytum*, *Rectal Injection of Calcium Chloride*.

Atomised Spray of Alum or Monsel's Salt Solution.

Hæmoglobinuria.—*Ammonium Chloride*, *Calc. Lact.*, *Iron Tonics*.

Hæmorrhage of Wounds.—*Acid. Gallic.*, *Acid. Sclerotic.*, *Acid. Sulph. Dil.*, *Calcium Chloride*, and *Lactate*, *Cornutine*, *Digitalis*, *Ergota*, *Ergotin*, *Eucalyptus Gum*, *Ferri et Quininæ Chlorid.*, *Ferro-Alumen*, *Gelatin*, *Hæmatoxylum*, *Hamamelis*, *Ice*, *Iron Persalts*, *Plumbi Acet.*, *Potassii Succinas*, *Stypticol*, *Terebinth. Ol.*

Hæmorrhage from bullet wounds in chest has been controlled by inhalation of *Amyl Nitrite*.

Local Applications to Wounds and Bleeding Surfaces.—*Acid. Tannic.*, *Alumen*, *Amadou*, *Bryonia*, *Catechu*, *Cupri Sulph.*, *Cupri Sulphocarbolas*, *Erigeron Oleum*, *Eucalyptus Gum*, *Eucalypt. Fol. Tinct.*, *Ferri Perchlorid.*, *Ferro-Alumen*, *Hamamelis*, *Hydrog. Perox.*, *Monsel's Solution*, *Styptic Colloid*, *Tinct. Benz. Co.*, *Zinci Chlorid. Liq.*, *Zinc Perhydrol*.

Hæmorrhage Dental, after Extraction.—

Adrenalin, *Amadou*, *Ergotinine Injection*, *Eucalyptus Liq. Extract*, *Tincture*, *Ferri Perchlor.*, *Tannin*, *Tinct. Benz. Co.*, *Zinc Sulphate*, *Zinc Sulphate with Morph. Acet.*

If extensive laceration of the tissue has been necessary, anodyne mouth wash, *s.g.*, *Zinc Sulphate* 8 grains, *Zinc Chloride* 6 grains, *Morphine Acetate* 2 grains, *Water* to 8 ounces.—*Smale and Colyer*.

Hot water, (blood having an insufficient amount of fibrinogen coagulates at 106° F.) *Chloroform Water* (2%), *Sandarach Varnish*.

Potass. Permang. Paste (4% Vaseline) or Potass. Permang. and Kaolin with small quantity Vaseline.

Hæmorrhage, Intestinal.—Calcium Chloride, Ergot, Lead Acetate with Camphor or Opium, Acid Gallic, Acid Sulphuric Dil., Formanilid, Supra-renal preps., Turpentine.

Styptic Enemata of Adrenalin, Alum, Copper Salts, Monsel's Salt, Tannin.

Hæmorrhage, Uterine and Post Partum.—Acid, Sclerotic, Adrenalin, Amyl Nitrite inhaled, *Caffeine Inject.*, *Camphor Inject.*, *Caffeine Inject.*, Cannabis and Chloral, Cornutine, Ergota, Ergotin inj. hypod., Ergotinine inj. hypod., Ferri et Quininae Chlorid., Gossypii Rad. Cort., Hydrastin, Nux Vomica, Opium with Alcohol, Pituitary Ext., Strychnina and Salts, Stypticin, Supra-renal preps., *Clavin*, *Mistura Ergotæ cum Ferro*.

Adrenalin, Alumen, Ferri Perchlorid., Gossyp. and Liquor.—See also B.M.J. i./07, 185 for lines of treatment.

Hæmorrhage Renal.—Hæmostatic Drugs. See recent article.—L. i./08, 1066.

Hæmorrhoids.*—Suitable laxatives are Cascara Sagrada, preps. Cascagar, Conf. Piper., Conf. Sennæ, Infus. and Mist. Sennæ Co., Pulv. Glycyrrhizæ Co., 'Hindu Dates,' *Sinsiviera Ext. Liq.*, *Stillingia*, Sulphur (with treacle), Trilactine.

Acid. Boric. Ung., *Anusol Suppos.*, Bismuth Subiodate, *Coninæ Ung.*, Copper Ionised, *Gallæ cum Opio Ung.*, *Collapsubes*—Bismuth, Calcium Chloride Injection for bleeding, Conules Ephedrin Comp., Eucalyptus Gum Suppositories, *Glyc. and Ung. Chrysarobin, Hamamelid. Liq.*, Hypodermic injection into the piles of *Liq. Hamam. and Glyc. with Phenol.* (v.p. 356), *Lotio Plumbi Spirituosus. Morph. et Cocain and various (see Index)*, Pessar-Suppositories, *Ranunculi Ficaræ Ung.*, *Stillingia*, Stovaine Ointment, *Suppos. Bellad. et Morph.*, *Suppos. Cocain et Morph.*, *Suppos. Supra-renal et Morph.*, *Ung. Bismuth et Cocain, Ung. Thorii Oleat.*

Hair, to Promote Growth of.—Bone Marrow, Hæmoglobin and Tonics.

Amyl Nitrite, Cantharides, Jaborandi Liniment, Pilocarpine Lotion, Resorcin Lotion, Sublimate in Spirit Lotion.

Hair, to Remove.—Barium Sulphide, Calcium Sulphide, Corrosive Sublimate Alcoholic Pigment (with caution). *Pigmentum Thymol, Sodii Sulphid.* 25 to 40%, *Aq. Sol.* 'X' rays, Electric Needle.

Hay Fever.—Ammonii Chlorid., Anthoxanthum, Arsenic, Belladonna, Camphor, Grindelia, Heroin hydrochlor., *Liq. Ethyl. Nitritis*, Potass. Iodid., Quinine preps., Terpene hydrate.

Acid. Salicylic. Pulv., Adren-ol, Adrenalin. Bismuth. Co. Pulv., Carbolicised Smelling Salts, Compound Asthma Fluid, Vapor, Cocain. Hydroch. Liquor. Douche of Mercuric Iodide, 1 in 2,000, *Eucalypti Oleum*, Hydrogen Perox. Nasal Spray, Menthol, Menthol and Camphor, Nebulae, *Pigmentum Antisepticum*, Pollantin, Pulv. Lobelia Comp., Quinina Collunarium, *Stramonium Fumes*, *Supra-renal Extract (excellent)*, Terebene.

Headache, Bilious or Sick.—Antipyrine, Chloro-Sodio-Magnesian Aperient, Colalin, Elixir Gentian. Acid., Eucalyptin, Guarana, Hydrastis, Iridin, *Liq. and Tabella Pepsinæ et Caffeinæ*, Phenacetin, Podo-phyllin, Sodii Phosph. Efferves., Sodii Sulph. Efferves., Sodio-Magnes. Sulph. Efferves., Sodio-Mag. Sulph. with Caffeine.

Headache, Congestive or Inflammatory.—Actæa, Colchicum, Ergot, Ammon. Chlorid., Antimony, Antipyrine, Hydrarg. Subchlorid., Maricel, Ricini Ol., Salicylates of Sodium, &c., *Sedaff*, Trilactine, Veratri Viridis Tinct.

Headache, Nervous.—Acetopyrin, Acid Hydrobromic, Hydrocyanic., Acid. Actæa, Ammon. Arom. Spt., Antipyrine, Apolysin, Arsenic, Aspirin, *Aspiraphen*, Auri Bromidum, Belladonna, Bromides, Butyl Chloral, Caffeine, Camphora, Cannabis, Chloralimide, Cimicifugin, Citrophen, Elixir Anti-Neuralgicum, *Elixir Caffeinæ*, Ferri Valerianas, Gelsemium, Guarana, *Iboguine*, Iodo-Caffeine, Iodo-Theobromine, Iron Salts, Kola, Methylene Blue, *Migraine*

* Ointment Introducers (Rectal, Allingham's) are square or round in shape, of vulcanite. Pearce Gould's has graduation marks on tube. Urethral Ointment Introducers are also supplied.

A further modification of Allingham's Introducer, consists in the piston being provided with a screw cap. The cap being free, the piston works up and down by pressure, when fixed the piston works only by screwing it round on the cap. A rubber tube is added.—L. ii./03, 10.

Powders, Migranin, Nitroglycerin, Phenacetin, Phenazone, Pulv. Calc. Glyceroph. et Lac. exsic., Quininae Valerianas, *Sedeff*, *Syrupus Coffea*, Theine, *Theobromine Lithium Benzoate*, Trilactine Tablets, Trilactine Milk, etc. Zinci Lactas, Oxidum and Valerianas.

Nitroglycerin (L. i./07,277) with Strychnine (Tabellæ).—Gowers, B.M.J. ii./06. 1617.

Radium. Exposure to rays of.

Heart.—See *Cardiac Tonics* and *Dropsy*, *Cardiac*, also *Vasodilators*.

Hectic Fever.—Acid. Benzoic. and Benzoates, Acid. Salicylic., Acid. Sulph. Aromat., Agaricus albus and Agaricin, Gelsemium, Phenocoll, Picrotoxin, Quinine preps., Salicin, Salicylates.

Hepatic Colic.—See *Calculi*, *Biliary*.

Hernia. (*Local use.*)—*Tropacocaine Intraspinal Injection* prior to operating.

Herpes, and *Zoster.*—Morphinæ inj. hypod. (for pain), Quinine preps., Salines and Saline Aperients,

Amyli Glycerin., *Anodyne Colloid*, *Carron Oil* (or mixed with *Zinc Oxide Ointment* 3:1), *Cocainæ Ceratum*, *Collodium*, *Cotarnin Ointment*, *Hydrarg. Ammon. Ung.*, *Hydrarg. Oleat. Ung.*, *Hydrog. Perox.*, *Ichthyol*, *Menthol pigment* or *Unguent* (for pain), *Zinci Oleat. Ung.*, *Zinci Ung.*

Hiccough.—Æther. Spt., Amyl Nitris, Camphora, Capsici Tinct., Chloral, Chlorof. Spt., Extract. Ergotæ Liq., Liq. Ammon. Acet. Morphine preps., Musk, Ol. Succini, *Pilocarpinæ Hydroch.* (q.v.), *Sedeff*, *Sodii Bicarb.*, *Trilactine Valerian Tinct.*

Hordeolum.—Argent. Nit., *Belladonnæ Fotus*, *Hydrarg. c. Morphinâ Oleat.*, *Iodi Tinct.*, *Ung. Hydrarg. Oxidi Flavi*, *Ung. Metallorum*.

Hydrophobia.—Anesthetics, Amyl Nitris, Cannabis Indica and Cannabin, Chloral, Curara, Hydrogen Peroxide, Hyoscine, Hyoscyamine, Morphine, Nitroglycerin, Nux Vomica, Pelletierine, Physostigma and Physostigmine, *Pilocarpine*.

Immediate use of Actual or Electric Caутery, or Nitric Acid or Argent. Nit. Solid, or other caustic paste at hand.

Hyperchlorhydria.—Alkalis, Bismuth, Cerium Oxalate, Glycogen, Nux Vomica (large doses), Pepsin, *Sedeff*.

Hypertrichosis.—See *Hair, to Remove*.

Hypnotics.—See *Insomnia*.

Hysteria.—Actæa, Allii Ol. Essent., Amyl Nitris, Asafetida, Auri Bromidum, Auri Chlorid., Bromal, Calcium, Magnesium, Manganese and other Bromides, Cannabin Tannate, Cannabis Indica, Cypripedin, *Ibogaïne*, Iron Salts, *Liq. Antihystericus*, Lupuli Tinct., Nux Vomica, Ol. Succini, Phosphorus, Pulsatilla, Quinine preps., *Sedeff*, Spirit Ammon. Arom., Syr. *Pilocarpin et Pot. Brom.*, Strychnine, Sumbul, Valerian and Valerianates, Validol, Zinc Salts.

Ichthyosis.—*Resorcin* (q.v.) and *Salicylic Acid*.

Impetigo.—Remove crusts with Olive Oil or by Boracic Starch Poultice, then 10% Ammoniated Mercury Ointment; and see *Eczema*.

Impotence.—Arsenic, Auri et Sodii Chloridum, Cannabis Indica and Cannabin Tannas, Cantharides, Coca and Cocaine, Damiana, Easton's Syrup, Ferri Perchlorid., *Formates*, Gokhru, *Ibogaïne*, *Muiracithin*, *Muirapuama*, Nux Vomica, Orchitin, Phosphorus, *Pilula Potentin Co.*, Piperazina, Sanguinaria, Spermin, Strychnine, Testicular Extract, *Theobromine Lithium Benzoate*, Yohimbin, Zinci Phosphid.

Incontinence of Semen.—Antipyrine, Arsenic, Auri. et Sodii Chloridum, Belladonna, Bromides, Camphor Monobromide, Chloral, Ergota, Ferri Perchlorid., Ferri Phosph. and Ferri Phosph. c. Quin. et Strych. Syrup., Gokhru, Hyoscine, Hyoscyamine, *Ibogaïne*, Salix nigra, Saw Palmetto.

Incontinence of Urine.—Ammon. Brom., Antipyrine, Arsenic, Belladonna, Buchu, Calcii Glycerophosph., Calcii Phosph., Calomel to regulate bowels, Camphor. Monobrom., Cantharides, Ergota, Ferri Iodid., Ferri Perchlorid., Gokhru, Hyoscyamus, Lycopodii Tinct., Naphthalin, Nux Vomica, Potass. Cit., Rhus Aromatic Ext. Liq., Liq. Strychninæ (Ringer), *Thyroid Extract.*—L. i./09,1245.

Indigestion.—See *Dyspepsia*.

Inebriety.—See *Alcoholism*.

Infant and Invalid Feeding.—Pasteurised Milk, Dried Milk, Foods A, B and C., Pulv. Calcii Glyceroph. c. Lacte exsic., Peptonising Powder for humanising milk, Trilactine Milk, Whey Powder, Lactalbumen, Albulactin, Glaro,

Sodium Citrate to add to ordinary milk to increase digestibility, Koumiss, See Chapter 'Nutrimenta.'

A Milk Humaniser has been placed on the market (*q.v.*), Peptonised Milk.

Inflammation.—Aconite, Antifebrin, Antimony, Antipyrine, Belladonna, Digitalis, Gelsemium, Granules d'Aconitine, Hydrarg. Subchlorid. and cum Opio, Opium, Quinine, Salicin, Veratrina.

Cataplasma Salicyl. Co., Glycerinum Plumbi Subacet., Iodine Ionised.

Influenza.—*Acetyl-Salicylic Acid*, Aconite, Acetanilide, Actæa, Æth. Nit. Spt. Ammon. Acet. Liq., Ammoniae Aromat. Spt., Antim. Tart., Aristochin, Belladonna, Camphor, Cinnamates, Cocain. Hydroch. Liquor., Diaspirin, *Formates*, Ipecac. Co. Pulv., Ibogaine, *Iodi Tinct.* Inhalations of Eucalypti Ol. Menthol, *e.g.*, Ozonic Inhaler (clears the head), Menthol and Camphor; Novaspirin, Opium and Morphine preps., Phenacetinum, Quinine preps., Salicinum, Salipyrin, Salol, Sodii Salicylas, Tinct. Quinin. Ammon., Tab. Ammon. Quinine Comp., *Pollantin. Influenza B. Vaccina.*

For sweating of—Amyl Nit. $\frac{3}{8}$ minim doses internally.

A note on Antiseptic Treatment.—*L. i./og, 1203.*

Insect Bites *vide* Bites and Stings.

Insomnia.—Acetanilide, *Aldol*, Ammon. Bromid., Amyleni Hydras, Antifebrin, Antipyrine, Bromal Hydras, Bromidia, Bromural. Butyl Chloral, Camphor, Cannabis Indica and Cannabin, Chloral (not now advised), Chloralamide, Chloralose, Chlorotone, Chlorobrom, Coca, Codeina, Dormiol, *Gutta Castorei Comp.* Hedonal, Hop pillows, Hyoscyamine, Hypnal, Hypnone, *Isopral*, *Lactucarium*, Liquor Bromo-Chloral Comp., Lupulin, Morphine, *Neuronal*, Opium, Paraldehyde, Phenazone, Potassii Bromid., *Proponal*, Scopolamine Hydrobromid., *Sedeff*, Sodii Bromid., Somnal, Stramonium, Strychnina and its salts, Sulphonal, Syrupus cum Narceina, Tetronal, Trional, Urethane, Valerian, Veronal, and *Veronal Sodium*.

Hans Meyer has shown that narcotics are chemically fat solvents, all chemically indifferent substances which dissolve fats, act narcotically on protoplasm. The comparative strengths depend on the affinity to fat substances on the one hand, and to the other constituents such as water on the other. The coefficient of its distribution between fat and water was proposed as an index of narcotic activity.—*B.M.J. i./og, 554. Vide also, Neuronal Bromural, etc.*

Intertrigo.—*Acid. Boric. and Ung.*, *Acid. Tannic Glycerin*, *Calamine Lotio Calci Carb.*, *Calci Aqua*, Camphor, French Chalk, Fuller's Earth, Hazel Foam, Iodi Tinct. diluted with 3 times volume with Eau de Cologne, Liquor Carbonis Detergens diluted with equal vol. or twice volumes of Eau de Cologne or Ichtliol diluted with water 50 or 60 times, Kaolin, *Lysoform*, Methylene blue, Oleogen Compounds Pellanthum preps, Ung. Thorii Oleat, *Vaseline*, Zinci Cremor and Ung., Zinci Oleat Pulv., Zinc Salicylas.

Intestinal Antiseptics.—See Antiseptics.

Intestinal Worms.—See Worms.

Iodism.—*Acid Sulphanilic.* Preps. containing ammonia.

Iritis.—Colchicum, Hydrarg. Perchlorid. and Subchlorid., Iodum, Oil of Gaultheria, Potass. Iod., Pilocarpine, Salicylic Acid.

Atropina cum Vaseline, *Atropina Sulph. Gutta* and *Lamellæ*, Belladonna, Duboisine, Dionine, Scopolamine, *Sterules* various.

Itch.—See Scabies.

Jaundice.—*Acid. Citric*, *Acid. Nitro-Hydroch. Dil.*, Aloes, Ammon. Chlorid., Benzozates, Elixir Gentiana Acidum, Calci Chlorid., Eriogonin, Ferri or Sodii Succinas, Hydrarg. cum Cretâ, Hydrarg. Subchlor., Hydrastis, Iodoform, Iridin, *Manganese Sulphate*, Myricin, Pilocarpine, Podophyllin, Salol, Sennæ Co. Mist., Sodii Phosphas and Sodii Phosph. Efferves. Sodii Salicylas, Sodii Succinas, Sodii Sulphas, and Sodii Sulph. Efferves., Stillingia, Taraxacum.

To relieve skin irritation Dilute Nitric Acid Lotion or Sodium Bicarbena Solution, Hazel Foam, Liquor Carbonis., Ung. Rusci, Comp.

Kala Azar. Organic Arsenic comps. *q.v.*

Keloid.—Radium, "X" Rays.

Laryngismus Stridulus.—Aconite, Amyl Nitris, Belladonna, Bromides, Chloral, Conine Hydrobrom., Emetin, Gelsemium, Piscidia.

Laryngeal Ulcers.—Lactic Acid as pigment and nebula.

Laryngitis, Acute.—Aconiti Tinct. or Pastil., *Adren ol.* Ammon. Acetat. Liq., and Ammon. Chlorid., Antimonials, Antipyretics, Calomel, Codeine Jelly, Dionin, Glycaphorm, Heroin, Linctus (various), *Lichenoids*, *Melaleuca*, *Pulsatilla*.

Counter-irritation, fomentations, leeches. — Inhalations of Ammon. Chlorid., Sprays of Menthol in Oil, Thymol, Tinct. Benzoin Co., Belladonna and Conium, Juniper, Æther Acetic.

Laryngitis, Chronic.—Ammon. Chlorid. and Liquorice, Codeine Jelly, Creosote preps. Cubeba, Dionin, Glycophorm, Heroin, *Lichenoids*, Morphine preps., Pautauberge's Solution, Tab. Formalin (to suck), Tar preps., Terebene, Terpin.

Injectio Creosoti or Creosoti Co., Insufflatio Morphinae et Bismuthi and of Catechu, or Menthol, or Tannin., Pastils of Glyco-gelatin (see list). Pigments of Cocaine, Eucaïne, Menthol, &c. Vapour of Creosote, Eucalyptus Oil, Juniper Oil, Pini Sylvestris Ol, Teretene, Thymol, Ol. Succini Liniment, Adren-ol.

Leprosy.—Anacardium, Gurjun Balsam, Gynocardia Ol. Nastin. Tannic Acid.

Ammonium Persulphate and Acid HCl. Nasal Douche. Sulphur burning Inhalation.

Leucocythemia.—Acid, Carbolic (inhaled). Arsenical preparations, Caco-dylates, Digitalis, Glycerophosphates, Hypophosphites, Iodine, Iron Salts, Liquor Ferri Peptonat. Marrubin, Phosphorus, *Syrupus Iodo-Tannicus*, Syrupus Tann-Iodo Phosphoratus, Syrupus Trium Phosphatum, Zinc Phosphide.

Leucorrhœa.—Hæmatoxylon, Iron Salts, Manganese preps., Mineral Acids, Myrrh, Vegetable Tonics, Fæxin Ext.

Abies Canadensis, Acid. Boric. Lotio, Acid. Carbolic. Lotio, Copper, Zinc or Iodine Ionisation (for obstinate discharge), *Alumen, Ammonio-Ferric Alum, Boric Acid in powder, Kaolin Insufflation, Hydrastis, Iodates, Lysoform Pessaries, Ovules of Alum, Carbolic Acid, Mercuric Chloride, Naphthol, Quinine Hydrochloride, Tannic Acid; Piceratol Suppositories, Pessus Quininae, Potassii Permang., Pulsatilla lotion, Sodii Bicarb., and Belladonna (Ringer), Sodii Perboras, Tannin and Alum Injection, Zinci Sulphocarb., Zymocide.*

Leukoplakia.—Radium.

Lichen planus.—Acid Phosphoric c. Strych., Acid Salicyl Ung.

Locomotor Ataxy. — Acetanilide, Aluminium Chlorid. Antifebrin, Argent. Nit., Argent. Oxid. Arsamin, Arsenic, Auri Chlorid., Cannabis Indica, *Cerebrin and Myelin together, Chloral Formamide, Ergot, Hexamethylene Tetramine, Mercury Benzoate, Morphine, Morrhua Ol., Nickel Salts, Nitroglycerin, Keratin, Physostigma, Phenacetin, Phenazone, Phosphorus, Potass. Bromid., Potass. Iodid., Quinine, Santonin, Sodii Salicylas, Strychnine, Zinc Phosphide.*

Chloroform on Linf. Cataphoresis of Cocaine Solution, Radium.

Treatment of tabes dorsalis.—L.i./10,355.

Lumbago.—*Actea, Ammon. Chlor., Atropine, Belladonna, Camphor Monobrom, Capsicum, Cimicifugin, Colchicum, Elixir Acid Salicylic Co., Morphine inj. hypod. Ol. Terebinth, Phenazone, Potass. Iodid. Quinine, Salicylates, Sedeff. All Purgatives as Chelsea Pensioner, Guaiacum and Sulphur,*

Aconite Liniment, Amyl Salicylate, Amysal, Atropina Linim., Belladonna Linim., Capsici Linim., Chloroform Liniment, Heat Rays, Iodum Oleatum, Iohydrin, Menthol Linim., Menthol Plaster, Mesotan, Methysal Balm, Oleogen Camphor, Oleogen Guaiacol, Oleogen Iodi, Oleogen Salicylicum, Opii Linim., Ung. Iodi Intinctum, Picis. Empl., Ung. Antim. Tart., Veratrina Ung., 'X' Rays. Static Electricity.

Lupus.—Amyli Iodid., Arsenic, Aristol, Auri Chlorid., Gynocard, Ol., *Hydrargyri Binioididum, Iodum, Morrhua Ol., Myelocene, Phosphorus, Quinine preps., Thyroid gland. Tuberculin Old.*

Acid. Chronic., Acid. Cinnamic, Acid Hydrochloric, Acid. Lactic., Acid Nitric Fumans, Acid Pyrogallie Emp. and Ung. Aiol., Bismuth Iodas, Camphora Salicylata, Carbonic Snow, Ethyl Chloride, Fibrolysin, Finsen Light, Gynocardia Ung., Hydrag. Nitræ, Hydrogen Peroxide, Ichthyol, Iodoform, Iodoform—Ether—Paraffin Injection, Isarol, Lassar's Paste, Lysoform, Lysol, Oleogen Iodi, Oleogen Ichthyol, Oleogen Potassii Cantharidas, Potassii Permanganas, Radium, Radium Ointment, Resorcin, Thiosinamin, Tuberculin, Tumenol, 'X' Rays, Zinc Chloridum.

Hydrochloric Acid and Ethyl Chloride freezing alternately.—L. ii./07,81. Anilin, Copper, Pyrogallol also Zinc Ionised.

Lupus is recalcitrant to Vaccine treatment. In mixed infection it is often well to treat with one Vaccine at a time.—Sir A. E. Wright, L.ii./08,732.

Lupus Erythematosus.—*Hydrarg. Binioidid, Myelocene, Finsen Lamp, and with Erythrosin), Radium, Salicin, Ung. Thorii Oleat., 'X' Rays.*

General treatment.—Salicin 15 gr. per diem increasing to 30 gr. Besides its action on the toxin it is a cardiac depressant and reduces the hyperæmia in the skin. Quinine internally, also painted on with Tincture of Iodine.

Locally remove adherent scales with soap and spirit lotion, then dry the lesion by Zinc Oxide and Magnesium Carbonate *p. aeq.*, or by Calamine Lotion. Then reduce hyperæmia and vascular dilatation by Ichthyol Ointment. Formalin Ointment 5 to 10% to be used with caution. Of mild caustics Oxidised Pyrogallol Ointment 6% or 10%, Resorcin in spirit painted once a week; of radio-therapeutic measures Finsen light best.—L. ii./08 1771.

Malaria.—*Vide* also **Ague and Fevers.**—Andrographis, Arsamin, Arsenic, Eucalyptus Oil, *Inj. Antimonii*, Methylene Blue, Pulvis Quinin. Comp., Quinin. Sulph. Eff., Quinine base (for children), Giemsa's injections, Quin. Hydrobrom. injections, Quin. Hydrochlor. internally in preference to Sulphate, Salicin, Salicylates, Tylmarin., Urea.

Rusot (q.v.) good results in Chronic Malarial Fever of children with hepatic derangement. Warburg's Tincture rarely used in India now.—Ghosh.

Malignant Tumours—See **Cancer.**

Malta Fever.—See **Mediterranean Fever.**

Mammary Abscess.—See **Breast, Inflammation of.**

Mania.—Apomorphine, Veronal, and other hypnotics, Atropine, Bromides, Cannabis and Cannabin Tannas, Chloral Hydras, Chloroform, Conine, Diacetyl and Ethyl Morphine, Digitalis, Gelsemina, Hyoscine salts, Hyoscyamine, Morphine preps., Opium preps., Paraldehyde, Syr Pot. Brom. et Pilocarpin., Sodium Bromide, Sulphonal, Thyroid Gland, Trional.

Marasmus.—Arsenical preps., Lecithin, Iron preps. Meat preparations, Marrubin, Medullary Glyceride, Thymus.

Measles.—Aconite, and Pastil of, Æther Nit. Spt., Ammon. Acet. Liq., Ammon. Carb., Belladonna Tincture, Ipecacuanha, Potass Tart. Acidus.

Mediterranean Fever.—Intestinal Disinfectants, *e.g.*, Benzonaphthol, Salol, Urotropine, &c. Boil the milk.

Melancholia.—Bromides, Brominol, Bromipin, Camphora, Coca and Cocaine, Cannabis, and Cannabin Tannas, Damiana, Elixir Gentianæ Acidum, Elix. and Emulsio Lecithin. Musk, Nux Vomica, Phosphorus, Pil. Potentin Co. Syr., Glyceroph Co., Valerianates.

Menière's Disease.—Acid. Salicylic., Bromides, Gelsemium, Gelsemine, Pelletierine.

Meningitis.—Aconite, Belladonna, Calomel, Iodides Opium, Veratrum.

Lumbar puncture, Antiseptic Injections, Mercural Injections.

Menorrhagia.—Acid. Gallic., Acid. Sclerotic., Acid. Sulph. Dil., Beberinæ Sulphas, Bromides, Cannabis, Cinnamon Oil, Cotarnine, Digitalis, Elixir Ergotæ cum Ferro, Ergota, Ergotin, Erigeron Oil, Eumenol, Ferro-Alumen, Hamamelis, Hydrastis, Iron Persalts, Lecithin Elix. and Emuls., Monsel's Solution, Plumbi Acetas, *Rhus aromatica*, Ruta, Salipyrin, Sodii Citras, Styptol, Viburnum, Vinca Major, Zinc Ions.

Metallic Poisoning.—See Lead, Nickel p. 558, 892.

Migraine.—See **Headache, Nervous.**

Milk, to increase flow.—Acid. Lactic., Galega (Goat's Rue), Ext. Gossypii pulp., Jaborandi and Pilocarpine, Malti Ext., Maltolivine, Meat Extracts, Marrubin, Thyroid Gland.

Ricinus Communis, leaves and oil of.

Milk, to arrest flow.—Agaricus albus and Agaricin, Antipyrine, Belladonna and Atropine, Conium, Ergota, Saline Purgatives, Sodii Iodid.

Atropine Breast Discs, Belladonna Empl., and Glycerin, or Glycerinum Atropina.

Moles.—Liquid air. Caustics, Liq. Sodii Ethylatis.

Morphine Habit.—Cactus, Camphor, Cocaina, Combretum, Dionin, Dormiol, Heroin, Hyoscina, Mist Belladonnae Xanthoxyli and Hyoscyami, Nitroglycerin, Nux Vomica, Sodii Bicarb., Sodii Bromidum, Sparteinæ Sulphas, Trional. Jennings' "Therapeutic triad."

Mosquitoes, to ward off.—See **Bites and Stings.**

Mumps.—See **Parotitis.**

Muscular Rheumatism or Myalgia.—Actæa, Ammon. Chlorid., Atropine inj. hypod., Cimicifugin, Ibogaine, Iron Salts, Morphine inj. hypod., Pot. Iodid., Salicylates, Sedeff.

Belladonnae Glycerin and Linim., Capsici Empl. and Linim., Camphor Liniment and Compound, Clove Oil, Ether Spray, Gaultheria Ointment, Iodi. Linim., Iohydryn, Oleogen Comps., Menthol, Methysal Balm, Opium (in poultice), Veratrina, Ung.—See also Lumbago.

Myasthenia Gravis.—Lecithin, Electricity.

Myxœdema.—Arsenic, Iron Salts, Jaborandi, Nitroglycerin, Pilocarpine, Strychnine preps., Thyroid feeding and preps.

Clinical Lecture on,—Guthrie Rankin, Pr. Feb./09, 204.

Nasal Catarrh.—See *Catarrh, Nasal.*

Nœvi.—Acid Carbonic, Acid. Chromic., Acid. Nitric., Actual cautery and vaccination, 'X' rays, Collodium, Sodii Ethylas, Zinci Chlorid. Iodid. and Nitras.

Invalid Air. High Frequency Current.

Nephritis, Chronic.—Aconite, Basham's Mixture, Buchu, Copaiba, Digitalis with Caffeine, Erythrol Nitrate, Gokhru, Haustus Imperialis, Hordei Dec., Iodo-Caffeine, Iodo-Theobromine, Jaborandi, Koumiss, Lini. Infus., Pareira Pot. Nitris, Pot. Iod., Pulv. Potass. Nitrit. Co., (Brunton), Salt free diet, Santali, Ol., Scoparius, Sodii Sulphocyanidum, Strontii Lactas, Strophanthus preps., Theobromine Aceto-Salicyl., Triticum Repens, Uva Ursi.

Saline Solution injected may prolong life.

Nervous Debility, Nervousness.—Acid. Hydrobromic., Acid. Phosph. Dil., Agurin, Ammon. Bromid., Arsamin, and other Arsenic preps., Asafetida, Atropine Methyl Bromide, Atropine Valerianate, Antiseptics, e.g., Calomel; Auri et Sodii Chlorid., Bisciniod, Bromal, Bromalbacid, Bromipin, Bromocarpin, Bromoglidin, Bromural, Calcii Bromidum, Calcii Glycerophosphas, (et. cum. Lact. Exsicc), Camphora, Cannabis Indica, Capsul. Valerian. Comp., Coca Wine, Easton's Syrup, Ferri Glycerophosphas, Ferric Salts, Ferri Oxalas, Guttæ Castorei Co., Hæmoglobin Capsules, etc., Hypophosphites, Ibogaine, Ignatiæ Tinct., Lavand. Co. Tinct., Lecithin (Elix. and Emulsi.), Liquor Auri et Arsenii Bromidi, Liquor Auri et Hydrarg. Brom., Liq. Antihystericus, Liq. Ferri Mang. Pept. c. Hæmoglobin, Liq. Iodo-Ferri Pept., Magnesii Brom., Maltolivin, Manganesii Bromidum, Marrubin, Ol. Allii Essent. Ol. Morrhuæ, Pil. Potentin Co., Phosphorus, Potass. Bromid., Protyllin, Quinine preps., Quinina Valerianas, Salicin, Salicylic Ions, Scutellarin, Syrup Kolæ Comp., Sodii Phosph., Spermin, Spt. Meliss. Comp. Strychnine, Strychnine Valerianate, Sumbul, Theobromine Lithium Benzoate, Trillactine, Valerian preps., Validol, Valyl, Vanadates, Veronal, Virogen, Zinci Valerianas.

Speech Fright.—See *Stage Fright.*

Neuralgia.—Acetanilide, Aconite, Actæa, Æther (injected) Alcohol injections. Ammon. Carb., Ammon. Chlorid., Antipyrine, Arsenic, Aspirin, Atropine Valerianate and Salicylate, Belladonna, Bromides, Butyl Chloral, Caffeine, Cannabina, Chloral-Hydras, Cimicifuga, Cinchonine, Cinchonidinæ Sulph., Colchicine, Conium and Conine Hydrobromid., Diaspirin, Elixir Antineuralgic, Elixir Genitan. Acid., Exalgin, Euphorin, Gelsemium preps., Hyoscyamine, Ibogaine, Iron Salts, Lecithin Elix. and Emuls., Liquor Bromo-Chloral Comp., Methylene Blue, Monobromacetanilide, Muirapuma, Neuralgic Pills, Neuralgia Powders, Nitroglycerin, Phenacetin, Phenazone, Phenocoll, Phosphorus, Pulv. Morphin. Eff. Quinine preps., Quinina Hydrobrom., Salicylates and Salol, Saloquinine Sedeff, Syr. Glyceroph. Co., Syr. Hypoph. Co., Syr. Pilocarpin. et Potass. Brom., Theophylline Sodium Acetate, Theobromine Lithium Benzoate, Thiocol.

Ethyl Chlorid., Aconiti Linim., Aconitina Ung., Belladonnae Collodium et Tinct. Æthereæ. Linim. and cum Chloroform. Bromine Ionised, Chloral Hydras cum Camphor and cum Menthol, Chloroform, Chloroform by Cataphoresis, Chloroformum Aconiti, Delphina Ung., Glycopasta Aconiti, Belladonnae, Ung. Iodi Intinctum, Iohydryn, Menthol, Menthol cum Aconitina, Menthol Linim., Menthol Plaster, Methyl Chloridum, Methyl Salicyl Balm, Morphinæ Oleat., Oleanodyne, Oleogen Camphor, Oleogen Guaiacol, Oleogen Iodi, Oleogen Menthol, Oleogen Salicylate, Opii Linim., Quinine Ionised, Radium, Thorium, Veratrina Ung. All Anodyne Liniments.

Neuritis.—Antipyrin, Arsenical preps., Iodides, Mercurials, Salicylates, Sedatives—Nitroglycerin, Static Electricity. Interrupted current.

Neurasthenia.—See *Nervous Debility.*

Night Sweats.—Acid. Camphoric., Acid. Gallic., Acid Hypophosph. and Hypophosphites, Acid. Sulph. Aromat., Agaricus albus and Agaricin, Atropine and inj. hypod., Atropine Methyl-bromide, Belladonna, Calcii Chlorid., Codeine, Coto and Cotoin, Guaiacol Carb., Homatropine, Hyoscine Hydrobrom., Hypophosphites, Ipecac. Co. Pulv., Iron Salts, Picrotoxin, Quinine preps., Strychnine, Zinci Oxidum. Sweats of phthisis.—Thallium Acetate was tried.

Nipples, Fissures of, and Sore.—See **Fissures of Nipples.**

Nocturnal Emissions.—See **Incontinence.**

Nymphomania and Satyriasis.—Bromides, Camphor, Conium, Hyoscine, Tabaci Folis.

Obesity.—Alkalis and Alkaline Carbonates, Fucus Vesiculosus, Iodum, Potassii Iodidum, Potass. Permang., Saccharin instead of sugar, Sodii Mag. Sulph. Efferves., Thyroid gland, Iodo-thyrin. Also Aperient Waters, *q.v.*

Oedema.—*Calc Lactas* (of feet) *Calcii Chlorid*, Theophylline Sodium Acetate, Theocine Sodium Acetate.

Cataplasma Salicyl. Co. Antiphlogistine, Linimentum Pot. Iodi. cum Sapone, Iohydrin. Ung. Hydrarg. Co. (of Ankles).

Ophthalmia.—See **Conjunctivitis.**

Ophthalmia, Gonorrhoeal. (*Local use.*)—Argyrol, Collargol, Crêdê's Ointment, Ichthargan.

Ophthalmia Tarsi. (*Local use.*)—Acid. Boric. Lotio and Ung., Glycerini Plumbi Subacetatis Ung., Copper Sulphate, Hydrarg. Oxid. Flav. Ung., Iodoform Ung., Lysoform, Sphagnol.

Orchitis.—Acetanilide, Aconite, Anemonin, Antimonials, Pot. Iod., Phytolacca. All saline aperients.

Belladonna, Glyc. et Ung., Guaiacol, Iodi Tinct., Oleosa and Ung., Mercurial Plaster. Methysal Balm.

Otitis and Otorrhœa.—Acid. Sulphanilic., Aconite, Antimonials, Iodides, Phosphorus, Saline aperients, Sodii Sulphanilas. Pneumococcal Vaccine.

Aurinaria, see List.

Acid. Boric., Acid. Chromic, Acid. Tannic, Alum Insufflatio, Alum and Bismuth Insufflatio T.H., Argenti Nitras and Bismuth Insuffl. T.H., Calendula, Calomel, Carbonis Detergens Liq. (as Lotion), Chinolin, Cyllin, Dermatol, Ferri Perchlor., Glycerin, Hydrogen Peroxide (and Borated), Ichthyol, Iodates, Iodi Tinct., Iodoform Wool and Insufflation with Bismuth T.H., Lysoform, Lysoform, Microcidine, Naphthol, Potass. Permang., Proctanin, Resorcin, Salicylic Acid, Thymol, Turpentine, Xeroform, Zinc Chloride.

Ovarian Pain.—Ammonii Chlorid., Antipyrin, Bromides, Castor. Tinct., Morphine preps., Pulsatilla, Sumbul Tinct.

Ozæna. (*Local use.*)—Acid. Boric. Lot. and Ung., Acid Carbolic, Buginarium, Adren-ol, Aldehydi Vapor, Alumen, Alumin. Acet. Liq., Aristol, Creosoti Vapor, Cupri Sulph. Buginarium, Eucalypti Globuli Infus. and Tinctura, Europhen, Finzen Light, Hydrocotyle Asiatica, Hydrogen Peroxide (and, Borated), Inula Helenium, Iodates, Iodoformi Buginarium Iodoformi Ung., Liq. Violæ Glucosidl, Lysoform, Menthol spray and pigment, Potass. Permangan. Lotio, Sanitas (toilet), Sodii Chlorinat. Liq., Sodii Chlorid., Sodii Silic. Sol., Thymaglycine, Thymol Lotio, Zinci Sulphocarb., Zinci Sulphas., see *Buginaria*. Zinc Ions.

Palpitation.—Aconite, Bromides, Camphora, Cannabis, Cimicifuga, Convallaria, Digitalis, Tabellæ Digitalini, Nitroglyc., Ibogaine, Valerianates.—See remedies for Dyspepsia.

Paralysis Agitans.—Chloral, Formates, Hyoscina, Hyoscyamus, Hypophosphites, Iron Salts, Phosphorus, Physostigma, Strychnine, Sparteine. Certain mineral waters, as Baden-Baden, Tepitz.

Paralysis Bulbar.—Sodium, Lithium, Salicylic or Iodine Ions.

Paralysis, Diphtheritic.—Ferri Iodid. and other Iron Salts, Nux Vomica, Pepsin, Strychnine inj. hypod.

Paralysis, Hemiplegia.—Damiana, Ergota, Iron Salts, Nux Vomica, Phosphorus, Physostigma and Physostigmine.

Paralysis, Paraplegia.—Calcium and Sodium, Damiana, Ergota, Hypophosphites of Iron, Iron Salts, Phosphorus, Physostigma and Physostigmine, Rhois Tinct., Strychnine.

Parasites, Animal, on Skin. (*Local use.*)—Benzol, Hydrarg. Ammon. Ung., Hydrarg. Oleat., Hydrarg. Oleas c. Sulphure, Hydrarg. Perchlorid. Iqsoform, Lotio and Ung., Iodates, Lotio Hydrarg. Acetic, Lotio Parasiticidus, Naphthalin Ung., Naphthol Ung., Ol. Cajuput, Ol. Sassafras, Phenoloid Disinfectant—diluted, Pyrethri Flores Pulv. and Tinct., Sapo Viridis, Staphisagria, Sulphur Baths, Lotion, and Ung., Sulphurated Lime Lotion, Oleatum Hydrarg. cum Sulphure, Styraz.

Parasites, Intestinal.—See **Worms.**

Parasites, Vegetable, on Skin. (*Local use.*)—Acid. Boric., Acid. Carbolic., Acid. Chrysophanic Ung., Acid. Sulphuros., Cupri Oleat. Ung. (*for favus*),

Formol, *Hydrarg. Oleat.*, *Hydrogen Perox.*, *Lotio Parasiticidus*, *Lysoform*, *Petroleum of Commerce (fusus)* (B.M.J. i./og, 1297), *Phosphor. Ol.*, *Picrotoxin Pigment.*, *Pyrogallol*, *Sassafras Oil*, *Sodii Hyposulphit. Lotio.*, *Thymol Ung.*, *Ung. Thorii Oleat.*, 'X' Rays.

Parotitis (Mumps).—*Aconite*, *Antipyrin*, *Aperients*, *Iodides*, *Salicylates*, *Salines*.

Glycerin of Belladonna to neck, *Iodine Ointments and Liniments*, *Methysal Balm*, *Thorium Oleate*.

Pediculosis Capitis (Lousiness). — *Benzol*, *Friction with Paraffinum Liquidum (Toilet Paraffin)*.—*Naphthol*, *Sassafras Oil*, *Stavesacre Oil or Ointment*.

Pericarditis.—*Aconite*, *Caffeine*, *Digitalis*, *Levurine*. *Mercury preps.*, *Nuclein*, *Opiates and Musk* (to relieve pain), *Potass.* and *Sodii Iodid.*, *Salicylates*.

Belladonna Emp. and Liniment, *Leeches*, *Ice*, *Blisters*.

Peritonitis.—*Aconite*, *Antifebrin*, *Antipyrine*, *Digitalis*, *Hydrarg. Subchlorid.* cum *Opio*, *Hyoscyamus*, *Mercury and chalk with Iodoform*, *Opium*, *Opium and Belladonna*, *Tuberculin*, *Veratrum Viride*.

Turpentine or Belladonna, *Stupes or Poppy-head fomentations*. For *Pelvic*,—*Collargol Suppository*.

Peritonitis, Pneumococcic.—See L. i./o6, 1591.

Perspiration, Excessive.—*Abies Canadensis*, *Acid. Agaric.*, *Acid. Phosph. Dil.*, *Acid. Sulph. Aromat.*, *Atropine and inj. hypod.*, *Atropine Methyl-bromide*, *Belladonna*, *Ergota*, *Jaborandi*, *Pilocarpine*, *Picrotoxin*, *Quinine preps.*

Acid Chromic (of feet) *Amyli Pulv.*, *Diachyli Ung.*, *Emol.*, *Formol*, *Kaolin*, *Lysoform*, *Naphthol sol. in Alc.* and *Glycerin*, *Tannin*, *Zinci Oleat. Pulv.* and cum *Thymol.*, *Zinci Oxid.*, *Zinc Carbonate*, *Zinc Borate*, *Pasta Zinci et Amyli*.

Perspiration, Fetid.—*Mineral Acid and Vegetable Acids* (*Calcii Sulphas.* as in *Contrexville Water*), *Sulphur* (of feet), and *Tonics*.

Acid. Boric. Lotio and Ung., *Acid. Carbolic. Lotio and Ung.*, *Acid. Salicylic. Pulv. cum Talco*, *Aluminii Acet. Lotio*, *Atropine or Belladonna Linim.*, *Borax*, *Diachyli Ung.*, *Glycerini Plumbi Subacet. Ung.*, *Iodates*, *Lysoform*, *Tunnaform*, *Ung. Sulph. Zinc.* et *Kaolin* (of feet). *Zinci Oleat. cum Thymol.*

Pertussis.—See *Whooping Cough*.

Petit Mal. See *Epilepsy*.

Pharyngitis. (*Local use.*)—*Adrenol*, *Antipyrin Nebula 3%*, *Ung. or Nebula of Menthol and Boric Acid to nostrils*, *Hyd. Perchlor. Gargar.*, *Inhalation of Friar's Balsam*, *Iodine Vapour*, *Potassium Chlorate Gargle*, *Sulphurous or Arsenical Waters internally and as Spray*, *Silver Nitrate* and *Zinc Chloride Pigments*, *Counter-irritation to neck*, *Tablets of Formalin* (to suck).

Zinc Ions.

Phthisis.—*Acid. Camphoric.*, *Acid. Cinnamic.*, *Acid. Coumaricum*, *Acid. Fluoric* and *Ammonium Fluoride inhalations*, *Acid. Hypophosph.* and *Hypophosphites*, *Acid. Lactic.* and *Lactates*, *Acid. Malic.*, *Acid. Phenylacetic.*, *Acid. Phenylpropionic.*, *Allium preps.*, *Allmatein* (*Intestinal*), *Arrhenal*, *Arsenic.* (and organic arsenic compounds), *Atoxyl*, *Auri Cyanidum*, *Benzoates*, *Cacodylates*, *Calcii Chlorid.*, *Calcii Iodid.*, *Elixir*, *Calcii Hypophosph.* and *Phosph.*, *Cholesterin*, *Cinnaldehyde Capsules*, *Cinnamic Salts and Injection*, *Cinnamyl-Metakresol*, *Creosoform*, *Creosoti Carbonas*, *Creosoti Valerianas*, *Creosotum*, *Cupri Acetas*, *Dionin*, *Durant's Injection*, *Elixir Arsamin*, *Elixir Creosoti*, *Elixir Sodii Formatis*, *Emuls. Ol. Morrhuæ et Hypophosphitum*, *Emulso Petrolei*, *Eucalyptol*, *Ferrated Cod Liver Oil Emulsion*, *Ferri perchlor.*, *Felix Mass.*, *Formaldehyde Inhalant*, *Glycero-phosphates*, *Griserin*, *Guaiacol*, *Guaiacol Cacodylas*, *Camphoras*, *Carbonas*, *Cinnamas*, or *Phosphas*, *Guaiacol-Salol*, *Heroin*, *Hyd. Succinid.*, *Ichthyol mixture*, *Capsules*, etc., *Inj. Cacodyl. Co.*, 'Iodo-formic' *Acid* (for ulceration), *Iodoform Glyc. Injection* (*Tuberculous Abscess*), *Iodoform in Ether.* *al Injection* intravenously (phthisis), *Liq. Iodi Fort* (to swab out sinuses), *Iodi Tinct.* (as tonic) *Iodine Injection.* (*Durant*), *Lachnanthes*, *Lecithin*, *Liq. Ferri Mang. Pept. c. Haemoglobin*, *Iron Salts*, *Maize Oil*, *Maltolivin*, *Marrubin*, *Naphthol-Camphor* (inserted in joints), *Normal Horse Serum*, *Ol. Cedri Atlantic.*, *Oleum Morrhuæ*, *Ol. Morrhuæ c. Creosoto*, *Ol. Olivæ cum Acido Oleic.*, *Ovolecithin*, *Oxygen*, *Palladium Chloride*, *Pancreatin*, *Pepsin*, *Phenol Sodii Sulpho-Ricinas*, *Piscidia*, *Prunus Virginiana*, *Quinine preps.*, *Quinine Arrhenalate*, *Radium Comps.*, *Resorcin* (*Laryngeal*), *Salicio*, *Sodii Cresotinas*, *Sodii Fluoridum*, *Sodii Hypophosph.*, *Sodii phenyl-propiolos*, *Somatose*, *Strontii Cinnamas*, *Strych. Cacodylas*, *Sugar Feeding*, *Syr. Iodo-Tannic*, *Syrupus Potass. Cyanid.* (for cough), *Thiocol*, *Thorium Comps.*, *Tiodine*, *Tuberculin Old*, *Tuberculin R.*, and a large number of other *Tuberculin* preparations,

Trilactine (for intestinal tuberculosis), *Tylmarin*, Oxygen injection (tuberculous peritonitis). *Urea*, Ung. Acid. Salicyl. Terebinth., *Vanadates*, Vapor Acid Carbolico Co.,—Lees. Vapor Guaiacol Compositus, *Verbascum Thapsus*, Yeast Preparations. For *Haemorrhage* of, Amyl Nitrite Capsules.

Precipitation of Mercuric Iodide in the tissues.

Tuberculous Glands, *Radium Guaiacol*. See also Phthisis above.

Tuberculous Joints. Zinc Chlor. Solution, Iodised Phenol.

For diagnosis.—*Calmette's Ophthalmic Reaction*, *Von Pirquet's Cuti-Reaction*. See also *Opsonins*, p. 802 *et seq.*

Piles.—See *Hæmorrhoids*.

Pityriasis.—*Acid Boric. Lotio. and Ung.*, *Acid. Chrysophanic Ung.*, *Boracis Glycerin. and Lotio*, *Glycerini Plumb. Subacet Ung.*, *Gynocardia Ung.*, *Huile de Cade*, *Lotio Resorcini*, *Picis Ung.*, *Empyroform*.

Plague. The.—*Acid. Carbolico*, Antitoxic Serums of Haffkine and Yersin, *Adrenalin*, *Lustig's Vaccine*, *Strychnine*. As prophylactic, *Pil. Quin. Ipecac.* and *Camph.*, also *Nim fumigation*.

Pleurisy.—*Aconite*, *Ammon. Acet. Liquor*, *Antimony*, *Apocynum cannabinum* (for Pleuritic effusion), *Bryonia*, *Jaborandi*, *Morphine preps.*, *Potass. Iodid.*, *Pyranum*, *Quinine preps.*, *Sodii Salicylas*, *Sterilised Paraffin*, *Veratrum*.

Adrenalin, *Antiphlogistine*. *Blisters*, *Cataplasm. Salicylic. Co.*, *Iodates* by injection for empyema, *Salicylic Ions*, *Thermofuge*.

Pleuritic Effusion (Recurrent).—*Intra-plural Injections of Formalised Glycerin*. See *Formaldehyde* for references.

Pleurodynia.—See *Myalgia*.

Pneumonia.—*Acid. Salicylic.*, *Aconite*, *Ammon. Carb.*, *Ammonii. Citras* and *Chlorid.*, *Belladonna*, *Caffeine*, *Calcii Chlorid.*, *Camphor 'Sterule'*, *Chloral* and *Digitalis*, *Creosoti Carbonas*, *Creosote* combined with *Potassium Iodide*, *Digitalis*, *Ferri Perchlor.*, *Guaiacol*, *Heroin*, *Histosan*, *Hyoscyamus*, *Hypophosphites*, *Liquor Ferri Acetatis*, *Normal Saline Solution*, *Ol. Allii Essent.*, *Phenacetin*, *Phenazone*, *Pilocarpin*, *Quinine preps.*, *Salines*, *Veratrum viride*, *Antipneumococcic Serum*, *Saline transfusion*.

Pneumococcal Vaccine, *Pneumococcine*, *Cataplasm*, *Salicyl Co.*, *Ice Bags*, *Oxygen*.

Robin on treatment of.—*B.M.J.* i./07,50.

Antipyretic drugs, even *Quinine*, should be avoided.—*M.P.* Mar. 20, 1907,310.

Paraldehyde (for the insomnia).—*L.* i./07,808.

Eucalyptus Oil.—*Saturated atmosphere*.

Ewart on principles of Treatment.—*L.* i./05,138; *B.M.J.* i./08,716. He employs large doses of Solution of Ammonium Citrate in six doses at one hour's interval, and subsequently a few doses at two hours' interval, and then at intervals of four hours.

Success with 3 grains of Calomel, strips of blister at intervals of about one inch, linseed poultice above, and mixture containing Potassium Iodide 4 grains, Potassium Citrate 10 grains, Solution of Ammonium Citrate $\frac{1}{2}$ drachm in $\frac{1}{2}$ ounce water every four hours.—*L.* i./09,160.

Pneumonia, heart failure in.—*Calcii Chlorid.* See *B.M.J.* i./07,616 and pp. 292 293.

Strophanthus, *Alcohol* and *Strychnine* (for the heart).—*L.* i./07,808.

Opium and *preps.*, and *Alcohol* should be avoided, since they are harmful to phagocytes.—*B.M.J.* E. ii./07,48.

Poisons.—See *Antidotes* under each heading in the text, and *Emetics*, also special Chapter at end.

Polypi. (Local use.)—*Hydrogen Peroxide*, (and *Borated*)—styptic in removing.

Portwine Stains.—*Radium rays*.

Post-Partum Hæmorrhage.—See *Hæmorrhage*.

Pregnancy, Vomiting of.—*Aconite*, *Adrenalin*, *Antipyrine*, *Argent Nit.*, *Arsenic*, *Belladonna*, *Bismuth preps.*, *Cerii Oxalas*, *Chloral*, *Chloroform*, *Iodides*, *Iodl Tinct. m l.* in ounce Aq. every two hours.—*B.M.J.* ii./06,1718. *Cocaine*, *Sedell*, *Creosote*, *Hydrocyanic Acid*, *Ingluvin*, *Ipecac. Vin.*, *Iridin*, *Menthol*, *Morphine preps.* and *inj. hypod.*, *Nux Vomica*, *Pepsin*, *Pot. Permang.*, *Quinine preps.*, *Spt. Nucis Juglandis*.

Prolapsus Uteri.—*Quinine* injected, *q.v.*

Prostration.—Amyl Nitrite Capsules. Coca preps., Oxygen Inhalation, Stimulants.

Prurigo.—Arsenic, Bromides, Cantharides, Iron Salts, Pilocarpine, Quinine preps., Quinine Lygosinate, Sodii Carb., Thorium Salts, Trilactine.

Acid. Boric. Lotio and Ung., Acid Carbol. Lotio and Ung., Acid. Oxy-Naphthoic., Borax, Cocaine Ceratum, Ichthyol. Iodoformi Ung., Liq. Ammon. Dilut., Liq. Hydrarg. Perchlor., Liq. Plumbi Subacet. Dilut., Lysoform, Oleagen Comps., Pilocarpine, Staphisagria, Sulphur Ung., Tar, Ung. Rusci. Co., Ung. Sulph. cum Hydrarg., Anderson's Ointment.

Pruritus Ani, Vulvæ, &c.—*Acid. Carbol. Lotio and Ung., Acid Picric Lotio, Acid. Salicylic. Ung., Acid Sulphuros. Lotio, Alkalis (Lotion of), Aloes Tampons, Alum Lotion, Argent. Nit. in Sp. Ether Nit., Bismuth Subiodate, Bismuth subnit., Calcium Lact. (gouty), Calomel dusted on, Carbol. and Cocaine Lotion, Carbonis Liq. Lotio., Chlorotone, Chloroformi Ung., Cocain. Cocaine Ceratum, Conii Ung., Epicarin, Eucaine, Gallæ cum Opio Ung., Glycerinum Plumbi Subacet. Ung., Hydrarg. Oleat et cum Morphind., Hydrarg. Subchlorid. Ung., Ichthyol Suppos., Liq. Picis Carb., Lotio Ac. Carb. et Cocain. Lotio Nigra, Lysoform, Mentholeate, Menthol et Boracis Lotio., Naphthalin Ointment and Suppos., Anderson's Ointment, Hydrastis Liquid Extract and Hamamelis injected, Orthoform, Potass. Cyanid. Lotio., Sodium Thiosulphate, Tannin, Thiol preps., Tinct Cannabis, Ung. Acid Boric., Ung. Rusci. Co.*

See résumés.—B.M.J. ii./08,632; ii./09,452 (Tar and Lead Lotions and Mercurial Ointments).

Pruitis of glycosuria.—B.M.J.i./10,360.

Psoriasis.—*Adren-ol., Arsenic preps., e.g., Arsamin and Cacodyl preps., Cantharides, Granula Dioscoridis, Gynocardia Ol., Hydrarg. Iodid. Viride, Iron Salts, Morrhuæ Ol., Levico Water, mild and strong, Phosphorus, Pil. Asiatica, Quinine preps., Resinol, Sulphur.*

Acid. Carbol. Ung., Acid. Chrysophanic Ung., Acid. Pyrogall. Ung., Acid. Salicylic Ung., Anthrarobin, Aristol, Betula Pyrolig. Ol., Carbonis Liq. Lotio, Epicarin, Eugallol, Eucrobin, Euphrophen, Fagi Pyrolig. Ol., Gynocardia Ol., Huile de Cade and Ung., Hydroxylamine, Ichthyol, Ichthyol Resorcin and Salicyl, Iodates, Lanolin, Lenirobin, Lysoform, Mollin, Naphthol, Picis Ung., Potass Sulphurata, Radium, Rusci Pyrolig. Ol., Sodii Carb., Sulphides (in Baths), Sulphuris Hypochloritis Ung., Salophen, Ung. Thio-Resorcin, Thorii Oleat Ung., Quinin. Lygosinas, Thymol Iodide, Trilactine, Ung. Acidi Pyrogall. Oxidat., Ung. Iodi Intinctum, Ung. Rusci Co.

Ionisation of 1% Sodium Salicylate or 0.5% Sol. of Sodium Sulphide.—(Lewis Jones).

Ptomaine poisons.—Trilactine Milk preps. See also pages 892, 893.

Ptyalism.—See Salivation.

Puerperal Fever.—*Acid. Boric, Antifebrin, Antipyrine, Anti-Streptococcic Serum, Ferri Perchlorid., Jaborandi, Nitro-glycerin, Nucleine Acid, Opium, Pilocarpine, Quinine (in large doses L. ii./09,338), Streptococcal Vaccine, Terebinth. Ol., Veratrum.*

Vaginal Injections of Sal Alembroth, or Mercuric Iodide Solution, or of Cyllin, Injectio Iodi.

Uterus to be freely irrigated with Iodine Solution.—L. ii./09,338, *c.f.* Injectio Iodi, C.H.W.

Normal Saline subcutaneously and Saline enemata useful in supporting a failing circulation and carry off bacterial poisons.—L. ii./09,338.

Purgatives.—See Constipation.

Purgatives Hypodermic.—Apocodeine, Colocyntin, (but may prove emetic), Physostigmine.

Purpura.—*Acid. Citric., Acid. Gallic., Acid. Sulphuric. Dil., Calcii Chloridum, Ergota, Iron Salts, Lime Juice, Phosphorus, Quinine preps., Terebinthine Oleum.*

Pyæmia.—Autogenous Vaccine.

Pyelitis.—Benzoates, Benzoic Acid, B. Coli. Vaccine, Collinsonia Canadensis, Erigeron Oil.

Pyorrhœa Alveolaris.—Vaccines.

Argyrol. Antiseptic mouth washes. e.g. Lotio Acidi Citrici, et Phenolis.

Pyrexia.—See Fever.

Pyrosis.—*Acid. Hydrocyanic., Acid. Hydrochlor. Dil., Acid. Nit. Dil., Acid.*

Sulphuros., Atropine methyl-bromide, Bismuth preps., Carbo Ligni, Cerii Oxalas, Magnesia, Sodii Bicarb. Sodii Sulphocarbolas.

Quinsy.—See Pharyngitis, Throat Inflammation.

Rectum and Colon Ulceration. See Colitis.

Remittent Fever.—Apol, *Arsamin*, Eucalyptus Globulus, Quinine and other Cinchona Alkaloids, Salicin, Salicylates, Salol, Warburg's Tincture, *Mistura oleo-Balsamica*.

Rheumatic Fever.—Vaccine Strepto. Rheumaticus.

Rheumatism, Acute.—Acid. Aceto-Salicylic, Acid. Benzoic, and Benzoates, Acid. Salicylic and Salicylates, Acetanilide, Acetopyrin, Aconite, Actæa and Cimicifugin, Antifebrin, Antipyrine, Asaprol, Aspirin, Caffeine-Chloral, *Cocaine Ionization*, Colchicum and Colchicin, Elix. Ac. Salicyl. Co., Fæxin Ext., Ferri Perchlorid., Gnaicum, Lactophenin, Lemon or Lime Juice, Lithion, Methysal Balm, Opium, Ozonic Ether, Phenazonum, Phenocoll Hydrochlor., Potass. Acetas, Bicarb. Cit. or Nit., Quinine preps., Rubidium Iodid., Salicylamide, Salpyrin, Salol, Salocoll, Salophen, Sodii Bicarbonas, Sodii Sesquiphosphas, *Tylmarin*, Veratrum.

Rheumatism, Chronic.—Acid Citric, Acid Hydriodic and Iodic, Actæa, Amyl Salicylas, Antim. Sulphurat., Arsenic, *Articular Extract*, Aspirin, Aspirophen, Benzosalin, Bisclniol, Caffein Salicyl., Chloral with Camphor and Menthol, Cimicifuga, Cichonidinæ Salicylas, Citarin, Colchicum, Conf. Guaiaci Comp., *Diaspirin*, Ethyl Iodid. and Salicyl. Euphorin, Ferri Iodid. Syr., Ferri Salicylas, Formates, Gautheria Oleum, Gelsenium, Granular Eff. Piperazine and Phenocoll, Ibogaine, Ichthyol, Ichthyol Salicylate, Iodalbum, Lithii Hippuras, Lithion, Lycetol, Manaca, Methylene Blue, Naftalan, *Hydrangea*, *Novaspirin*, Ol. Morrhuæ, Pelletierina, Phytolaccin, Pilocarpina, Piperazina, Piperazin Benzoas and Glycerophosphate, Piperidin preps., Podophyllin, Potass. Iodid. et cum Quinina, Pyranum, Rhus, Saffrol, *Sarsaparilla preps.*, Sodii Boro-Salicylas, Sodii Cresotinas, Sodii Formas. Succini Ol., Sulphur, Trilactine, Ulmaren, Uricedin, Vanadates, Xanthoxylum.

Alcoolat de Fioraventi, Amysal, *Atropinæ Linim.*, *Bellad. Linim. and Linim. Co.*, *Belladonnæ Chloroformum and Tinct. Ætherea*, Belol, Camph. Co. *Linim.*, *Cuprici. Emp. and Linim.*, Chloral cum Cumphor., Caffein and Sodium Salicylate injected, Croton Oil Liniment, Eucalyptus Oil, Gautheria Oleum, *Glycopasta Arseni et Belladonnæ*, Iodine, Cocaine Solution and Chloroform Ionised, Lin. Menthol Comp., *Lithium Iodide Ionised*, *Mesoton*, Methysal Balm, Methyl Salicylate and Plaster and Ung., *Methylacetyl Salicyl.*, Nankelm Bath Salts, Oleogen preps., *Opil Linim.*, *Pini Sylvest. Oleum*, Potassii Lactas, Sal. Marlin-Artif., *Salic.*, *Sassafras Oil*, *Sporosal*, *Ulmaren*, Unguentum Iodi Intinctum, Ung. Acidi Salicylici.

Pyorrhœa, tonsillitis, and other forms of local sepsis often the initial lesion in Rheumatism and Gout. Removal of offending teeth often successful treatment. — *L. ii.*, 189, 1895.

Rheumatoid Arthritis.—Actæa, Arsenic, Aspirin, Colchicum, Ferri Iodid., Ferri Iod. Sacch. Formates, Guaiacol Carbonate, Lithii Carb. and Citras., *Lithii Iodid.*, Morrhuæ Ol., Potass. Bromid. and Iodid., Quinine Salicylas, Thyroid preparations.

Ac. Formic Injections, *Radiant Heat*, *Sulphides (baths of)*, 'X' Rays. Blister applied to the spine, v.p. 215.

Rhinitis Atrophic.—Zinc Sulphanilas packing. Also Zinc Ions.

Rhinitis.—See Catarrh, Nasal.

Rickets.—Acid. Phosph. Dil., Adrenalin, Lecithin Emulsion, Calcii et Ferri Phosph. Pil., Calcii Hypophosph. Syrup., Calcis, Liq. Sacch., Calcii Chlorid., Lactas, Phosph., Lactophosph., Syr. and cum Ferro, Capsulæ Cruoris, Cinchona preps., *Cupri Arsenis*, Emulsio. Ol. Morrhuæ cum Glycerophosph., Ferratin, Ferri Phosph. Syr. and Comp., Ferri Iodidum, Ferri Vinum, Fooda A, B, and C, Glycerophosphates, *Glycerol Glycerophosphatum cum Medulla Rubra*, Liq. Ferri Hypophosph. Comp., *Liq. Iodo-Ferro-Mang. Pept.*, Malt Ext. c. *Hypophosph.*, c. *Hæmoglobin*, c. *Pancratin*, etc., *Multoloin*, Marrubin (and Comp.), Morrhuæ Ol., Ol. Morrhuæ Phosphoratum, Phosphorus, Plasmon, Pulv. Calc. Glyceroph. et Lact. Exalce, *Russian Hemp Seed*, Sanatogen, Somatose, Sodii Phosphas, Thymus Gland, Trilactine, Saccharated Wheat Phosphates, Zinc Phosphide.

Ringworm.—See Tinea.

Rodent Ulcer. (Calcii Permang. internally) (*Local use.*)—Carbonic Snow. Radium Rays, "X" Rays, Zinc Ions.

Saint Vitus's Dance.—See Chorea.

Saliva, to promote.—Ether, Ginger, Horseradish, Iodides, Jaborandi, Mercurials, Most Emetics, Mustard, Pelletierine, Pepper, Physostigma, *Pyrethrum Glyco-gelatin* (*Pastils of*), Tab. Formalin, Tobacco.

Saliva, to check excessive.—Acid. Hydroch. Dil. Atropine and Belladonna, Chlorates, Coto, PicROTOXIN.

Acid. Boric., Alumen, Borax, Chlorates, Creosoti Vapor, Lysoform.

Sarcinæ.—Acid. Sulphuros., Betanaphthol, *Bisciniod*, Calcii Chlorid., Salol, Sodii Hyposulphitis, Sodii Metabsulphitis, Sodii Salicylas, Sodii Sulphis.

Lavage.

Scabies.—Acid. Oxy-Naphthoic, Calcis. Sulphurat. Lotio, Cyllin, Epicarin, *Hydrarg. Perchlorid. Ung.*, Lotio Boeck, Lotio Picis-Benzol-Aceton, Liq. Carbonis Detergens, *Lysoform*, Naphthalin Ung., Naphthol Ung., Peru Balsam, Pigmentum Thymol, Potass. Sulphurat. Balnea, Stryacis Ung., Sulphur Ung., Sapo Viridis, Ung. Resorcin Co. Ung. Rusci Co., Ung. Thorii Oleat.

Special article on Itch.—L.ii/08,92.

Scalds.—See Burns.

Scarlatina.—Acid. Salicylic., Aconite, Ammon. Carb., Antidiphtheritic Serum, Antistreptococcic Serum, Belladonna, Eucalypti Tinctura, Formalin Spray, Ozonic Ether, Potassii or Sodii Chloras, Procyonase.

(For sore throat in) *Compress of Salicylic Acid 2% in Alcoholic Solution.*

Scar Tissue.—To relax and remove. From gullet, stomach, also uterine adhesions.—Thiosinamin, Inj. Thiosinamin et Antipyrin, Fibrolysin.

Sciatica.—Acetanilide, Acetopyrin, Actæa and Cimicifugin, Agathin, Agurin, Alphol, Alum Aceto-Tartras, Aspirin, *Bisciniod*, Codein Sulphas., Colchicum and Colchicin, Conf. Guaiaci Comp., Ellx. Ac. Salicyl. Co., Ether Injection, Glycero-phosphates, *Ibogaïne*, Lithii Citras, Methylene Blue, Morphine inj. hypod., Phenazone, Piperazine, *Piperazine Glycero-phosphates*, Potass. Iodid., Pyraum, Quinine Salicyl., Salol, Saloquinine, Sodii Salicylas, Strychnine, Terebinthinæ Ol., Theobromine-Sodium Formate, Theophylline Sodium Acetate, Trilactine, Tylmarin, Uricedin.

Tropacocaine Injection (q.v.) and stretching the nerves.

Aconitinæ Ung., Amysal, Bellad. Linim., Chloroform Linim., Cocaine Ionisation, Ether Spray, Ether injection, Iohydrin, Menthol, Menthol cum Camphora, Menthol Linim., Methyl Chloridum, Methysal Balm, Ol. Betulae, Oleogen Camphor, Oleogen Guaiacol, Oleogen Salicyl., Radiant Heat, Radium, Veratrinæ Ung., 'X' Rays.—Salicylic Ionisation (L.ii/08,1299).

Scrofula.—Barii Chlorid., Bismuth and Zinc Iodates, Calcii Chlorid., Calcii Hypophosphis, Calcii Phosph., Calcii Sulphid., Calciol, *Extract. Malti cum Iodinol*, Ferratin, Ferri et Calcii Phosph. Pil., Ferri Iodid. Syr., Ferri Phosph., *Hydrarg. Iodid. Virid.*, Iodoform., Iodum., Maltolivin, Marrubin and comps., *Morrhue Ol.*, *Morrhue Ol. Emuls.*, *Ol. Olivæ c. Acid Oleic.*, *Phosphor Iodipin*, Potassa Sulphurata, Quinine, preps., Sodii Phosphas, Solveol, Stillinga, *Syrup. Iodo-Tannic.*, *Syrupus and Vinum Tann-Iodo-phosph.*, Trilactine.

Scurvy.—Arsenic and Iron, Calc. Lact., Lime or Lemon Juice, Phosphorus, Potass. Chloras and Citras, Sassafras, Sodii Carbonas, Sodii Citras, Sodii Lact.

Sea-Sickness.—Acid. Hydrobromic., Antipyrine, Amyl Nitris, *Atropine Drops in one eye*, Bisedia, *Bon Voyage*, Brometone, Chloralamide, Chloretone, Chloral Hydras, Chlorobrom, Chloroform and Tinet. Co., Chlorof Perles or Caps. Cocainæ Hydrochlorid., Cocaine tablets and solutions, Eucalypti Troch., Hyoscine, Hyoscyami ia, Iodi Tinet., Morphine inj. hypod., Nitroglycerin Tablets ($\frac{3}{16}$ gr.), Oxorexine Tannate, Phenazone. Potass. Bromid., Sedeff, Sodii Bromid., Sodii Nitris, Veronal and Veronal Sodium.

Counter-irritants to stomach, Ice-bags to the spine.

Seborrhœa.—Locally—*Lysoform Ointment*, Resorcin Lotion and Ointment, Sulphur and Salicylic Acid Ointments, Thigenol, *Thorii Oleat. Ung.*

Septicæmia and Pyæmia.—Acid. Salicylic, AntiStreptococcic Serum and Vaccine, *Antistaphylococcic Vaccine*, Eucalyptus Globulus, Ferri Perchlor., Fæxin, Nuclein, Quinine preps., Resorcin, Salicin, Sulphites, Saline Injection.

Shingles.—See Herpes Zoster.

Shock, Surgical.—Adrenalin, Brandy hypodermically, Ergot, Ether, Morphine, Pituitary Extract, Saline transfusion, Supra-renal Extract, Strychnine

Sickness.—See Vomiting.

Skin Diseases.—See **Eczema, Psoriasis, &c.**

Skin Irritation. (*Local use.*)—Acid. Hydrocyan. Dil., Bran bath, Cod Liver Oil with Huile de Cade as pigment, Corrosive Sublimate lotion, Sodii Carb., Zinc Cream. See also **Eczema.**

Sleeping Sickness.—See **Trypanosomiasis.**

Sleeplessness.—See **Insomnia.**

Smell, Loss of Sense of.—Borated Hydrogen Peroxide has led to regained sense of smell.

Smoking Habit, Excessive.—Wash the mouth out with Silver Nitrate, 1 in 250.—M.P. March 6, 1907, p. 621. Anti-smoking Gum. Lysoform Pastils, Menthol and Eucalyptus Pastils.

Snake-bite.—Alcohol and Ammonia, *Blepharis Capensis*, Calmette's Anti-Venomous Serum, Potass. Permang., Strychnine inject. hypod., Calcil Chlorid., injection and internally, Tinct. Ammon. Comp., *Mistura Oleo Balsamica.*

Arnica Tinct., *Blepharis Capensis*, *Chloroform*, *Chloral cum Camphora*, *Cocaine Hydroch.*, *Liquor*, Hydrogen Peroxide.

Spray the part with Ethyl Chloride, whilst making incisions and rubbing in Potass. Permang.—L. i./07, 1151. See also p. 448.

Sneezing, Chronic.—Several methods of treatment.—B.M.J. i./07, 724.

Spasm.—Aconite, Æther, Ammon. Arom. Spt., Amyl Nitris, Atropine inj. hypod., Cajuput. Ol., Camphora, and Camphor. Spt. Fort., Chloroform, and inhaled, Chloromorphiæ Liq., Couina, Erythrol Nitrate Tablets, Ext. Grindelii Liq. (of larynx), Mannitol Nitrate Tablets, Menth. Pip. Ol., *Mistura Ætheris cum Ammonia*, Opium, *Piscidia.*

Speech Fright.—See **Stage Fright**, also **Nervousness.**

Spermatorrhœa.—See **Incontinence of Semen.**

Spina Bifida.—Iodine Liniment, Iodo-Glycerin injection.

Sprains.—*Arnica*, Fomentations (hot) of Poppy-head or Belladonna, or cold with vinegar, or spirit lotions, Lead and Opium Lotion, *Lotio Ammonii Chloridi.* When chronic, Liniments of Belladonna, Chloroform, Camph. Co., *Lin. Tereb. Acet.*, Radiant Heat, 'X' Rays.

Spring Catarrh.—See **Catarrh, Nasal**, and **Hay Fever.**

Sprue.—Castor Oil, Cyllin, Koumiss, Milk diet, Pepsin, Santonin, *Ipecacuanba sine Emetina.*—Trilactine Milk. Locally—Lysoform.

Stage Fright.—Cannabis with Laudanum. Gelsemium (*q.v.*), Laudanum, Opium Pills, Opium with strong coffee (Morell Mackenzie) also with Sal Volatile and Camphor Water. Three deep inspirations valuable.—B.M.J. i./09, 1379, 1456, 1499, 1510, 1573; ii./09, 40, 50, 178, 404, 420. Valolid Camphorate.

Sterility.—Certain Mineral Waters are advocated, *e.g.*, *Eaux Bonnes*, *Franzensbad* and *Schinznach.*

Stings.—See **Bites.**

Stomach Dilatation.—Sodium Phosphate as nervine tonic—as antiseptics where fermentation to overcome.—Bismuth Salicylate, Salol, Betol, Naphthol, Benzonnaphthol. Aperient effervescent preparations or mineral waters. Trilactine Milk.

Stomatitis.—Eucalypti Globuli Tinct., Hydrastis, Laudanum, Potassii Chloras, Sodii Bisulphur, Sodii Chloras.

Acid. Boric., *Acid. Carbolic*, *Acid. Picric* as paste (stomatitis mercurialis). *Acid. Salicylic*, *Acid. Sulphuric*, *Alumen*, *Borax*, *Glyc.* and *Mel.*, *Calcis Aqua*, *Collutoria* (see Index), *Cupri Sulph.*, *Hydrogen Peroxide*, *Liq. Alum.* *Aceto Tart.* as Mouth-wash frequently, *Lysoform Mouth Wash*, *Myrrhæ et Boracis Tinct.*, Salol Mouth Wash or stronger as paste to brush the parts; *Sodii Chloras.*—See **Pastils.**

Stenosis of Pylorus, Urethra, &c.—Cicatricine, Fibrolysin.

Strictures.—Cicatricine, Fibrolysin.

Styes.—Copper Point or Copper Sulphate Solution.

Styptics.—See **Hæmorrhage.**

Sunburn.—See **Freckles.**

Sunstroke.—Ammon. Carb., Apomorphina, Atropine inj. hypod., Digitalis, Ergot, Hyoscina, Morphine inj. hypod., Quinine, Veratrum.

Purgative enemata, *Sinapis Emplastrum.*

Sweats.—See **Night Sweats.**

Sweating feet.—Formalin, Lysoform Pulv. Salicyl. cum Talco.

Sycosis. (*Local use.*)—*Ichthyol*, *Liq. Hydrarg.* *Perchlor.*, Hydrog. Perox. (1 to

2 vol.), *Sulphur*, Ung. Cupri Oleat 10%, Ung. Hyd. Ammon., Ung. Hydrarg. Nit., Ung. Hydrarg. Sulph. Flav., Ung. Thorii Oleat, 'X' Rays.

Synovitis.—Static Electricity.

Syphilis, Constitutional.—Ammon. Iodid., Antim Sodii Tart. *Arsamin*, *Neisser's Method*, q.v. Auri Chloridum, Barii Chloridum, Calc. Iodo. kicinoleat. Condurango, Ferri Iodid. Syrup, *Glycogen Iodi*, *Tiodine*, Hydrarg. cum Cretâ, Hydrarg. Cyanid. Pil., Hydrarg. et Potass. Iodid., Hydrarg. Gallas, Hydrarg. Iodid. Rub., Hydrarg. Iodid. Viride, Hyd. Benzoas, Bromid. with Sod. Bromid., Hydrarg. Oleo-brassidas, Hydrarg. Peptonas, Perchlorid., Hydrarg. Pil., Hydrarg. Salicylas, Hydrarg. Subchlorid., Succinimidum and Thymolacetates, Tannas, Hydriodol, Injectio Hydrarg. Intramuscularis, Iodalbumin, Iodalbumin, Iodinol, Iodum, *Jacaranda Ext. Liq.*, Mist. Quin. c. Ferro, Mercuriol, Phytolacca, Potass. Iodid., Pil. Quin. Hydrarg. et. Opii, Quinine Hydrochlor, Quinine Nucleinas, Quinine Periodide, Rubidii Iodid., *Salicin*, Sarsaparilla preps., e.g., Zittmann's Decoction, Sodii Iodid., Stillingia, Strontii Iodidum, Succus alterans, Syrupus Acidi Hydriodici.

(See opening pages of Hydrarg. Chapter for latest *Hypodermic* and *Intravenous* treatments).

Atoxyl Paste, *Hydrargyri Lanolinum*, Hydrarg. Oleat. and cum Morphind Hydrarg. Ung., Iontophoresis of Potassium Iodide, and of Lithium Iodide Solutions. Ung. Prophylaxis (capsules of) Metchnikoff Li/c6, 1629.

Arsenic in, see Beddoes 106 *et seq.*; also Anæmia of syphilitic women, treatment of, Beddoes 147.

The "TREATMENT OF VENEREAL DISEASE AND SCABIES IN THE ARMY," First Report, 1904 (Eyre & Spottiswoode), gives a useful summary of the whole matter. With regard to Syphilis it is stated the mercury enters the blood on intramuscular injection as metallic mercury in a fine state of subdivision and not as formerly stated in the form of an albuminate. Mercury tends to accumulate in the body, especially in the liver and kidneys. The pros and cons of administering mercury by the mouth, by inunction and by injection are discussed. Hutchinson recommends Hyd. c. Cret. 1 grain in pill every 2, 3, 4 or 6 hours, according to the case. If diarrhœa supervene he adds Pulv. Doveri 1 grain to each pill.

It is stated *Mercury Binioidide* in 2% solution with 2% Sodium Iodide, dose 1 cc., (=0.02 Gm. Mercuric Iodide) is the least painful and in general the best soluble salt for injection. Of insoluble preparations; Calomel is the most effective, but always very painful. The green iodide (Mercurous Iodide) in 10% suspension in Vaseline Oil, dose—1 cc.=0.01 Gm. was stated to give excellent results.

In "Mercurial Stasis" Mercury ceases to be absorbed, involving great risk to the patient. "In some patients mercury by the mouth does not seem to be absorbed at all. Great probability of producing serious disturbance of the alimentary tract."

The Second Report (Dec. 1904) contains evidence of experts. It is obviously impossible to condense these opinions. Should certainly be referred to by those requiring detailed information.

Third Report (undated). Major Pollock reports on methods of treatment in foreign hospitals. Here again space prevents us from detailing methods in vogue, most of which are dealt with, however, in our "Hydargyrum," chap. q.v.

Final Report (undated). *Commencement of Treatment.*—Presence of syphilis must be absolutely ascertained before mercury is begun. *Method of giving.*—More or less continuous course by the mouth for 1½ to 2 years. Inunction and injection more likely to prove efficient for the Army. *Precautions.*—Weight, urine (albumen), mouth, and gums to be watched. *For Inunctions.*—Ung. Hydrarg. 4 gr., Adeps Lanæ 20 gr., to be used on each occasion, daily, for 20 to 30 minutes, the course being 42 more or less. Plan of 2 years' treatment is given:—1st and 2nd Course 42, then 3 months' interval after each. 3rd and 4th Course 30, then 6 months' interval. 5th Course, 20. *Soluble injection.*—Hyd. Perchlor. 8 grains, Sodium Chloride 4 grains, Water 400 minims. 10 minim doses. *Insoluble Injection.*—The Injectio Hydrargyri Intramusc. 10%, *vide* our p. 360, is to be the standard preparation.

Syphilis, Skin Diseases.—Euphen, Hydrarg. Ammon. Ung., Hydrarg. Emplast., Hydrarg. Nit. Ung., Hydrarg. Oleat., Hydrarg. Perchlorid. Ung., Hydrarg. Subchlorid. Fumigation and Ung., Hydrarg. Ung., Iodoformi Gossypium and Ung., Iodates, Iodinol, Resorcin, Thiol.

Syphilitic Sore Throat.—Alum Garg., Borax Garg. and Mel Boracis. Chlorine or Sodii Chloras Garg. and Troch., Hydrarg. Cyanid. Garg., Hydrarg.

Perchlorid. Garg. and Pastil., Insufflatio Iodoformi Comp. and Pastil., Potass. Chlorat. Garg., Pastil. and Troch.

Syphilitic Ulcers. (*Local use.*)—*Acid. Chromic., Collod. Salicylic. c. Hydrarg. Perchlor., Iodo-thio-resorcin. Dusting powder of Calomel and Bismuth, Europhen, Hydrarg. Acid. Nit. Liq., Hydrarg. Flava and Nig. Lotio, Hydrarg. Iodas. Hydrarg. Naphthol, Hydrarg. Oleat. and cum Morphina, Hydrarg. Subchlorid., Iodoform, and Collodium cum Iodoformo Iodoform Wool, Iodoformi Ung., Iodol, Resorcin, Thio-resorcin Zinci Chlorid. Iodid. and Nitras. Internal Remedies, see Syphilis, Constitutional, also B.M.J. ii./06,138. (Calcii Iodidum.)*

Tabes Dorsalis.—See **Locomotor Ataxy.**

Tachycardia.—*Amyl Nitrite, Atropine, Cactus, Convallaria, Digitalin, Nitroglycerin, Sparteine, Strychnine.*—See also B.M.J.ii./04,109.

Tænia.—See **Worms.**

Tartar on Teeth to dissolve.—*Lotio Acidi Citrici et Phenolis.*

Tetanus.—*Acid. Carbolic. (Injection), Anæsthetics (to relax spasm), Antitoxin, Amyl Nitris, Bromides, Cannabis, Chloral Hydras, Chloretote Enema, Conine Hydrobromid., Curara, Eucaine Lactate, Gelsemium, Hydrarg. Perchlor (B.M.J. ii. 06,77), Hydrogen Peroxide, Intracerebral injections, Liquor Arsenicalis, Magnesium Sulphate or Sodium Chloride injections, Morphine, Opium, Pelletierine, Phenol inj. hyp., Physostigmine, Pilocarpine, Strophanthus, Urethane, Hydrogen Peroxide (to wash wound).*

Thirst, to Relieve.—*Acid. Citric., Acid Drops, Acid. Phosph. Dil., Acid. Sulph. Aromat., Acid. Tartaric., Ammonium Iodide, Coca, Cyperi Rad., Dec. Hordei Tartariz, Elixir Acid., Formalin Tablets (Internal), Haustus Imperialis, Mucin, Pot. Chlor. Tablets, Pot. Cit., Potass., Tart. Acidus, Spondias Mongifera.*

Throat, Inflammation of, and Tonsillitis.—*Acid. Salicylic, Aconiti Tinct. and Pastil, Ammon. Brom. Antimony, Antipyrine, Belladonna, Cyperi Caps. or Mlat., Ferri Salicylas, Formalin Tablets (Internal), Guaiacol, Jephson's powder, Lichenoids, Liq. Ferri Perchlor, Quinine Salicylas, Salicylates, Sodii Benzoas, Sodii Bicarb., Solubes (various), see Index. Tab. Formalin (to suck).*

Adren-ol, Benzoin. Tinct. Vapor, Chlorates in Troch., Cocaine (Pigment of), Formalin Pigment, Guaiaci Trochisci, Iodi Vapor, Monsel's Solution, Sodii Perboras, Thymaglycine, Juniperi Ol. Vapor.

Anti-Meningococcic Serum, Pyocyanase.

Throat, Relaxed Sore.—(*Local use.*)

Acid. Carbolic. Pastil., Acid. Tannic Garg. and Glycerin., Atumen and Glyc. Aluminis, Alum Aceto-Tart. Liq. and Alum Format. Liquor, Ammonii Chloridi Vapor, Argent. Nit., Benzoin. Tinct. Vapor, Bismuth. Pastil., Catechu Insuffl., Eucalyptus Gum Insuffl., Ferri Perchlorid. Pigment. Ferro-Alumen, Geranium Ext. in gargle or pastil, Guaiaci Troch., Hydrastis Tinct. and Rhus Tinct. or as gargle, Lichenoids, Pini Sylvest. Vapor, Uranii Nitras, Solubes (various), see Index.

Thrush.—See **Aphthæ.**

Tinea Favosa and Sycosis. (*Local use.*)—*Acid. Carbolic. Glycerin, Acid Sulphuros, Anacardium, Croton Oil (Alder, Smith), Chrysarobinum, Cupri Oleat. Ung., Formaldehyde, Hydrarg. Oleat. Hydrarg. Iodas, Hydrarg. Perchlorid, Lotio. Iodi Linim, Lanoline, Nicotinæ Salicylas, Petroleum of Commerce, B.M.J. i./09, 1297, Picrotoxin Pigment, Pyrogallol, Resorcin, Sodii Chlorid Ung., Cutaneous phoresis of Copper Sulphate, Sodii Hyposulphitis Lotio, 'X' Rays. Copper Ionised.*

Tinea Tarsi.—See **Ophthalmia Tarsi.**

Tinea Tonsurans and Circinata. (*Locally.*)—As for **T. Favosa** and—*Anacardii Oleum, Anthrarobin, Cantharid. Pigment, Chrysarobin. Coster's Paste, Cupri Oleas, Formaldehyde, Hyd. Oleat. Ung., Hydrarg. Nit. Acid. Ung., Hydro-naphthol Plaster, Iodi et Olei Picis Pigment., Iodized Phenol, Iohydrin, Izal, Iodoform, Pyrogallol, Sphagnol, Salicylic Acid, Sulphur, Ung., Hyd. Iodid. Rub., Ung. Potass. Sulphurat., Ung. Sulph. Naphthol, Salicylat, Ung. Thorii Oleat., 'X' Rays.*

Tinea Versicolor.—*Acid. Chrysophanic., Acid. Sulphuros., Borac. Glycerin., Formaldehyde, Gynocard. Ol., Lotio Culeti Sulphurati, Sodii Hyposulph. Lotio.*

Tinnitus Aurium.—*Bromipin, Oleogen Iodi, Pilococarpine Injection.*

Digitalis in the pulsating form (not Alcohol), Bromide (useful at bedtime and often gives great relief), hypnotics, sedatives, Thiosinamin (and Fibrolysin), Paraldehyde, Potass. Iodide (where associated with vertigo), Pilocarpine (in cases showing Menière's symptoms.—L. ii. 06,473.

Prolonged use of Phosphorus also Thiosinamin (hypod).

Toothache.—Acid. Hydrobromic, Atropine Methyl bromide with Aceto Salicylic Acid, Butyl-Chloral Hydras, Chlorotone, Delphinine, Gelsemina., Gelseminæ Hydroch., Gelsemii Tinctura, Morphinæ inj. hypod., Piscidiæ Ext. Fluid., Quin. Tinct., Ammon.

Acid. Arsenios., Acid. Carbolic. with Collodion, Butyl-Chloral cum Menthol, Caryophyll. Ol., Chloroform cum Camph., Chloroform cum Mastice, Cocaina, Cocaine-Menthol-Phenol, Creosotum, Eugenol, Iodi et Aconiti Tinct., Liq. Sodii Carbolatæ, Men'h. Pip. Ol., Opii Tinct., Pasta Arsenicalis, Potassii Permanganas, Pyrethri Tinct., Resina Carbolica, Sodii Peroxidum.

Tonics.—See Anæmia, Debility, Fevers, Rickets, etc.

Tonsillitis.—See Throat and Pharyngitis.

Toxæmia.—Alcohol (Brandy Steales) hypodermically, Ether, Purgatives, Diuretics, Jaborandi, Sal Volatile, Stimulants, Strychnine.

Trachoma.—Radium Rays—good results. Copper Sulphate (and Ionisation of), Silver Salts.

Trichinosis.—Ergota, Ergotin, Liquor Arsenicalis, Sclerotic Acid.

Trypanosomiasis and Tick Fever. (*Local use.*)—*Antitoxic Serum, Arsenic (Sodium Arsenate), Atozyl,* and combined with Hyd. Perchlor., Antimonii-Sodii Tartras, Arsacetin, *Arsenphenylglycin* and other organic arsenic compds., *q.v.*, Malachite Green, Methylene Blue, Trypanroth, Injectio Antimonii Oxidi and Antimonii Cinnamici, Elixir Antimonii.

Tuberculosis, Laryngeal.—See B.M.J. ii /5, 1188.—*Acid Lactic Spray or Pigment, Ac. Picric Inhalation, Borax, Borax and Opium Gargle, Boric Acid Insufflated, Cocaine (Lozenges and Spray), Iodoform, Iodol, Iodine Inhalation, Menth. 20% in Olive Oil, Morphine, Orthoform Insufflated, Pastils of Cubebs, Potassium Chlorate or Ipecac., Silver Nitrate Spray, Vapor Olei Pini Sylvestris.*

Tuberculosis.—See Phthisis.

Typhoid Fever.—Acetozone, Acid. Salicylic. and Salicylates, Ammon. Carb., Aristochin, Cinnamon Oil, Carbolic Acid, Cinchona Alkaloids, Eucalyptus Globulus, Hydrarg. Naphtholacetat, Subchlor. and Perchlor. Hydrogen Peroxide, Iodopyrin, Iodates, Kryogenin, Magnesi Salicylat, Mistura Chlori cum Quinina, Naphthalene, Naphthol (a.), Olive Oil, Quinine, Salol, Sodii Acid. Sulph. as water disinfectant, Sodii Chloras, Soda Chlorinata, Sodium Nucleinate Injection, Sulphurous Acid, Thallin, Thymol, Typhoid Vaccines, Tribromophenol, Trilactine Milk, Turpentine Oil, Zinc Sulphocarbonate, Guaiacol.—Notes on Treatment, see B.M.J. i. /5, 415.—Hæmorrhage, Intestinal from: Calcium Chloride, Crocq's Pill, Argenti Nitras, Ergot, Pil Plumbi Acetatis cum Opio.

Hydrarg. Perchlor. intravenously.

Ulcers.—*Acid. Boric. Lotio and Ung., Acid. Carbolic. Lotio and Ung., Acid Lactic, Acid. Salicylic. Adren-ol, Gossypium and Ung., Actol, Argent. Nit., Belladonna Glycerin., Bismuthi Oxyiodid., Borated Hydrogen Perox., Carbonis Cataplasma., Chartazine, Collodion, Cupri Acetas, Cupri Oleat. Ung., Eucalypti Ung., Eucalyptus Sawdust, Fermenti Cataplasma., Hamamelis, Horse Serum (Antilytic Serum), Hydrogen Peroxid., Iodates, Iodoform, Iodol, Izal, Linimentum Æruginis, Lysoform, Methysal Balm, Naphthalin, Orthoform, Oxygen, Unna's Paste, Paste Carbonis et Zinci, Plumbi Subacet. Glycerin. and Ung., Potass. Permang., Potassium Permanganate Pencils, Quinine Lygosinate, Resina Ung. and Res. Ung. cum Chlorof., Resorcin, Sal Alembroth gauze, Salol, Santas, Sanoform, Sodii Citras locally to soften, Toluol (locally) Trilactine, Ung. Pheno-Boric, Ung. Potass. Chlorat. et Zinci, Ung. Thorii Oleat., Zinci Chlorid., Zinci Oleat. Ung., Zinc Perhydrol, Zinci Sulph. Solube as Lotio.*

Calcii Chloridum (internally), 15 grs., *t.d.s.*—See B.M.J. ii. /5, 138.

Ulcer Gastric, Diagnosis. Vide Stomach Contents Examination.

Uræmia.—Aconite, Amyl Nitris, Apocynum Cannabinum, Atropine, Bromides, Caffeine, Digitalis, Elaterin. Pulv. Co., Erythrol Nitrate, Hydrarg. Subchlor., Jaborandi and Pilocarpine, Jalapæ Pulvis Co., Lithii Hippuras, Nitroglycerin, Saline Purgatives, Saline Solution, Scilla, Scoparii Succus, Sodii Benzoas, Thialion, Urosin, Veratrin, Strophanthus preps.

Uræmic Convulsions.—Bromides, Chloral (per os. or per rectum.—B.M.J. ii. /6, 1449), Chloroform, Jaborandi, Morphine, Saline Solution may prolong life. In the treatment of coma (i.) when blood pressure exceeds a certain point reduce by urgent means—venesection or catharsis, with compound jalap powder or elaterium; (ii.) with low blood pressure and rapid acting heart, digitalis.—B.M.J. ii. /6, 1449.

Urethritis.—Argent Nit. (0·02 to 0·1%) Irrigation or combined with Hydrogen Peroxide (1 to 2 volume), Glyc. Resorcin, Vanadic Acid Solution.

Uric Acid Diathesis.—See Gout, Rheumatism.

Urinary Calculi.—See Calculi.

Urine, Blood in.—Ammon. Chlor., Calc. Lactas; Iron Salts.

Urine, Incontinence of.—See Incontinence.

Urine, Tests for Albumin.—See page 860 *et seq.*

Urine, Tests for Sugar.—See page 875 *et seq.* For other urinary constituents see p. 858 *et seq.*, or consult Index.

Urticaria.—Antipyrine, Apis Mellificæ Tinct., Bromides, Calcii Lactas, Cream of Tartar, Magnesia Cream, Mistura Alba, Sodii Bicarb., Sulphur, Trilactine.

Acid. Benzoic. Lotio, Acid. Boric. Lotio, Acid. Carbolic Lotio, Acid. Hydrocyanic Dil. Lotio, Bromocoll, Chloroform. Ung., Cocainæ Ceratum, Plumbi cum Lacte Lotio, Sodii Carb. Balnea, Zinc and Starch Powder.

Uterus, Catarrh of.—See Catarrh, Uterine.

Uterus, To cause Contraction of.—Borax, Caulophyllin, Cimicifuga, Cornutine, Ergota, Ergotin, Ergotinine, Ergotoxine, Ernutine, Gossypii Rad. Cortex., Hamamelis, Hydrastis, Sclerotic Acid, Tyramine, Ustilago Maidis.

Uvula, Relaxed.—Gargles of Alum, Capsicum Tinct., Catechu, Ferri Chloride, Kino, Pigment of Glycerol of Tannin, Potass. Chloras, Rhatany, Kino or Tannin Lozenges, Zinc Sulphate or Zinc Chloride Gargle and Pigment.

Vasodilators.—Amyl Nitrite, Benzoates, Cinnamates, Coumarates, Erythrol Nitrate, Hippurates, Mannitol Nitrate, Nitroglycerin, Thyroid Extract

Variola, To prevent pitting.—Acid. Boric. Ung., Acid. Carbolic Ol., Amyli. Glyc., Argent Nit., Calcis Linim., Collodium, Finsen Red Light, Hydrarg. Ung., Phenol pure, Styptic Colloid., Zinci Oleat. Ung.

Venereal Diseases.—See Syphilis, Gonorrhœa, Chancroid.

Vertigo.—Acid. Hydrobromic, Ammon. Spt. Arom., Auri Bromid., Caffeine, Guarana, Quinina Valerian., Strychnine, Zinci Valerianas.

Treatment of auditory vertigo L. i./10,355.

Voice, Loss of.—Cocaine, Potass Chlorate and Borax, Rhatany, Cod Liver Oil Emulsion, Soluble Borax Co. or Soluble Potass., Permang. or Soluble Phenol, dissolved as Gargle, Lysoform Pastils Menthol, Tabellæ, Lichenoids, Ozonic Inhaler, Throat Pastilli (Glycogelatin, *q.v.*). Tab. Formalin (to suck).

Vomiting.—Acetanilide, Allium Juice, Arsenic, Acid. Carbolic, Acid. Hydrocyanic. Dil., Ammon. Bromid., Beef Essence (Brand's), Bisedia, Bismuth Preps., Calcii Chlorid. Calcis Aqua, Cerium Salts, Chloral, Chloroform preps., Coca and Cocaina, Elixir Gentianæ Acidum, Hydrag. Perox. Inguvin, Iodi Tinct., Liquor Sodæ Effervescens, Magnes. Carb. Liq. Morphine inj. hypod., Nitroglycerin, Nux Vomica, Potass. Bicarb. cum Acid. Citric. Mist. Efferves., Sedaff, Sodii Phosph. Effervescens., Stovaine, Vin. Ipecacuanhæ in minim doses, Normal Saline per rectum.—B.M.J. i./05,1350. Of infancy, Sodium Bicarbonate; of Pregnancy, see Pregnancy.

Vomiting Post-Operative.—Alypin, Chloretone, Cocaine subcutaneously. See also Vomiting if patient able to take internally.

Warts and Corns.—Lime Water internally. Acid. Acetic Glaciale, Acid Carbolic., Carbonic Acid Snow, Acid. Chromic., Acid Nit., Acid Picric, Acid. Trichloroacetic, Anacardium, Collodium Cullosum, Collodium Salicylicum, Collodium Salicylicum c. Acid. Lactic, Formalin, Hydrarg. Nitras, Iodi Linim., Papayotin, Paraform Collodium, Potassæ Liquor, Radium, Liquor Sodii Ethylatis, Thuja, Magnesium also Zinc Ions.

Water, Purification.—See Antityphoid Tablets, Copper, Iodine, Potassium Iodate, Silver Fluoride, Sodium Persulphate.

Whitlow.—Hydrog. Perox.

Whites.—See Leucorrhœa.

Whooping-Cough.—Acid. Benzoic. and Benzoates, Acid. Carbolic, Acid. Hydrocyanic Dil., Alumen, Amyl Nitris, Antipyrine, Antitusin, Apomorphinæ Hydrochlorid. (minute doses), Atropine, Atropine Methyl Bromide, Auri et Sodii Chlor., Belladonna, Benzol, Bromides, Bromoform, Bryonia, Calcis Aqua, Camphor Elixir, Camphora Monobrom., Cannabis, Chloral, Cocaine HCl. (Has been advised on the basis of one grain thrice daily for an adult), Codeine Jelly, Conium, Ergot, Fluoroform, Gelsemium, Glycaphorm, Grindelia, Ipecac., Koumiss, Lobelia, Morphine preps., Ol. Succint, Oxygen inhalation, Ozonic Ether, Orthoform (new), Pertussin, Phenacetin, Phenazonum, Potass Bromid., considerable doses combined with Chloral Enemata, Quinine, Rubidium-Ammonium Bromide,

Senega, Sodii Benzoas, Stramonium, *Syrup Thymi*, and Ext. Liq., Tab. Formalin (to suck), Zinci Oxid. and Sulphas.

Inhalation of Acid. Fluoric., Ethyl Iodide from glass capsule, *Formalin* or *Naphthalene*, or *Pyridine*, *Carbon Dioxide per rectum*, *Himrod's Cure*, *Hyoscyamus*, *Pigmentum Cocaine et Hydrarg.* Perchlor. *Succini Ol. as, Liniment*, *Vapor Coninæ*. *Fumigate room with Sulphurous Acid*, *Resorcin as Nebula*, Vapor and Liniment Terebeni.

For discussion on whooping cough *vide* L. i./09,35.

Worms (Intestinal):—

Ascarides (Threadworms).—Acid Carbolie 2 grains $\frac{1}{2}$ hour *ante cib.* and Ung. Hyd. to rectum for a few nights.—B.M.J. i./07,356. Aloes Vinum with Salt Enemata, *Chenopodium*, *Enemas of Vinegar or of Aloes*, *Sodium Chloride*, *Salicylic Acid*, *Thymol or Quassia*, also *Sansiviera* Ext. Liq. internally.

Lumbrici (Round Worms).—*Anacardium*, *Areca*, *Cambogia*, *Calomel*, *Chenopodium*, *Azedarach*, *Jalap*, *Naphthalene*, *Santonin* (with garlic draught), *Santoninoxim*, *Scammony*, *Spigelia*, *Sansiviera*, *Conf. Santonin Comp.*, Turpentine.

Tenia (Tapeworm).—*Areca*, *Calomel*, *Couso*, *Embelia Ribes*, *Filicic Acid*, *Filix Mas*, *Kamala*, *Mucuna*, *Pelletierine*, *Pepo*, *Thymol*, *Terebene*, *Tapeworm*. Recent ref.—L. i./10 386.

Many of these drugs may be prescribed in Stearpills, Stearettes, or *Formagules*, *q.v.*

Wounds.—Soluble Glass, Collodions, *Celloidin Solution*, Formalised Gelatin, Zinc Ions. See also **Antiseptics**. *Mercuric Chloride* or *Binioidide Lotion e.g.* from a 'Solube' 1 in 2000.

Zoster.—See **Herpes**.

POISONS AND ANTIDOTES.

This comprehensive list of Poisons and their Antidotes briefly outlined (the majority being more fully described in the text) will it is hoped be an aid to the practitioner, when suddenly called to a case of poisoning, in assisting him to determine: (1.) The poison, if unknown, by taking the possibilities of the case into account. (2.) The appropriate immediate antidotal treatment.

Acetanilide.—*Inhalation of Ether and Oxygen;—stimulants, e.g., Strychnine.*

Acetylene.—*As Carbon Monoxide.*

Acid Carbolic.—*Apomorphine, Egg White, Oil (vide text)—Iodine, within limits give same quantity of Tincture of Iodine as of Liquid Phenol taken, Saline transfusion.*

Acid Hydrochlor.—*Alkalis, Chalk, Carron Oil.*

Acid Nitric.—*As Acid Hydrochlor.*

Acid Oxalic.—*Apomorphine, Saccharated Lime Solution, Castor Oil.*

Acid Phosphoric.—*As Acid Hydrochlor.*

Acid Hydrocyanic.—*Stimulants, Ammonia, Sal Volatile ad lib. If patient cannot swallow, give brandy as enema or hypodermically. Alternate with cold douches, artificial respiration, Atropine hypodermically.—Murrell Adrenalin delays absorption of, c.f. Potassium Cyanide, but is by no means a complete antidote.*

Acid Sulphuric.—*Magnesia and c.f. Acid Hydrochloric.*

Aconite.—*Apomorphine, Stimulants, Amyl Nitrite, Digitalis. Adrenalin delays absorption see Potassium Cyanide.*

Æthyl Chlorid.—*Weak Ammonia Vapour. Hot fannels to heart.*

Alcohol Methylic.—*Brandy, Strychnine, Coffee (rectal injections if acute).*

Alkalis Caustic.—*See Potash Caustic and Ammonia.—Amylum Iodatum.*

Alkaloids.—*Amylum Iodatum.*

Ammonia.—*Vinegar well diluted, Lemon or Orange Juice, Acetic Acid, Amylum Iodatum, Tracheotomy may be necessary. Bronchitis kettle, Morphine.*

Anilin.—*Emetics, artificial respiration, fresh air, oxygen, bleeding or transfusion.*

Antifebrin.—*See Acetanilide.*

Antimony Compounds.—*Stomach tube (but not for Caustic Compounds, e.g., Bister of Antimony) emetics, Tannin or tea, Stimulants.*

Antipyrin.—*See Phenazone.*

Aqua Fortis.—*As Acid. Hydrochlor., q.v.*

Arsenic.—*Antidotum Arsenici.*

Atropine.—*Emetics, stimulants with Morphine or Pilocarpine. Adrenalin delays absorption.—See Potassium Cyanide.*

Battery Fluids.—*See Acid Sulphuric.*

Battley's Solution.—*See Morphine.*

Barium Chloride.—*Sodium Sulphate.*

Belladonna.—*See Atropine.*

Biniiodide of Mercury.—*e.g., in Antiseptic Tablets taken in error.—See Hydrargyri Potasii Iodidum.*

Blistering Fluids.—*As Cantharides.*

Butter of Antimony.—*Vide Antimony.*

Butyl-Chloral Hydrate.—*Emetics, Caffeine, Coffee, Atropine.*

Caffeine.—*Stomach tube, Emetics, Nitroglycerin, Apomorphine.*

Calabar Bean.—*See Physostigma.*

Camphor (and Camphorated Oil).—*Caffeine injection.*

Cannabis.—*Stomach tube, Emetics, Stimulants, Artificial respiration.*

Cantharis.—*Stomach tube, Emetics, White of Egg—no fat.*

Carbolic Acid.—*See Acid Carbolic.*

Carbon Monoxide and Dioxide.—*Artificial respiration, Oxygen, Stimulants.*

Chloral and Chloralamide.—*Keep patient awake. Strong Ammonia to nostrils, stomach tube or emetics followed by Amyl Nitrite, Coffee, Oxygen, Picrotoxin, Strychnine.*

Chlorine.—*As Carbon Monoxide.*

Chlorodyne.—*As Morphine, q.v.*

Chloroform.—*Amyl Nitrite, Artificial respiration—see R.D.H. directions.*

Coal Gas.—*As Carbon Monoxide.*

Cocaine.—*Amyl Nitrite, Ether hypodermically (5 minims).*

Codeine.—*As Morphine, q.v.*

Colchicum.—*Evacuate the stomach, Demulcents, White of Egg, Stimulants.*

Colocynth.—*Spirit of Camphor, Laudanum, Stimulants.*

Conium.—*Stomach tube, Emetics, Tannin, Stimulants and Artificial respiration.*

Copper Salts.—*Stomach tube, Emetic, White of Egg, Milk, hot fomentations to stomach. (For quantities of fatal doses of Chloride and Sulphate see text.)*

Corrosive Sublimate.—*See Hydrargyrum.*

Creosote.—*As Acid Carbolic, q.v.*

Curare.—*Artificial respiration, Stimulants freely—see text.*

Cyanides.—*See Acid Hydrocyanic and Potass Cyanide.*

Digitalis.—*Emetics, Tannin, Camphor, Nitroglycerin, recumbent position.*

Dover's Powder.—*As Morphine, q.v.*

Emetics.—*Ipecacuanha in powder or wine. Emetine, Apomorphine (hypodermically), strong Salt solution (tepid), Olive oil, Copper sulphate (2 grains), Tartar Emetic, Mustard and Water.*

Ergot.—*Stomach Tube, Emetics, Purgation with Castor Oil or 'Epsom Salts,' Tannin, Stimulants, e.g., Amyl Nitrite, Nitroglycerin $\frac{1}{10}$ gr. Patient to lie down.*

Exalgin.—*As Acetanilide.*

Foxglove.—*See Digitalis.*

Fungi.—*A large proportion of deaths are due to Amanita phalloides, which peels like a common mushroom, but has bulbous part at base of stem, also yellowish green colour at edges and white gills; it grows beneath trees; the poison is a toxalbumin.—Phallin, not an alkaloid. Ford believes the substance (which has hæmolytic action) is a glucoside.—B.M.J. ii./06,1540. Stomach pump and Emetics, Castor Oil, Atropine and Belladonna, Brandy, Spirit of Chloroform, Sal Volatile, Morphine for the pain, and administer normal Saline. Potassium Permanganate has been suggested to decompose any Phallin left in the stomach.—B.M.J. ii./05,541.*

Ipecacuanha is best emetic (25 grains). On no account give Tartar Emetic where there is contraction of jaw muscles, or in the case of children. Apomorphine $\frac{1}{4}$ gr. (or $\frac{1}{10}$ grain or less for child) may be preferable.

Promote free vomiting by strong tepid salt solution. Any purgative (not senna or jalap).

If delirium and convulsions set in ether or chloral may be necessary (the latter may also be given in Enemata. Finally for abdominal pain Morphine or opium, but always begin with an emetic.—M.P. Oct. 13/09,398.

Gases.—*See Gas in question.*

Gelsemium.—*Emetics, Atropine or Strychnine hypodermically, also Nitroglycerin or Amyl Nitrite; Artificial respiration, Stimulants.*

Hydrargyrum (Mercurial Salts).—*Emetics, Apomorphine, White of one Egg for every 4 grs. of Perchloride (avoid excess). Reduced Iron, Alcohol or Ether for collapse. (Carron Oil made with Cod Liver Oil was given on one occasion where 43½ grains had been taken.)*

Hydrarg. Potass. Iodide (Biniodide Antiseptic Tablets taken in error).—*Olive Oil, Milk, White of Egg, Petroleum Emulsion, warm draughts.—See text.*

Hyoscyamus.—*Vide Atropine.*

Hypnotics.—*Vide Drugs in question.*

Iodum.—*Stomach tube, Emetics (Apomorphine), Starch, Saccharated Lime Solution, or Sodium hyposulphite, Demulcents—finally Opiates.*

Jaborandi.—Murrell says Atropine $\frac{1}{10}$ grain hypodermically or 30 minims of Tincture of Belladonna at once arrests symptoms.

Laudanum.—As Morphine, q.v.

Lead.—See Plumbum.

Lunar Caustic.—As Silver Nitrate.

Matches.—As Phosphorus.

Mercury.—See Hydrargyrum.

Monkshood.—See Aconite.

Morphine.—Emetic first (Apomorphine), then stomach tube. Wash out stomach with Potass. Permang. (Morphine, injected subcutaneously is excreted into the stomach and then reabsorbed.—Osler, Vol. I.) Saline Transfusion, Stimulants, Ammonia to the nose, Strychnine, Atropine hypodermically.

Mushrooms.—See Fungi.

Nepenthe.—See Morphine.

Nicotine.—See Plants, Unidentified.

Nightshade.—See Atropine.

Nitrous Fumes.—See Carbon Monoxide.

Nitrous Oxide (Dental).—Vide page 119.

Nux Vomica.—See Strychnine.

Oil of Mirbane.—Copper Sulph. or other Emetics, Calomel, Bismuth.

Oil of Vitriol.—See Acid Sulphuric.

Opium.—See Morphine.

Paraldehyde.—See Chloral.

Paregoric.—See Morphine.

Phenazonum.—Brandy, Ether, Strychnine, Oxygen.

Phosphorus.—Oil of Turpentine, Potass. Permang. Solution 1 $\frac{1}{2}$ per os. Murrell advises 3 grains Copper Sulphate every five minutes until vomiting is induced. To be continued 1 grain every fifteen minutes with a little Morphine if rejected. Epsom Salts as purgative.

Physostigma.—Emetics as Mustard, Zinc Sulphate, Apomorphine, Pot. Permang. by stomach tube; stimulants freely.

Pilocarpine.—See Jaborandi.

Pit Gas.—See Carbon Monoxide.

Plants, Unidentified.—Stomach tube, Emetics, Aperients. Treat symptoms, Artificial respiration.

Plumbum.—Emetics (Zinc Sulphate or Ipecacuanha) stomach tube, dilute Sulphuric Acid $\frac{1}{2}$ drachm in water; Magnes. or Sodium Sulph. Poultices to abdomen; Morphine hypodermic injection for pain.

Potash, Caustic.—Dilute Vegetable Acid, Fixed Oils. Not stomach tube.

Potassium Chlorate.—Stomach Tube, Emetics.

Potassium Cyanide.—Ferrous Sulphate Solution, stomach tube, Emetics, Stimulants.—See also Acid Hydrocyanic.

Adrenalin by the mouth delays absorption, give immediately 3 drachms (diluted) of the 1 in 1000 solution, and after washing out stomach a further 1 $\frac{1}{2}$ drachms (diluted)—B.M.J.E. ii., '09, 68.

Ptomaines.—See page 892.

Rat Paste.—See Phosphorus or Arsenic.

Red Precipitate.—As Hydrarg. Give White of Egg freely.

Salt of Sorrel or of Lemons.—See Acid Oxalic.

Savin.—See Plants, Unidentified.

Sewer Gas.—See Carbon Monoxide.

Sheep Dip.—(?) Arsenic.

Silver Nitrate.—Common Salt in demulcent drink (avoid excess), White of Egg, Milk.

Soldering Fluid.—As Zinc Salts, q.v.

Soothing Syrups (Opated).—As Morphine.

Spanish Fly.—See Cantharides.

Spirit of Salts.—See Acid Hydrochlor.

Stramonium.—See Atropine.

Strophanthus.—After evacuation by emetics and Stomach Tube, Tannin and stimulants. Anaesthetics to relieve spasm.

Strychnine.—Stomach Tube, Emetics, Potass. Permang. Chloral, Amyl Nitrite. Adrenalin delays absorption. See also under Potassium Cyanide.

Sublimate.—See Hydrargyrum.

Sulphonal.—*Emetics, Stomach Tube, Strong Coffee, Strychnine, Artificial respiration.*

Sulphuretted Hydrogen.—*Amylum Iodatum.*

Tobacco.—*See Plants Unidentified.*

Trional.—*See Sulphonal.*

Turpentine.—*Empty stomach by pump or tube or give emetics—Apomorphine if necessary, Mag. Sulph., Demulcent Drinks.*

Verdigris.—*See Copper.*

Vermilion.—*See Hydrargyrum.*

Vermin Killer.—*As Strychnine or Arsenic, q.v.*

Weed Killer.—*See Arsenic.*

White Precipitate.—*See Hydrarg. White of Egg freely.*

Zinc Salts.—*Not stomach tube. Milk and White of Egg, Olive or any innocuous Oil, Washing Soda.*

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