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BY ARTHUR OLDFIELD,

Registered Teacher in Typography for the City and Guilds of London Institute, and Teacher of Typography at the Birmingham and Midland Institute.

LONDON:

E. MENKEN, 65 & 66, CHANCERY LANE, W.C.

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PREFACE.

WHEN this work was first taken in hand, the writer's intention was merely to compile a Text-Book exclusively adapted for the preparation of students wishing to pass the Examinations in Typography of the City and Guilds of London Institute. It was, however, pointed out by many valued correspondents that there was need of a book which should deal with the subject in a more comprehensive spirit, while at the same time not ignoring the special requirements of those attending Technological Classes in Typography. Knowing, moreover, from painful experience that on a variety of subjects but little trustworthy information was available, either to student or teacher, the author has been induced to enlarge his original plan, and to write the present work, which will be found to deal with everything that relates immediately to Letterpress Printing. His object has been to expound the theory of the subject, and to familiarise the student with the principles which are involved in the various subjects cognate to the Art, thus enabling the tyro to apprehend the reasons why and how things are done correctly in a given way, and in no other. It is an undoubted fact that many journeymen, as well as apprentices, work exclusively by "rule of thumb." Their one argument in support of any method of working they may follow, is, that thus and thus it has always been done; and beyond this they are utterly unable to advance any reason for the faith that is in them.

It is with a view of remedying the many evils which

must needs attend such a deficient and empiric system of working that the present "Manual" has been written. The object in view has been to inculcate sound general principles rather than minute details of practice, which latter can only be properly acquired by actual experience in a printing office. It has been the writer's aim to be concise in language, and to condense a maximum of valuable information and instruction in a minimum of sentences. Following out here this same salutary principle of fewness of words, the reader is referred to the book itself, as corroborating these few preliminary remarks.

Best thanks are tendered to the several firms and individuals who have kindly assisted by word and deed the compilation and illustration of the present work, especially to Mr. W. E. Moore, of Birmingham (himself a Silver Medalist in connexion with the City and Guilds of London Examination in Typography), for many kindly hints and valuable assistance in the revision of these pages; Mr. W. G. Hughes, Silver Medalist of Birmingham; and to Mr. J. E. Johnson, Technical Teacher, of Manchester.

The author's experience as a Certificated Teacher of Typography at the Midland Institute and other places, has convinced him of the existing need of a Practical Handbook like the present, and he trusts that his work will meet with the appreciation of the disciples of the art of Gutenberg.

CONTENTS.

PRACTICAL MANUAL OF TYPOGRAPHY.

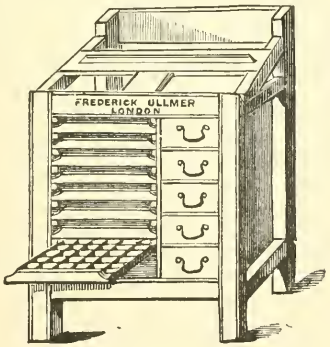
—o—

CHAPTER I.

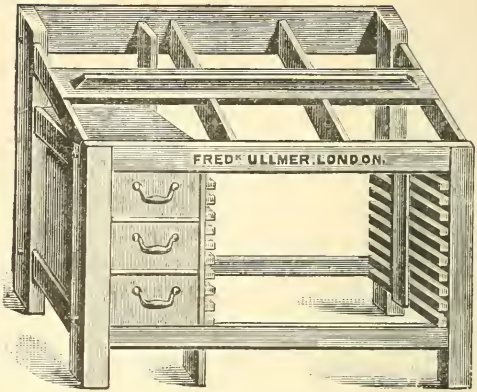
MATERIALS: THEIR STORAGE AND GENERAL ARRANGEMENT.

IT is well that the young printer should learn first of all the proper names of the different materials used, and also the best methods of storing them, so that they may be ready for use when needed.

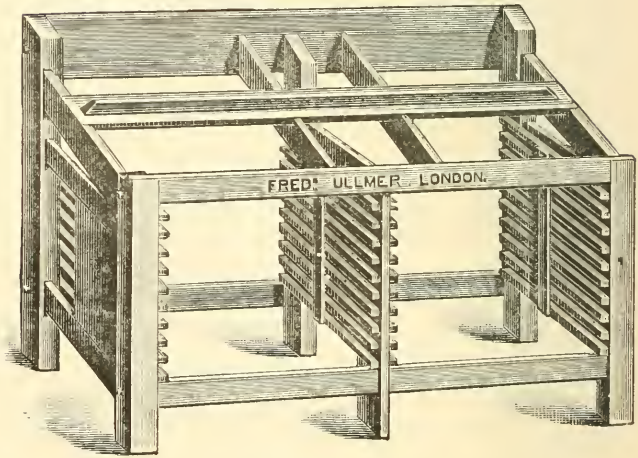
Frames are in this country made of wood; in America they are sometimes made of iron, and called "stands." There are four kinds of frames. 1. The Half-frame, which is merely a stand or mount for one pair of cases, and has no accommodation for spare cases. 2. The Three-quarter Frame, which holds one pair of cases on the top, and five pairs underneath. 3. The Whole Frame, which holds two pairs of cases on the top, and five pairs underneath. 4. The Double Frame, which holds two pairs on the top and a double rack for 10 pairs underneath.



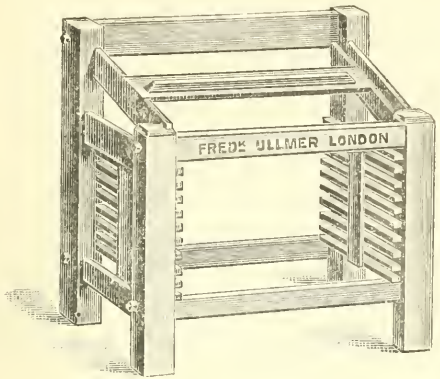
HALF FRAME.



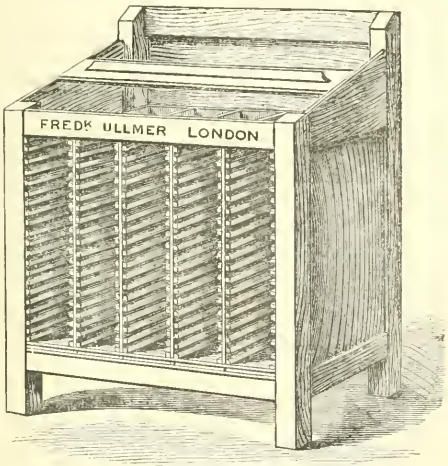
FULL FRAME.



DOUBLE FRAME.



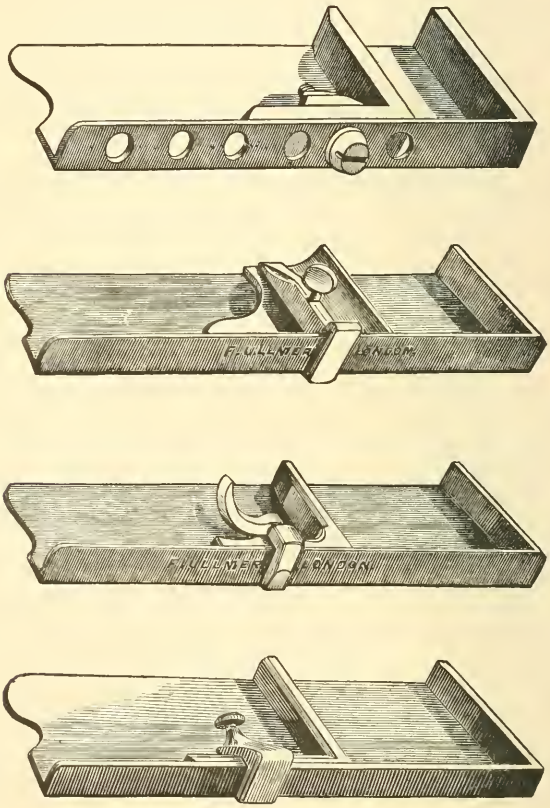
THREE-QUARTER FRAME.



THREE-QUARTER FRAME FITTED WITH GALLEY RACKS.

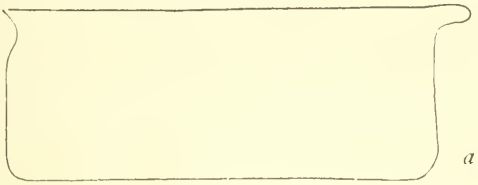
Composing Sticks are usually made of iron or gun-metal. The flat bed is called the plate. At the end, and about $\frac{5}{8}$ in. high, is the head, and along the back of the plate is the flange (of the same height as the head), having holes in which the screw is inserted for fastening the slide. There

are various methods of fastening the slide, but it is generally considered that none are so secure or reliable as those fitted with the screw through the flange. Some examples of composing-sticks, showing different methods of fastening the slide, are illustrated herewith.



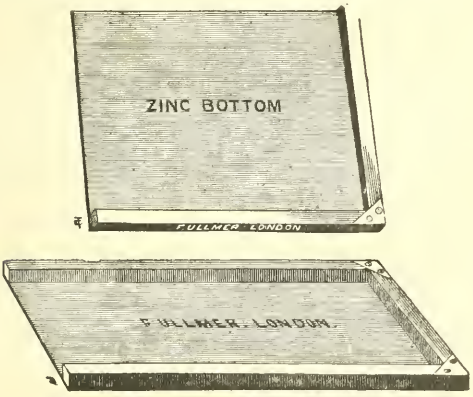
COMPOSING STICKS, SHOWING DIFFERENT METHODS OF FASTENING THE SLIDE.

The *Setting Rule* is generally made from brass rule, and is shaped after this manner :—



The notch at the back part of the rule allows of its being drawn out without so much being cut away at the fore edge of the rule under the neb at *a*.

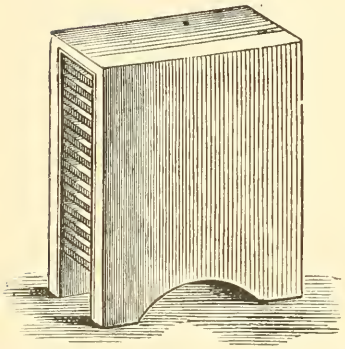
Galleys are made of wood, or wood and zinc, and sometimes entirely of brass ; the last-named being, of course, much more durable than the two former, and the difference of cost is not great. Brass galleys are, indeed, by far the most economical. Wood galleys should never be used for damping matter upon, as wood warps with damping.



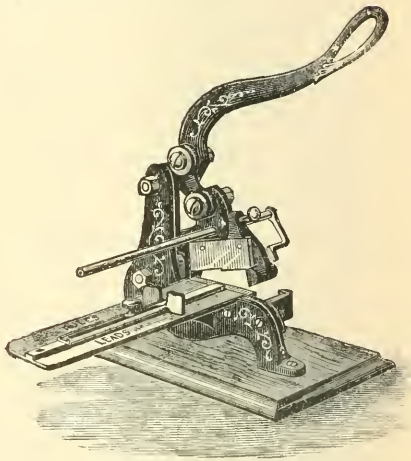
FOLIO GALLEY.

SLIP GALLEY.

Galley Racks for holding galleys containing matter, either for storage or waiting to be made up, are very useful, and no office should be without them; they are best made with sloping shelves, and may be so arranged as to be placed between two frames, thus taking up no room comparatively. Galley and form racks should not be placed under an imposing surface, as the oscillation caused by locking-up forms has a tendency to shake the matter into pie.



GALLEY RACK.

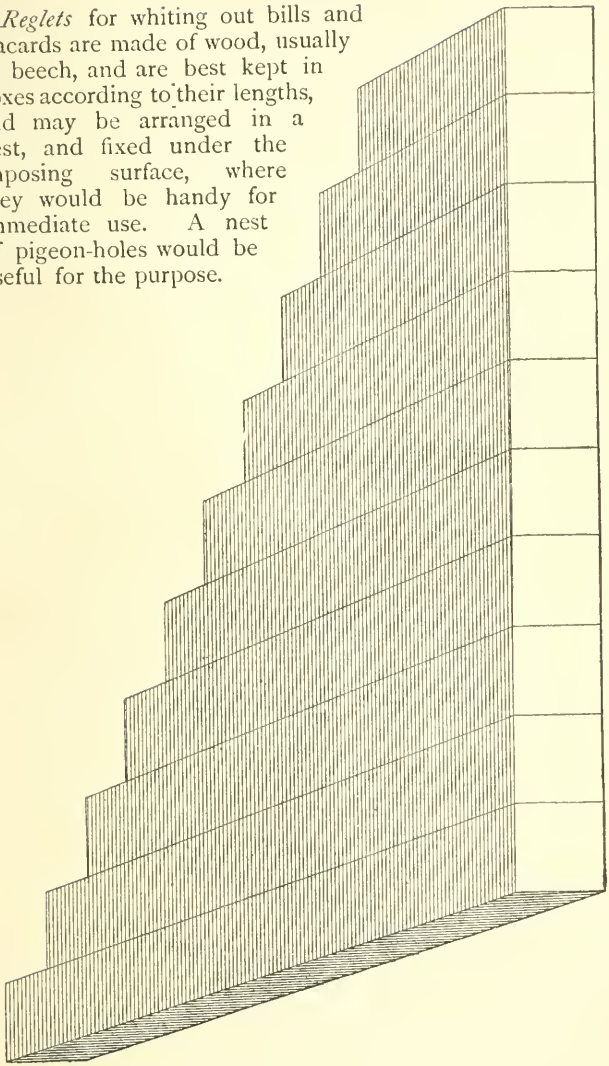


IMPROVED LEAD AND RULE CUTTER.

Mitreing Machines and *Rule and Lead Cutters* should be kept near the overseer, and should not be allowed to be used indiscriminately. Where lead and rule cutters are open for every one to use, it is next to impossible to keep rules and leads in order, or in anything like proper lengths, besides causing a large amount of waste. If rules are kept in standard sizes, viz., from two ems pica upwards, advancing by ens, say to 28 ems, and by ems from 29 to 46 em lengths, very little rule-cutting need be done.

The cases of brass rule, ornaments, borders, &c., are best kept mounted and in a position readily accessible. It is important that they should be kept in order, each size and kind to itself.

Reglets for whiting out bills and placards are made of wood, usually of beech, and are best kept in boxes according to their lengths, and may be arranged in a nest, and fixed under the imposing surface, where they would be handy for immediate use. A nest of pigeon-holes would be useful for the purpose.



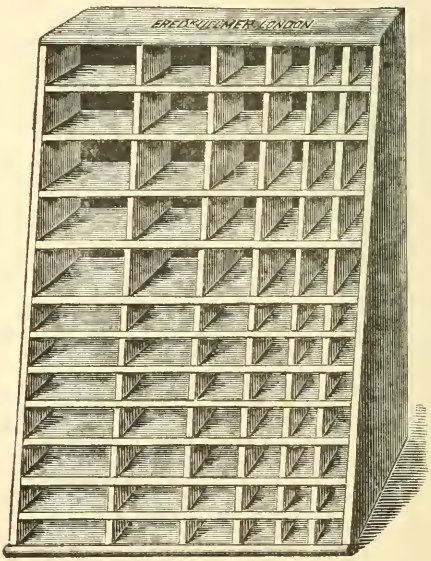
IMPROVED REGLET RACK FOR FIXING UNDER IMPOSING SURFACE.

Wood Furniture is made of beech wood, and of the various thicknesses indicated below:—

Narrow	3	ems	pica thick.
Broad	4	,,	,, ,,
Special	5	,,	,, ,,
Double Narrow	6	,,	,, ,,
Broad and Narrow	7	,,	,, ,,
Double Broad	8	,,	,, ,,

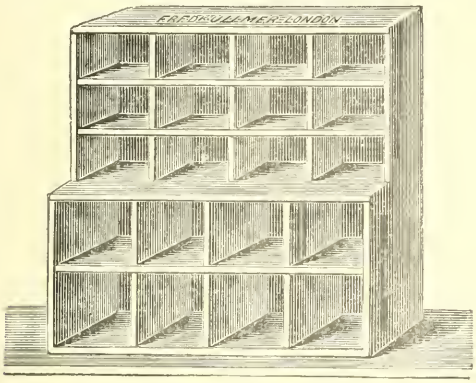
Metal Furniture, cast in lengths of from 4 ems to 50 ems, is best kept in a rack, mounted on the top of a frame, and in a convenient place readily accessible from the imposing surface, and all parts of the room.

Compartments, 3 inches deep, may be made to hold it, according to lengths. This will accommodate three layers, and is the most economical method of keeping it so far as space is concerned. Display cases may be kept underneath in racks.



RACK FOR METAL OR WOOD FURNITURE.

Leads are made of three kinds: thick, middle, and thin, or 4, 6, and 8 to pica respectively; that is to say, 4 thick leads equal the thickness of a pica, or 6 middle, or 8 thin ones. There are various methods of keeping leads; we are of opinion that the best is to have a board mounted on a frame and divided into compartments, to lengths of leads, and made to hold three layers. These compartments again to be divided to hold thick, middle, and thin leads respectively. It is imperative, in order to economise time in composing, that leads should be kept carefully separated according to their thickness and lengths. The weight of leads will be treated of in the chapter on the relative sizes of type.

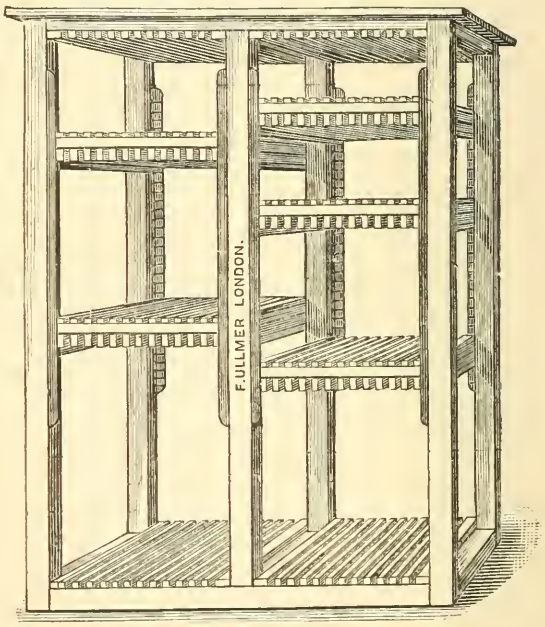


WOOD OR METAL FURNITURE RACK.

Chases are best made of wrought iron when larger than 4to. Wrought iron is smoother than cast; it is also closer grained, and chases made from it are usually lighter and not so clumsy; they are also much more durable. Chases are best kept in racks; a form rack answers the purpose of keeping both empty and full chases according to size. A most useful rack can be made of wood arranged with a groove at top and bottom, to hold chases from double demy to 16mo. If the top groove is made $2\frac{1}{2}$ inches deep it will allow for a little variation in the size of chases. A rack may be thus arranged which

will hold three hundred forms in the space of 12 feet by 3 feet, and of the height of a double demy form. The top may be utilised for keeping standing matter or holding "dis."

The top part may be made to hold 16mo., 8vo., 4to., and folio (demy); and the bottom part royal folio, demy, royal, and double crown; whilst double demy will take the whole depth of the rack. The illustration given herewith is on the same principle, and is a most excellent arrangement.

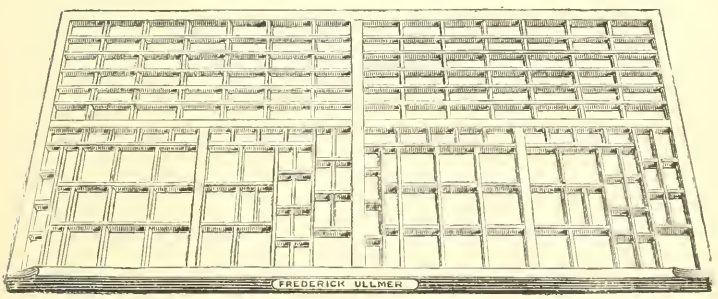


FORME RACK.

Horizontal grooves, formed by nailing slips of wood on a board or the floor, and corresponding vertical grooves on a board against a wall, make an excellent arrangement for keeping forms.

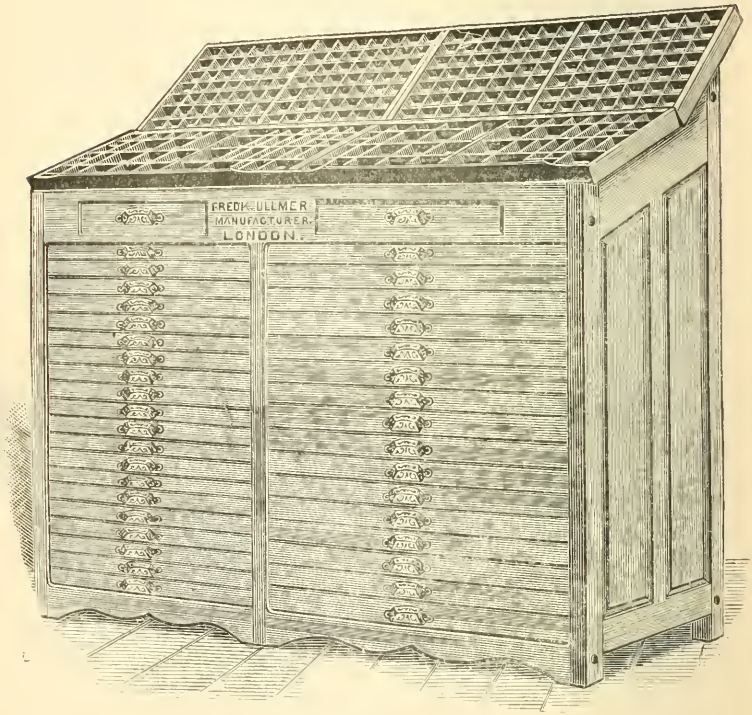
Cases.—All small types are kept in cases. The upper case, mounted on the upper part of the frame, contains the caps, small caps, &c., and the lower case, mounted on the lower part of the frame, contains the small letters, and in consequence of being kept in this position are termed lower-case letters. A case which contains compartments for upper and lower case letters is called a double case, and not a half case, as it is sometimes erroneously designated. A half case is half an upper case, and is used for display letters. Treble cases and fount cases, and two-fount double cases, are made, but we do not think them economical. The only advantage attaching to their use is the economy in room, but to set against this is the great disadvantage in the time lost in setting out of one of these cases in comparison with ordinary cases. The boxes are necessarily small, too small for letters to be picked out of them easily, so that what is gained in one way is lost four times over in the extra time required in composing.

We think that improvements which add to the difficulty of doing the work are questionable, and their use is false economy. A little more cost in providing ample case room is soon repaid by the greater expedition with which work can be executed. For this reason proper double cases will pay better than one two-fount double case, and three ordinary upper cases will pay better than two treble cases.

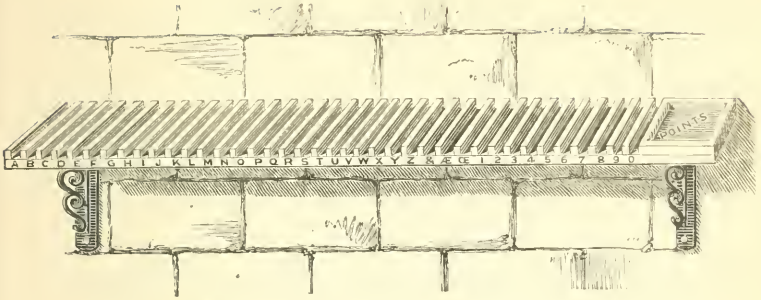


TWO-FOUNT DOUBLE CASE.

Wood Letters may be kept in trays, and when this is done it is well to number each tray, and an impression of each variety should be pulled and mounted on strawboard, the number of the tray attached, and hung on the wall for reference (see illustration of wood-letter cabinet). With letters that cannot be kept in trays, or where there is no convenience for doing so, the best method is to arrange them on shelves in pigeon-holes, one hole to each letter of the alphabet. This method, although the most expensive, is by far the most economical as regards room. Another method is illustrated on the opposite page.

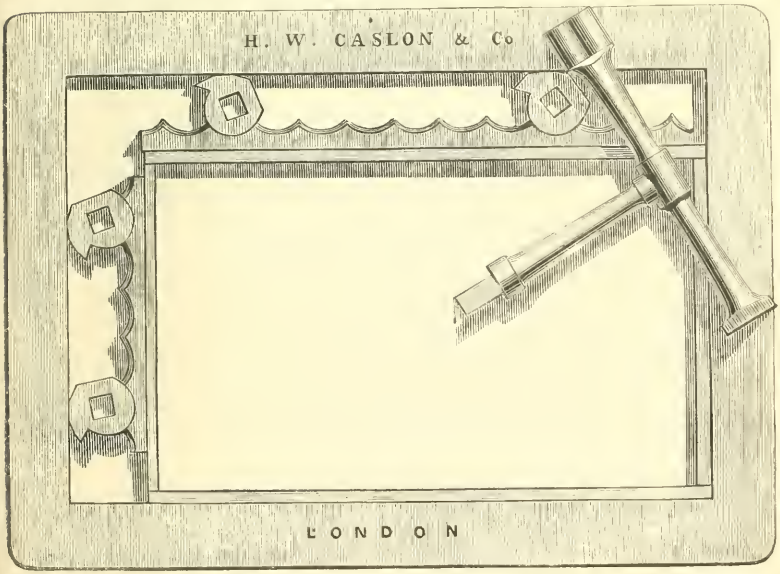


WOOD LETTER CABINET.



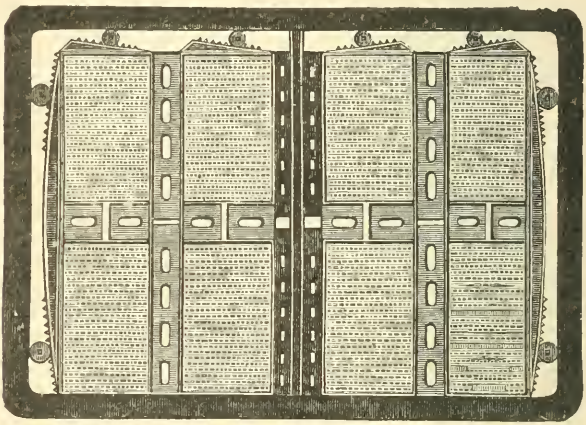
Quoins.—Many inventions have been brought out to improve on wooden quoins.

Lavater's patent consists of a round piece of iron with a projection, flattened, and a square hole in the centre into which a key is inserted; in use the projection is screwed round to the side of the chase. The quoin works in a side piece of iron, with a series of crescent-shaped grooves. They are very effective, and very useful. These patent quoins are supplied by Messrs. W. H. Caslon & Co. A chase fitted with these quoins is illustrated herewith.



WARD'S Locking-up Apparatus consists of two pieces of iron, wedge-shaped, one having projections which acts as the quoin, and is placed between the side piece and the chase. This also is an effective quoin, but not adapted for all classes of work.

The MARINONI Quoin consists of a small nut with rack working on a sidestick with cogs. A key is placed in the centre of the nut, and turned up the sidestick until sufficient pressure is obtained. This useful quoin is also illustrated herewith.



MARINONI LOCKING-UP APPARATUS.

HEMPEL'S Quoin consists of two pieces of iron, wedge-shaped, with a rack-shaped side, so that when two are placed together, and a key is inserted, they can be drawn together, thus exercising great lateral pressure. They are made in two sizes, the large ones we think the more useful. They are very effective, and a great improvement on the wooden quoin. Their cost, however, prevents their more general use.

YOUNG'S patent Box Quoin is similar to Hempel's, except that there are two distinct pieces for one quoin : one has a rack-work in the centre, and when the two pieces are brought together, the rack fits into a groove in the other piece, and a key inserted in the centre works the quoin similar to Hempel's.

SIMONS'S patent consists of two pieces of iron, one acts as a sidestick and the other as a quoin ; they are operated by the ordinary mallet and shooting-stick.

A good Quoin is made at Leeds of wedge-shape with a groove and projection, operated by the ordinary iron shooting-stick and mallet. They are sold at £1 per 100 pairs. Several other quoins of expensive manufacture, such as the Screw Quoin, are in the market, but the great drawback to the use of most of them is their cost.

What is needed in an iron quoin is an arrangement which will give the largest amount of lateral pressure with the minimum of force to obtain it.

As regards *Imposing Surfaces*, they should be of a good quality of iron ; inferior iron soon rusts and takes much more time and attention to keep in order. They should be periodically rubbed over with oil, say, two or three times a week. It is a great convenience to be well supplied with accommodation in respect to imposing surfaces ; much time is lost in many offices by reason of being pinched in this respect. The imposing surface should be mounted on a strong wooden stand, with drawers at each side for storing furniture, quoins, &c., and should be so placed as to be readily accessible from all parts of the room, and at the same time should be handy to the hoist or lift, or near the exit to the machine department. If possible, the furniture and lead racks should be arranged in the centre of the room, with an imposing surface at each end.

CHAPTER II.

COMPOSITION AND DISTRIBUTION.

"COMPOSING" may be described as being the art of picking up separate letters and arranging them in words according to a given copy. The mechanical part of this work is not hard, and a quick compositor, if he works on correct theoretical principles, does not have to exert himself very much physically. It is essential, however, that a compositor, to be a good as well as a quick hand, should have a fair knowledge of things in general; he should thoroughly understand the rules of pointing, and the variations of different word-endings, prefixes, and affixes, &c. This subject is fully, intelligently, and practically dealt with in a work on "Spelling and Punctuation," by the late Mr. Beadnell, himself a practical printer and printers' reader of great experience. The book is most excellent and complete, and will be found of invaluable service to every typo, giving, as it does, in a simple form the rules of pointing as well as the changes in word-endings, &c.; the volume forms one of the excellent collection of Practical Handbooks known as "Wyman's Technical Series," and is published at 65 and 66, Chancery Lane, London.

What we shall treat of in the present work will be mainly the mechanical part. The great object of a compositor is to acquire speed; the more letters he can pick up in a given time, the more money will he actually earn. His primary consideration, then, should be to carry out systematically every principle that will conduce to this end. First, he must place himself in an easy position, his case must not be too high nor too low, and should be so arranged that the bottom part comes just on a level

with his elbow. He should stand erect in front of the thick-space box, look at his copy, and "take" as much as his memory can conveniently carry. It is best not to attempt too much, and yet the more the better, if if it can be done without making mistakes, as, of course, looking at copy too often means lost time. It is best to take copy from one point to another point if possible. The compositor's next operation is to pick up the several letters required to form the words of his copy. Letters should be picked up methodically and deliberately; it is not well to make two or three tries at a letter, or to have to turn it when once picked up. The type should first be "sighted," note taken of its position, and then picked up by its head in such a way as to be conveyed to the stick without turning. As all letters are set with their nicks outwards, the eye should glance at the type, notice the position of the nicks, and such letter should be picked up accordingly.

Learners should at first not attempt to be quick, but rather methodical. Quickness will come in time if the proper method be adhered to, and no false motions are acquired. In setting, the left hand should follow the right so as to reduce to a minimum the time taken up in dropping the letter into its place. For instance, if the letter *i* follow immediately after *e*, it will be well for the left hand to be close up to the "e" box with the stick, so that the letter *e* may be dropped into its place at once without having to lose time in travelling half-way across the case, and the stick is at hand ready for the following letter (which is in the adjoining box).

It is astonishing how large a number of men indulge in false motions of some sort; in fact, it is rare to find one who is perfectly faultless in this respect. It must, however, be imperatively insisted on that there are certain habits to be acquired and others to be avoided.

The Habits to be acquired include the following.—Thoughtfulness; to select a letter in the box whilst putting the preceding one in the stick; to read copy whilst spacing out the line; to follow the right hand with the stick, as before explained; to pick up each letter in such a way as to obviate its requiring to be turned on its way to the stick.

Habits to be avoided.—All false motions, such as clicking each letter against the stick ; turning the letter on its way to the stick; shuffling about ; crossing the legs instead of standing erect in front of the case ; bowing to the case; flourishing the hand ; making two attempts to pick up a letter; looking too long or too often at the copy.

Proper *Justification* is very essential. Lines should not be too long nor too short. The proper justification is that a line should be just so tight as to hold itself in the stick if turned upside down, and yet not so tight as to be difficult to take out. When some lines are made so tight that the last space has to be thrust down by the aid of a type or space, and other lines are left slack, there will probably be a difference in the length of the lines of nearly a thin space, and matter of this sort is bad to deal with, causing letters to drop out of the form, or "draws" on the machine. Each line should be of exactly the same length. If letters are off their feet, they should be placed upright whilst justifying.

SPACING.

This is an important operation, and the good appearance of a book or job depends very much on its being properly done. There are five kinds of spaces: the en quadrat; thick space (three of which make an em quadrat), and are therefore also called 3-em spaces ; middle or 4-em spaces, which count four to the em ; thin or 5-em spaces, of which five equal an em quadrat ; and hair spaces, which are made to count eight or ten to the em quadrat. Hair spaces should never be used for the purpose of justifying, they are only to be employed in an emergency when a thicker space cannot be used, or to put between the letters of a word to spread it out. Hair spaces are usually very scarce, they are easily broken, and when careless persons use them for justifying they often break them.

The usual space for placing between words is a thick, or 3-em space, and if a word has to be "got in," the thick space should be taken out and replaced by a middle or thin space according to the room required. If the words need to be more apart in order to fill the line, and if there is not room for a middle or thin space between each word, thick spaces should be taken out and replaced by en quadrats until the line is full.

When matter is leaded, extra space is required ; usually an en quadrat is used, and sometimes double spaces—that is, two thick spaces.

Apparent equal space should be placed between each word. If a thick space is the average space used, then a middle space may be placed after a comma, and an en quadrat after the letter f, or any letter with a ligature. An en quadrat should follow a semicolon, and a thin space be placed before it. A thin space should be inserted after the first quotation marks (*i.e.*, inverted commas), and before a colon, a point of admiration, or a note of interrogation, and also before the last quotation marks (two apostrophes) if no point is used in front of this quotation work.

Irregular spacing should be avoided. Nothing spoils the appearance of solid matter more than "pigeon-holes." A wide gap between two words and the next nearly without space is proof of a bad workman. On Book and Pamphlet work this is very important, although on News it is not of so great consequence ; but a good workman will do his work right under all circumstances. Much time may be saved in spacing, by calculating beforehand the words to be got in and the space required to fill out the line.

In spacing poetry, all the spaces between the words must be equal ; and in justifying the line, the spaces outside the words should be placed after the last word, which will help to economise time in distributing.

In spacing display lines, it is a good plan to put space between each word equal to the average width of the letters. An expanded letter needs more space between the words than an ordinary or a condensed type, and the above plan of regulating the space to the width of the letter has been found a good one in practice.

It will be found a good plan to read over the matter set whilst spacing. This will save much time in corrections afterwards. It is worth much always to have "clean" proofs, and will conduce to the good character of a workman, so that a little extra trouble in this respect will be well rewarded.

If a man is determined to have clean proofs, he will be careful in his distribution, read his copy so as not to mis-

understand its meaning, and read over his lines whilst spacing out. Dirty proofs are disgraceful, and a direct loss to the employer as well as employed.

In connexion with this subject, may be mentioned the dividing of words, and uniformity of capitalising, the system of pointing, &c. In these matters compositors have to be guided by what is termed "the rule of the house." Usually two-letter divisions are not allowed, such as the carrying over of syllables like "ly," "by," &c.; and in some houses all questionable divisions are forbidden. (See chapter on Newswork.)

It is a good plan to have printed instructions as to the use of capitals, figures, the systems of spacing, pointing, &c. In regard to the use of numbers, sometimes they are put in words and sometimes in figures. Some offices adopt the plan of putting all numbers under 100 in words, and over that in figures; and newspapers put numbers as low as 10 in figures. Whatever the system followed there should be uniformity. Figures certainly do not look well in the text, and their use is best confined to tabular and statistical matter.

Distribution.—A good, clean compositor always distributes clean. "Dirty" or inaccurate distribution causes "dirty" proofs. The time occupied in this part of the work is reckoned at about one-fourth of that required for composition.

The best method to adopt in distributing is to take a word and its space, drop the space first and each letter afterwards, one at a time; if one is dropped in the wrong box it should be immediately sorted out and put in its proper place. Each letter should be dropped rather than thrown as the hand moves over the case.

If the type is new and sticks, it may be soaked in water in which a few drops of glycerine have been put. Type should on no account be beaten on the stone to loosen it, as such practice breaks off the feet of the letters, or makes them round and liable to work "off their feet." Before being distributed, letter should be "laid up." The matter is placed on a galley, and held together with sidestick and quoins, it is then taken to the trough and brushed first with lye, and next rinsed with water; then

the quoins are slackened and the types moved about with the fingers to work off the dirt. Where type has been stereotyped from, and the oil used in that process has got between the letters, the heat applied in stereotyping will cause them to stick very tenaciously. In this case hot water is useful for cleaning the type ; a jet of steam so arranged that the galleys can be passed under it is very effective, and reduces the labour in "laying-up" very much. If type has been properly cleansed alum will not be required, that substance being sometimes used to reduce the slipperiness of dirty type. The spaces should be carefully assorted, except the middle and thin spaces, which may be mixed, though it is best to keep some thin spaces separate, as they are very useful in a close-spaced line. Thick spaces, however, should be kept entirely separate. Some authorities recommend mixing the thick and middle spaces, but experience teaches that what we have here recommended is the preferable plan.

In our opinion it is best for an apprentice not to distribute until he has had experience in setting, and we recommend this from actual experience. The difficulty of distinguishing between the letters *u* and *n*, *p* and *b*, *q* and *d*, &c., when turned upside down is more easily overcome in setting.

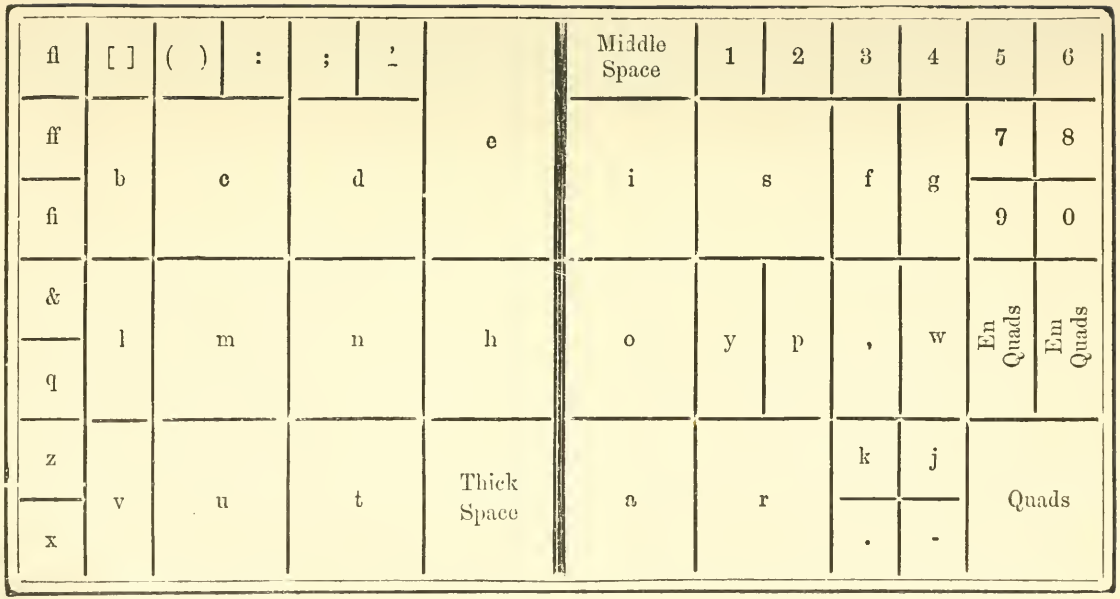
In distributing jobbing type great care should be used with fancy letters and ornaments. If types with delicate faces are thrown carelessly against each other they will necessarily be damaged. We are of opinion that this is a prolific source of batters, and the machine is often blamed for broken letters, when the real delinquent has been some careless compositor. Letters inadvertently dropped on the floor should be immediately picked up and put in their proper places.

LAY OF THE CASE.

It is essential for quick-setting that the lay of the case should be so arranged that the least time will be occupied in conveying each letter to the stick. The old method, which has been in use for probably one hundred years or more, does not meet these requirements. The lay which is illustrated on the two following pages is, on the whole, convenient and handy, without too much revolu-

ä	ë	í	ö	ü	÷ ‖ =		¼	½	¾	⅛	⅓	⅔	⅜
Æ æ æ	Œ œ œ	∼	∼	×	° ″ $	% %	⅝	⅞	♔	@	℔	℔	*
⌡ ⌠	‡ †	¶ §	+	?	!	… …	——	——	——	—	-	/	£
A	B	C	D	E	F	G	A	B	C	D	E	F	G
H	I	K	L	M	N	O	H	I	K	L	M	N	O
P	Q	R	S	T	V	W	P	Q	R	S	T	V	W
X	Y	Z	ffi	ffl	U	J	X	Y	Z	Hair Space	Thin Space	U	J

ORDINARY UPPER CASE.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Middle Space
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En Quads
Em Quads
z
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v
u
t
Thick Space
a
r
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j
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Quads

LOWER CASE.

1	2	3	4	5	6	7
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,	;	:	.	-	'	?
A	B	C	D	E	F	G
H	I	K	L	M	N	O
P	Q	R	S	T	V	W
X	Y	Z	£	&	U	J

HALF CASE FOR FANCY FOUNTS.]

¼ ä	½ ë	¾ ï	ö	ü		*
...	—	† ‡	§ ¶	Æ æ	Œ œ	☞ ☜
/	× +	?	!	ffi	fil	£
A	B	C	D	E	F	G
H	I	K	L	M	N	O
P	Q	R	S	T	V	W
X	Y	Z	Hair Space	Thin Space	U	J

ARRANGEMENT OF CAPS FOR A DOUBLE CASE.

tionising the old plan, and does not necessitate any new arrangement of the compartments themselves. A comparison of the two systems will show that the old lay has the capitals at the extreme left-hand top corner, so that the letter "A,"—a largely-used letter,—is the farthest away from the compositor's hand, and to get to it he has to stretch his arm right across his body. The New Lay, here illustrated, obviates all this, and places the capitals in the handiest possible position, saving a large amount in time. Another inconvenience in the old lay is the position of the copy, which was so placed that the compositor had to look across his case to read the copy. In the New Lay the copy is placed over the small capitals (the most seldom used letters in the case), and right in front of the operator. The figures in the New Lay are so arranged that tabular work may be set in very much less time. In the old lay they are usually ranged under the capitals, and as an en or em quad is wanted with almost every figure, the waste of time in travelling backwards and forwards across the case is very great. In the New Lay they are arranged close to en and em quads, the advantage of which is obvious. Another great drawback in the old system is the accumulation of pie in the bottom range of boxes, so that the accidentals, such as stars, daggers, &c., are in a state of chaos; and if a dagger be wanted, a wasteful search has to be made. We recommend this lay, as having been practically tried and found successful.

The best method to ensure clean cases is to have a copy of the lay mounted on cardboard and hung against the frame, put on a board over the frame, or fastened to the gas pendant, so that it can be readily referred to. This plan is useful for strangers or casuals, who are thus saved much trouble, and the office is saved much pie. It may be argued by some that the lay here advocated is not sufficiently sweeping in its changes. In reply to this, we may say that, after carefully weighing the matter, and after taking into consideration all the suggestions which have been made during the last ten years, we have come to the conclusion that the changes indicated are sufficient; that other changes have their drawbacks as well as advantages; and that, on the whole, a more extensive change is not needed.

CHAPTER III.

CORRECTING AND READING.

AFTER the type has been set up and emptied on a galley, it is ready for pulling, that it may be read for any mistakes which may have occurred in composing. A sidestick is placed against the type and quoins are inserted to hold it tight. The galley is then taken to the press and an impression pulled. A clear impression only should be submitted to the reader, never an imperfect one.

With regard to readers' marks, a code of signs or symbols is now recognised in connexion with this operation, and it is necessary that every compositor should be familiar with them. The *facsimile* page given on page 41 will illustrate their use.

A wrong letter is noted by a stroke being drawn through it and the proper letter written on the margin with a stroke after it. This stroke is placed after all corrections to keep the various marks separate. It is sometimes called the separatrix.

A turned letter is crossed through and a sign inserted in the margin, thus .

Where a letter or a word has been omitted a caret is placed ; that is, a mark like this ∧, and the omitted letter or word is written in the margin. If several words or a sentence has been omitted, and there is not room or time to write the whole of it in the margin, the words "see copy" are inserted in the margin in parentheses, and the omitted portion of copy is marked in brackets, thus [ ].

When a word or letter is required to be taken out, such word or letter is marked and a δ written in the margin which stands for *dele* (erase).

If a word is underlined once it means that it should be put in italics; if two lines are drawn under it, they mean small caps; and three lines mean caps. The word "Italic," "s. caps," or "caps" should, at the same time, be written in the margin.

When a new paragraph is required, a crotchet or bracket is drawn in front of the first letter, thus [.

To distinguish an apostrophe from a comma, it should have a curved line drawn under it and be attached to the down stroke. Full points or periods should have a circle drawn round them, thus ⊙.

When a page hangs lines are drawn across the matter out of place.

A battered letter is noted by a cross, thus X.

If a word is set in capitals and should be altered to lower case, draw a line under it and write "l.c." in the margin. If wrongly printed in italic, underline and write "rom." in the margin.

When two paragraphs are required to be made into one, or, in technical language, "to run on," draw a line from the end of the first paragraph to the beginning of the next, after this style.

A letter of another fount must be marked, and "w.f." written in the margin.

When space is required, a mark similar to a sharp in music should be made; and if space should be deleted, write the marks ⁀, and "close up" in the margin.

When a line has been too closely spaced, the pen should be drawn through between the words, and the words at the end of the lines should be marked off for being carried over.

Words which have been inadvertently crossed out should have a dotted line marked underneath, thus ....., and the word "stet" should be written in the margin.

If a proof has a large number of marks upon it, it is said to be dirty. A first proof, in contradistinction to the revise, is termed the dirty proof.

Literals,—that is, wrong letters,—do not take much time to correct, but if there are "outs" and "doubles" much time may be lost in overrunning the lines. We have some

times seen proofs with so many mistakes of this sort that a good compositor could reset the matter in less time than it would take to correct.

It is worth a great effort to set clean. We have known compositors who could set a whole column of a newspaper with only three or four literals. Such men are, however, rare. This perfection can only be attained by the utmost care. The mind should be given up entirely to the work in hand.

When commencing to correct a form it is best first to set up or gather the corrections in the stick, starting at the beginning. This answers two purposes: first, it saves time in not having to run about for the various corrections; and secondly, it acts as a check, insuring that all the corrections are made.

In making corrections in a form or on a galley it is best to stand at the head of the matter, to take the bodkin in the right hand and place the point at one end of the line, and by the aid of the forefinger of the left hand to lift the whole line up sufficiently to take out the wrong letter and replace it by the correct one, at the same time changing the spaces if necessary. The bodkin should not be thrust in between the letters or it will almost inevitably spoil one of the adjoining types.

If much alteration of spacing is required, as well as in the case of an "out" or a "double," it will be best to put the line into the stick. When overrunning has to be done, lift out as many lines as are judged to be necessary, lay them flat on the side of the galley, with the top part most accessible; they can be lifted piecemeal as required without fear of pying. This is better than spreading the lines out on a galley or on the stone.

Correcting Nippers or Tweezers are a prolific source of damage, they are destructive instruments in the hands of an ignorant and careless person; a slip of the tweezers is certain ruin to the type. They should only be used with great caution, although in their proper place they are useful and desirable instruments.

When making corrections take them *seriatim;* do not jump about from one place to another; commence at the top of the page or galley, and proceed downwards. If there

are several columns finish one column at a time; if there is, however, an "out" or a "double," necessitating a large amount of overrunning, it may be found most advantageous to leave this until all the other minor corrections have been completed.

When all the corrections have been made a *Revise Proof* will have to be pulled and submitted to the reader, who will examine it to see that all corrections have been properly made. If the corrections are still numerous or intricate in the second proof, a second revise may have to be pulled.

Sometimes a page may be inadvertently squabbled in correcting, by a mere slip of the hand; this may make the compositor nervous for the moment. It is best to leave the matter for a few minutes, then return, damp the type, and examine it carefully; in some cases the taking out of a few crossed letters and the judicious use of the bodkin will put all right without much trouble.

Proofs are required in various stages, and have a distinct name in each stage, as follows:—"slip," or galley proofs; "first" proofs; "revise" proofs; proofs in pages; proofs in sheets; "clean" proofs; and "author's" proofs.

"READING."

"Reading" is a very important work, and the utmost care and diligence are necessary to ensure correctness. The safest method is to read each proof twice, the first time the copyholder to read to the reader, for the purpose, more particularly, of detecting departures from copy; the second time for errors in spelling, pointing, capitaling, &c., and this time the reader himself should read to the copyholder. In job-work all work should be finally read over when the job is on the machine being made ready for working off. There are many reasons for this: the form may have been picked, a letter may have dropped out of the form, or a letter which printed in the press proof may not show up on the machine. Readers should never pass a proof until they feel absolutely sure that every word is spelt correctly and that the matter is according to copy. Every job, before working off at the machine, should be initialled by the reader, who should feel confident that the

job is all right before he does so, and who should never initial a proof he has a doubt about. In pulling proofs for jobbing it is well to pull two, one to go out and one to keep with the work ticket. The advantage of this is that sometimes a customer keeps the proof, or it may be lost, and the reserve proof then will be very useful for reference, particularly if the form has met with an accident, or any portion of it has fallen out after the proof had been sent out. A compositor will sometimes excuse himself for an error which has been passed because the reader failed to detect it, instead of blaming himself, who, after all, is the real offender.

Proofs, as well as the copy, should be taken great care of after the job is finished. Some offices make it a rule that all copy and proof be kept with the work ticket, and the practice is, in the writer's opinion, a very commendable one.

Mr. Theo. L. De Vinne's "Manual" gives the following excellent instructions:—

"Readers must refuse proofs that are too pale, over-inked, feebly printed, small in margin, or taken on an unsuitable paper.

Before sending it to the reader, the proof of a book form must be folded accurately to the print. The excess of an irregular margin should be torn off, but the proof must not be cut through the fold.

Before beginning to read new matter, the reader will make these queries:—

Does this properly connect with previous matter?

Is paging consecutive?

Are running titles, chapter-heads, blanks at heads of chapters, tables, and the more prominent features of composition according to written instructions, or in the same style as preceding pages?

Is the signature right?

If the proof shows that it does not connect with matter preceding, or if there be any serious departure from the written orders, or from the style of the preceding pages, the reader will at once notify the foreman, who will tell him whether he may proceed with the reading, or whether he shall order a correction and re-make-up before reading.

Allow no book or pamphlet form of more than one sheet to go to press without signature.

Corrections must always be made in ink.

Copy on first proof must always be read aloud by the reading boy, never by the reader.

Bad spelling and bad grammar for which there is no authority must be corrected where they have obviously been made through ignorance or thoughtlessness.

Exceptions must be made to this rule in dialect and quotations intended to be literally exact.

Dialect must be made uniform in its spelling, even if it is irregular in copy. Different abbreviations or clippings of the same word by the same speaker or writer should not be passed.

Strange proper names, either of places or people, of history or fiction, must always be verified by reference to a biographical or geographical dictionary. A reader is in fault if he allow to be misspelled any word which can be found in the reference books of the office.

The same observation will apply to quotations from the Bible, to ordinary proverbs, quotations or phrases in foreign languages, and to the ordinary nomenclature of science.

The time to be spent and the care to be given to a piece of reading must be determined by its importance. Ordinary work should be made correct to copy and yet done with a reasonable despatch. Writings of value should always be read critically, with a view to the discovery of more serious errors than those of punctuation and spelling.

When the reader discovers a plain error of statement, obviously made by the writer through lapse of memory or slip of the pen, he should correct.

He does so, however, at his peril. He must know, and not suspect, it to be an error, and must be prepared to vindicate the soundness of his correction, not by his own belief, but by recognised authority.

Wherever he only suspects error, he must query.

Whenever he makes a change in a quotation, date, or statement, he must, without exception, note upon the author's proof the change he has made.

In every writing of value, the reader should query faulty construction in a sentence, a bad metaphor, an inconsistent statement, the misuse of a word, and all faults of similar character; but in no case will he be allowed to correct these faults, when the author will follow his reading. He must stop with the query. Only in extreme cases will he be warranted in suggesting to the author a proper correction. The reader must not overstep his duty, which is to correct and not to edit.

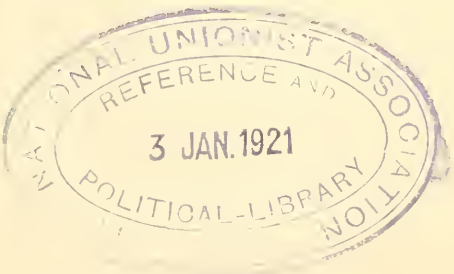
He must not spend unnecessary time in the consultation of reference books to make up the deficiencies of a careless writer, nor should he worry an author with suggested emendations or pedantic niceties.

The second reader must not remodel the punctuation of the first, nor make any serious change in the work he has done, unless the matters to be corrected are of unmistakable importance. If he thinks it necessary to make great changes, he should submit the changes proposed to the foreman for his decision.

First proof, second proof, author's proof, and author's revise, must be kept on separate hooks, or in separate pigeon-holes, and be properly marked with the initials of the reader.

The author's proof and revise must have on each sheet the office stamp and date.

Every paragraph containing an alteration in a proof that makes one or more overruns must be re-read as first proof. It must be read aloud by copy-holder, from last altered proof, or must be collated, word for word, to the end of a paragraph. The practice of revising the alteration only, and of re-reading the paragraph without copy-holder or collation, has made too many errors, and will no longer be permitted."



FIRST PROOF (with Corrections marked).

with Lysis, "O son of Demophon, which of you is the eldest?" "We are not sure," he replied. "Well then, which is of the best blood; you will not of course doubt?" "Yes, assuredly, we are in doubt." "As well as which of you is the fairest?" he proceeded. Here they both smiled. "Certes, I will then not ask you which is the richest, for you are friends, are you not?" "We are, indeed," they replied. "But it is said all things are common between friends; so that, in this respect, you do not differ, if it be true what is always said of friendship!" They assented.

Particular friendships, in religious communities, were ~~even~~ condemned, and, without doubt, the sentiments of human affection were less strong than those which induced men to love

AMENDED PROOF.

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CHAPTER IV.

BOOKWORK.

COMPOSING may be said to be divided into three distinct branches, viz., Book, News, and Jobbing work. We will first treat on Bookwork.

DIVISION OF A BOOK.

Usually the first series of a book is made up of preliminary matter, as follows :—

Half Title.	Dedication.	Introduction.
Title.	Preface.	Errata.
Advertisement.	Contents.	

Next comes the Text, followed by Notes and Index.

The *Half Title* usually consists of two or three lines only, and is best set in plain titlings, half the size of the title itself, or a little less.

The style of *Title-pages* is governed very largely by fancy, though there are certain rules which it is well to endeavour to carry out,—that is, as to style of type to be used. The following quotation from Mr. M'Kellar's "American Printer" argues the matter excellently :—

"Ornamental type may be used to good purpose in fancy jobs, and without violating any of the canons of correct taste. The universal eye is pleased with ornament; and it is well to foster this fancy, just as we cultivate a poetical feeling, or a passion for music, or flowers, or anything beautiful in nature. But as life should not be all music, or flowers, or poetry, so printing should not be all ornament. And as men whom nature puts in the fore front of all other men are noted for a becoming simplicity of life and style, so the title-page, that heralds all the inner pages of a book, should be printed in a style of elegance severe and unadorned. NO FANCY TYPE, except a line of Old English,

no italics, except perchance a single-line motto in pearl caps, no bold face, nor antique or Gothic, but plain, clear, light-faced letters that seem the embodiment of the soul of thought. All experienced printers incline to this simple style ; but publishers sometimes interfere, and insist on the indulgence of a taste which certainly owes no allegiance to any of the laws of beauty, and the printer receives credit for a title-page he would fain utterly repudiate."

We think it a mistake entirely to exclude rules, as they give a neat and more finished appearance to the page.

In setting a title avoid condensed letters if possible. Do not make too many display lines. Avoid two lines of equal length together. Catch-lines should be very small, say in small caps. In an open title thin space or hair space display lines where possible. In whiting out arrange all lines which are intimately connected close together, irrespective of inequality of white.

The *Dedication* usually forms the third page, and is set in small caps, with the exception of the name of the person to whom the book is dedicated, which should be in a line by itself, in caps of the text or a size larger. The whole should be neatly displayed in lines, in the form of a tablet, in centre of page.

The *Preface* may be set a size larger than the text, or in the same type with a thick or thin lead through it. The running heads are neatest if set in small caps.

The *Contents* is always set in type one or two sizes smaller than the text. The Synopsis of Chapters should be "set out and run on" ; that is, the first line full out at both ends, and the rest indented an em. Each line should, however, be kept in three ems, so that the figures of the folio in the last line may stand out. When there is only one line this need not be done, as the figures will fill up the line.

The *Index* comes usually at the end of the book, and is set in type several sizes smaller than that used for the text and in one or two columns, as may be required.

Head Lines, or running heads, usually consist of the title of the work on the left-hand page, and the subject matter of the chapter on the right-hand page. These head lines are set in small caps ; Italic caps may be used, however,

instead. Sometimes a rule, or double rule, is placed under them, and in other cases on each side. Chapter Headings are usually set in a two-line titling, a size larger than text.

Foot-notes are set smaller than the text. There is no absolute rule, but generally it is two or three sizes less. If the text were in pica the notes might be set in brevier, or even nonpareil. The same holds good for small pica or long primer. Foot-notes have references in the text, and when being set should be "flagged": that is, a piece of paper inserted in the type stating what it is, to guide the maker up, so that he can place it in its proper position.

The references in their proper sequence are:—

* Asterisk	‡ Double-dagger	‖ Parallel
† Dagger	§ Section	¶ Paragraph

Superior letters, such as here shown,—(1) (2) (3)—are often substituted for these marks, more especially in scientific and law books.

Side-notes are set several sizes smaller than text, and justified at the side of the page against the matter to which they refer.

What are termed *Cut-in Notes* are let into the text, usually at the commencement of a paragraph.

NOTES IN RELATION TO BOOKWORK.

In bookwork the words Street, Road, &c., are "kept up," —that is, the first letter of such words should be a capital; in newswork the opposite rule holds good, a lower-case letter being used with a hyphen preceding it, as John-street.

Uniformity of style is very necessary when a number of men are on a book or other job; there should be some general rules as to punctuation, capitalising, the spelling of words concerning which there is no fixed rule. Some useful information on this head will be found in "Spelling and Punctuation," a companion volume to the present work, in "Wyman's Technical Series."

As a general rule, it is well to "follow copy" in the MS. of an educated writer with regard to spelling, punctuation, the use of capitals, &c., even if such differ from the style of the house. An author has some right to have a

voice in these matters. Of course, this only refers to book-work proper, and not to contributors to magazines, &c. Undoubted errors in spelling should be corrected, but no sentences, &c., should be altered by the compositor.

The remarks under Newswork on uniformity of style will be useful in determining some rules for uniformity of style.

ILLUSTRATED WORKS.

When cuts having square or well-defined outlines have to be inserted, leave a margin of about a pica in solid matter, and of two picas in leaded matter on all sides, exclusive of the descriptive line. When the cuts have an irregular outline, have the blocks cut where there is a shoulder, and put type as near as can be done, with due regard to appearance, at uniform distance on all sides.

Blocks should have ample margin all round, and be let into the text only when very small.

A cut should never, if it can possibly be avoided, be allowed to back a cut on another page.

When *Head-pieces* are used they should be the full, or nearly the full measure of the width. Head and tail-pieces should harmonise throughout the work.

The *Rule of the House* is sometimes a great bugbear to compositors. Styles vary in almost every office, both as regards the use of capitals, division of words, spacing, pointing, &c.; and a compositor should therefore endeavour to acquire the style of the house where he is employed as quickly as possible. It would conduce greatly to the smooth working of the office, and to the rapid production of work, if some of the leading rules of the house concerning the above points were printed, and copies of the same placed prominently in the composing-room, or a copy given to each compositor employed.

TABLE AND TABULAR WORK.

This class of work needs extra care and nicety of calculation. A knowledge of the relative sizes of type will be found useful, as much depends on accuracy of measurement. In commencing work of this kind, think over carefully and methodically the necessities of the case.

On commencing a table from manuscript copy, first cast-off the number of columns, then ascertain the width

which each column will require, and then, by setting up quadrats in a line and making allowance for rules, see whether the matter will come into the required space.

Do not leave anything to guess-work; probably the width of some of the columns will have to be determined by the amount of descriptive matter in the heading; and in that case the head-lines should be set first, and the width of the column be regulated accordingly.

If there are a series of tables or pages with the same head, it will be best to set this so that it can be lifted away, or, in other words, it should be cut off from the bottom part by a cross rule.

Table work proper, when consisting exclusively of figures, and no words are inserted, may be set across the full width of the table and not in separate columns. So that supposing there were six columns of figures, three 8 ems wide and three 10 ems wide, the stick could be set to 54 ems, and each column of figures justified under the other, and rules could be dropped into their places when the composition was finished. This method will be found much quicker than setting each column separately. Care must, however, be exercised to keep the columns separate in justifying the quadrats to the respective widths, so that no difficulty may be experienced in inserting the rules. There should never be less than an en space between the matter and the rules, and a white line equal to an em or an en at the top and bottom.

Type for the headlines of tables should be two sizes smaller than that used for the body, though this point depends often upon circumstances beyond the control of the compositor.

When rules are cut for table work they should be exactly the depth of the column, not too long, or it will be next to impossible to make the matter lift. It will be best, if at all possible, to set each column to even ems, so that if rules are necessary between the lines of figures or type, metal rules may be used. Also, when it can be done, have all the columns of equal width.

Head lines, when set the long way of the page, should always read from left to right, or from the tail to the head.

When casting off for table matter, be careful to make allowance for fractions, if needed.

Tabular matter is so called when columns of figures and columns of type are interspersed, and are paid extra according to the number of columns or justifications. Two columns are paid one-third extra; three columns one-half extra; four columns three-fourths extra; and five columns or more are charged double. This to some extent, however, depends upon the custom of the trade, and varies somewhat in different parts of the country. Each column is, of course, supposed to mean a separate justification.

COMPANIONSHIPS.

The methods of working book offices are so many, and the systems are so varied, that scarcely two are carried on on exactly the same principle. As it would be impossible to give an account of all the systems, we shall describe one or two (on which practically all others are based) for the guidance of those who may be newly entering on this class of work.

A companionship is a number of journeymen compositors organised to work together somewhat after the following manner. Copy having been received from the overseer, and instructions given by him as to length and width of pages, &c., each compositor in turn takes copy. The compositors by this system have to make up their own pages and impose them. If one has matter over and beyond the number of lines required for his pages, he passes on such matter to the next, so that if the first compositor has two pages and fourteen lines over, he "lends" the fourteen lines to the next compositor, adding to it head and white lines, making in this case sixteen lines in all. He enters such over-lines in a book provided for the purpose, which is passed round for all to record in the same way borrowed or lent lines, as well as the total number of lines set. When a sheet is completed, the one with largest number of pages set imposes the sheet, and afterwards the compositors take it in turn to do the imposition.

The weak point in this system is the time lost in entering up the book, as well as the disputes which occur through errors.

THE CLICKING SYSTEM.

This system has come into vogue in recent years, and has almost entirely replaced the older system just described. A body of compositors have at their head one who is termed the clicker. He is usually elected out of their own number, though sometimes appointed by the house. The duties of the clicker are to receive and give out copy, make up and impose the pages as the matter is set, and generally superintend the production of the work. His usual method of procedure is to give out copy, and himself to set up, ready for use, head lines and other incidental matter for making up the pages and imposing them when finished. He also keeps an account of the number of lines set by each man. The advantage of this system is that the compositors can better keep to their work, and by not having to break off they can set more matter in a given time, and thus earn more money. Another duty of the clicker is to charge the work, receive the money, and divide it amongst the compositors. He counts up the total number of thousands set by each man, a given number of which are equivalent to an hour's work, and thus each man is computed to have done so many "hours." The clicker adds his own time to this, and divides the amount of the general bill (which he reduces to pence for the purpose) by this number, and by this means each man receives an amount in proportion to the number of thousands he has set, and a *pro ratâ* share of the "fat." The general bill is the total charge to the house of everything done by the companionship. Thus all fat matter is divided among the men proportionately to the amount of matter which each compositor has set. There is, perhaps, one disadvantage in this system, *i.e.*, the temptation to dishonesty on the part of a clicker. On the other hand, with a thoroughly honest and upright clicker, the clicking system is undoubtedly the simplest, best, and most effective method of conducting a companionship.

The systems vary, however, considerably as regards detail, and most houses have peculiarities incidental to themselves.

CHAPTER V.

MAKING UP PAGES.

AFTER the matter has been set up and corrected on the galleys, it will require to be made up into pages suitable for the size of the paper on which the book has to be printed.

DETERMINING SIZE OF PAGE.

Usually the size of the pages of a work is settled before the "copy" is placed in the compositor's hand, and often the printer has no option in the matter, receiving his instructions from the author or publisher.

The size of a page of matter is determined by the size of the type used; small type demands less margin than large or leaded type.

A good guide is to allow a margin for leaded long primer of say one-half of the area of the page. If the question be put,—"What would be the measure of a page of type each way, set in long primer leaded, for a demy 8vo. book?" we work out the answer thus:—

A demy 8vo. page measures, untrimmed, about $8\frac{3}{4}'' \times 5\frac{1}{2}''$; these multiplied together give $48\frac{1}{8}''$. Half this will be $24\frac{1}{4}''$, and as 36 pica ems equal one square inch we should have 873 pica ems in these $24\frac{1}{4}''$. These 873 picas need apportioning for the measure of the type. To do this properly it will be best to get a sheet of paper and mark off with a pencil what is thought to be a proper margin, and test it by measuring in pica ems each way, then adding the two together: if they amount to 873, and correspond in the proportion indicated, then the measure may be said to be correct; if, however, there is discrepancy then reduce or enlarge the measure, as the case may require, until the proper margin is obtained.

If a sheet of the proper size is not available, then proceed as follows :—Allow say $\frac{3}{4}''$ for side margin, which will leave $4''$ for type measure in width; and allow say $1\frac{1}{8}''$ head and tail margin : this would allow for depth of page $6\frac{1}{2}''$ or 39 ems pica, say 38 ems. The answer would be 38 ems deep and 24 ems wide. 38 and 24 multiplied together give 912 pica ems, and the half of the area of the page measures 873 ems pica, so that this is near enough for all practical purposes. If the matter is indented an en-quad it will be as near as possible. Another basis of calculation is that generally a page is half as long again as it is wide so that if a page be 24 ems wide it would be 36 ems deep, or thereabouts.

By the above means the measures of any page may be worked out mentally.

MAKING UP PAGES.

When ready for making up, place the matter on the left-hand case of the frame, wet with a sponge, and have a small galley on the right-hand frame ready for receiving the required matter for the page. Before commencing, set up a sufficient number of head-lines and blanks to make a sheet, or for the required number of pages. Cut a piece of reglet, or keep a piece of furniture for a gauge as to the length of page. First lift on to the making-up galley the head-line and blank, then the required number of lines from the galley of matter to make a page. White out with leads to the gauge of the page, being very careful to make each page exactly the same length, so as to obtain accurate register. At the foot of each page it is usual to place a white line, and in this line will be placed the signature when required.

The first page of a work, as well as the beginning of each chapter, is usually dropped; that is to say, six, eight, or ten ems of furniture are inserted at the head of the matter. It is usual, in high-class work, for this space to be partially taken up by a head-piece, which adds much to the appearance of a book.

As each page is completed, it should be tied up. Twine, or "page-cord," as it is termed, is passed round tightly four or five times, commencing at the left-hand bottom corner,

and terminating at the right- or left-hand top corner. About three inches from the end, the twine should be pushed under the plies and drawn up at the corner of the page in a loop, so as to prevent the possibility of slipping, and also to allow of the cord being easily unloosed.

Care must be taken to keep the type well on its feet, and the cord, after being fastened, must be thrust down to the middle of the type. See that the folios are in correct sequence, and that the name of the work is on the even and the subject heading of the matter on the odd page; also that the signatures are in their proper places.

In making up pages it is necessary to avoid turning over a single or even the last two lines of a paragraph, or for a new paragraph to commence at the last line of a page. To prevent this, it will sometimes be necessary to get in a line, or to drive one over.

When a number of forms are to be made up quirewise (that is, when several sections of pages are to be inserted one inside another, and stitched through the back like an ordinary 16 pp. pamphlet), the forms will have to be imposed accordingly, and the space for margin will have to be proportionately modified. Supposing forty-eight pages were to be made up in this manner, then the first eight and last eight would be imposed together, and by reason of being the outside section, and having more space taken up in the back by the insets, a nonpareil more should be placed in the backs than for an ordinary section of sixteen pages, and say a thick lead extra in the next sheet, which would consist of pages 9 to 16 and 33 to 39.

If several sheets are to be bound by stabbing through the back,—that is, if instead of being stitched through, each sheet is folded complete, and when placed in consecutive order the whole of them are fastened together by holes being stabbed about an eighth of an inch from the edge of the back for fastening with thread or wire,—in such a case more space will have to be allowed in the back, thus of course reducing the fore margin. Assuming that a pica will be taken up by the stabbing, then two picas extra will be needed in the backs. This method of binding should only be adopted where there is a wide margin.

The following instructions concerning Imposition are

from the Office Manual of Messrs. Theo. L. De Vinne & Co., and deserve to be placed upon permanent record for the benefit of English readers :—

"Never impose a form of more than twelve pages without finding out whether the form should be in one or more sections. For paper of ordinary thickness, sixteen pages may be put in one section; for very thick paper, the section should be of eight or four pages; for very thin paper, it may be of twenty-four pages.

If the paper is to be trimmed, make up your form to a sheet trimmed to the exact size. If it is not to be trimmed, make it up to the size, in inches, by which it is described and sold. Do not make it up to an accidentally selected sheet, which may be too long or short. If the paper is to be wet, find out from the foreman of press-room how much it will stretch in wetting, and allow for the increase.

Find out also whether the proposed form of pamphlet will be cut or uncut as to margins; whether it will be sewed or side-stitched, whether it will be bound in a stiff cloth case or in plain paper cover.

If it is to be side-stitched, or bound in stiff cloth case, allow more margin in the back than you would for a sewed, uncut, and paper-covered pamphlet.

If the pamphlet must be trimmed to a fixed size, allow enough of blank for the paper that will be cut off.

Always make up margins full, to fill the paper, so that the printed sheet can be truly folded by regularly even folds of the paper. Make sure, always, that each side margin on the outer edge of the printed sheet is exactly one-half of the broad inner margin nearest the cross-bars. Verify this in 16mo. forms by folding a sheet of the paper in quarto, and using it as a measure from any point in one quarter to a corresponding point in another quarter. If it does not tally, the margins are not right. Never send a form to press with unbalanced margins, which will compel the binder to cut off waste before he begins to fold.

When you can do so, put one or more nonpareil reglets in for the broad margins and at the tails of pages. If author or reader chooses to alter the margins a little, the change can often be made by transposing reglets, without change of quoins or furniture, and with little delay."

CHAPTER VI.

SIGNATURES.

A FINISHED book consists of a number of sections of pages; that is, each section consists of a number of pages on one sheet of paper, which has been folded so that the pages run in consecutive order. On the first page of each of these sections is a letter, generally a small cap, termed the "Signature"; it is placed at the foot of the page, on the right hand, and sometimes in the middle of the line. This signature is repeated on other pages of the sheet, with the addition of a figure 2 placed after it. Usually the first sheet of a book consists of the preliminary matter, which is reckoned as A, so that the second sheet commences with B, the next C, and so on all through the alphabet, with the exception of J, V, and W. If the letters of a single alphabet are not sufficient for the compass of the work, then the letters may be doubled for the succeeding sections, as AA, BB, &c., or 2 A, 2 B, &c.

Signatures serve various purposes:—1st. They are an assistance to the compositor in designating each sheet, alike for convenience of reference to its pages and for moving about for correcting, &c. 2nd. They act as a guide to the machineman or pressman in backing the sheet, as well as to distinguish the outer and inner forms. 3rd. To assist the binder in collating and gathering the sheets. If the signatures fall in proper alphabetical order there is no necessity to examine the pages to ascertain whether they fall in proper order. 4th. To assist the binder in folding, as the outer signature has reference to the inner, and each denotes respectively the proper method for folding.

The number of signatures in a sheet varies according to the scheme of imposition and number of pages in a sheet.

Octavos have two signatures, say B on the first page, and B 2 on the third page. The second signature is used to distinguish the forms, outer and inner, and when both sides are worked as one form, such second signature need not be used. A half-sheet of octavo has only one signature.

Twelves have three signatures,—B on page 1, B 2 on page 3, and B 3 on page 9, the last-named being the first page of the off-cut. A half-sheet has two signatures only, B on page 1 and B 3 on page 5, this being then the first page of the off-cut.

Sheets of Eighteens have two signatures, on the first and third pages respectively.

Sometimes two kinds of independent matter are imposed together for printing, being separated afterwards. A half-sheet of twelves may contain eight pages of one book and four pages of other matter; a sheet of eighteens may consist of three twelves, each twelve pages being different matter. In these cases a signature would be required to the first of each twelve.

For sizes of paper and their subdivision see chapter on Paper.

With regard to the use of signatures we should say that there is no arbitrary rule; different houses have rules of their own governing all this, so that what holds good in one place may be wrong in another.

TABLE OF SIGNATURES AND FOLIOS.

No.	Sigs.	Folio.	4to.	8vo.	½ Sh. 8 vo.	12 mo.	½ Sh. 12mo.	16mo.	18mo.	
1	B	1	1	1	1	1	1	1	B	1
2	C	5	9	17	9	25	13	33	C	37
3	D	9	17	33	17	49	25	65	D	73
4	E	13	25	49	25	73	37	97	E	109
5	F	17	33	65	33	97	49	129	F	145
6	G	21	41	81	41	121	61	161	G	181
7	H	25	49	97	49	145	73	193	H	217
8	I	29	57	113	57	169	85	225	I	253
9	K	33	65	129	65	193	97	257	K	289
10	L	37	73	145	73	217	109	289	L	325
11	M	41	81	161	81	241	121	321	M	361
12	N	45	89	177	89	265	133	353	N	397
13	O	49	97	193	97	289	145	385	O	433
14	P	53	105	209	105	313	157	417	P	469
15	Q	57	113	225	113	337	169	449	Q	505
16	R	61	121	241	121	361	181	481	R	541
17	S	65	129	257	129	385	193	513	S	577
18	T	69	137	273	137	409	205	545	T	613
19	U	73	145	289	145	433	217	577	U	649
20	X	77	153	305	153	457	229	609	X	685
21	Y	81	161	321	161	481	241	641	Y	721
22	Z	85	169	337	169	505	253	673	Z	757
23	2 A	89	177	353	177	529	265	705	24mo.	
24	B	93	185	369	185	553	277	737	B	1
25	C	97	193	385	193	577	289	769	C	49
26	D	101	201	401	201	601	301	801	D	97
27	E	105	209	417	209	625	313	833	E	145
28	F	109	217	433	217	649	325	865	F	193
29	G	113	225	449	225	673	337	897	G	241
30	H	117	233	465	233	697	349	929	H	289
31	I	121	241	481	241	721	361	961	I	337
32	K	125	249	497	249	745	373	993	K	385
33	L	129	257	513	257	769	385	1025	L	433
34	M	133	265	529	265	793	397	1057	M	481
35	N	137	273	545	273	817	409	1089	N	529
36	O	141	281	561	281	841	421	1121	O	577
37	P	145	289	577	289	865	433	1153	P	625
38	Q	149	297	593	297	889	445	1185	Q	673
39	R	153	305	609	305	913	457	1217	R	721
40	S	157	313	625	313	937	469	1249	S	769
41	T	161	321	641	321	961	481	1281	T	817
42	U	165	329	657	329	985	493	1313	U	865
43	X	169	337	673	337	1009	505	1345	X	913
44	Y	173	345	689	345	1033	517	1377	Y	961
45	Z	177	353	705	353	1057	529	1409	Z	1009

CHAPTER VII.

IMPOSITION.

WHEN the matter has all been made up into pages the next thing will be to impose the same; that is, arrange them in such a manner for locking up in chase that when printed and the sheet is folded they will all read in consecutive order.

Compositors will do well to give thought and study to this subject, and learn something of the principles of imposition, so that if occasion should require they will be able to give a good account of themselves. A careful study of the diagrams given herewith will simplify matters, and no difficulty will be met with but which may be overcome with a little practice.

On referring to the diagrams it will be found that page 1 always occupies the left-hand bottom corner, and the last page is always next to it. There are some exceptions to this rule. The sheet sometimes is made up from the inside, as by this means heavier or lighter pages may be arranged to better advantage. Note that two pages in pairs, placed side by side, their folios being added together should give a total of one more than the number of pages in the sheet, as, for instance, 1 and 16 make seventeen in a half-sheet of sixteens; and seventeen should therefore be the result of every two adjoining folios thus added together.

The least number of pages which can be printed on any sheet of paper folded into leaves, provided it be printed on all its divisions, is four. This is called *folio*, from the Latin *folium*, a leaf, each page constituting a leaf.

Sheet work is arranged in two forms, the outer and inner. The outer contains page 1 and all pages printed on that side of the sheet. Half-sheet work is imposed in

one form to back itself, and the sheet when printed is cut in two, yielding two perfect sheets.

A sheet of Folio contains ...	...	4	pages in	2	forms
A sheet of Quarto contains	...	8	„ „	2	„
A half-sheet of Quarto contains	...	4	„ „	1	„
A sheet of Octavo contains	...	16	„ „	2	„
A half-sheet of Octavo contains	...	8	„ „	1	„
A sheet of Sixteens contains	...	32	„ „	2	„
A half-sheet of Sixteens contains	...	16	„ „	1	„

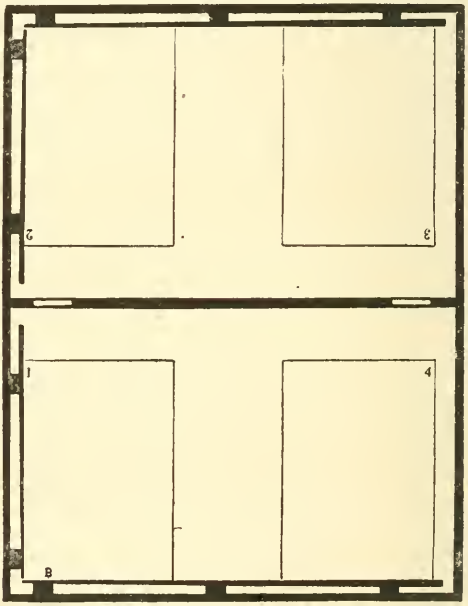
When pages are imposed on the stone they are in a reverse position compared with their appearance on the printed sheet. If a printed sheet be opened out, it will be found that page 1 is at the right-hand corner, but on reference to the scheme it will be found that the same page is at the left-hand corner. This should be borne in mind if at any time a plain sheet is folded and marked for imposition. We have known men mark a sheet and then lay the pages down as marked on the sheet, instead of transposing their position, with the result that the work had to be done over again. Great care should be exercised to see that pages are properly imposed *before the strings are taken off*. A mistake may be easily rectified whilst the page-cord is still on, but afterwards it is both dangerous and difficult to do so.

SCHEMES OF IMPOSITION.

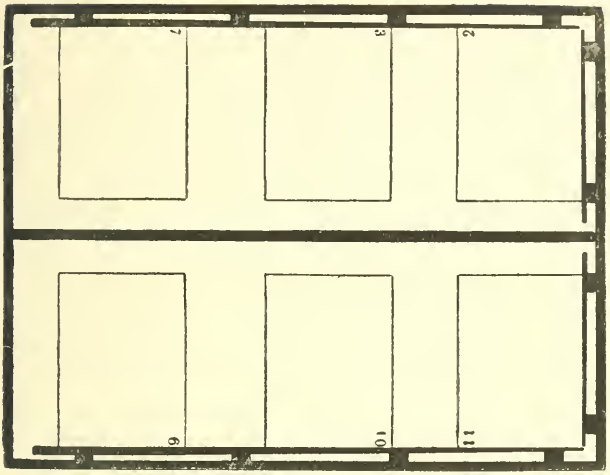
The schemes here given are for imposing a certain number of pages. The question as to whether sixteen pages have to be worked as a half-sheet of sixteens or as a sheet of octavo is one of convenience. There is no difference in the imposition; the difference is in locking up. For a half-sheet of sixteens, the sixteen pages would be locked up in one chase, and worked at one time; or they might be locked up in two chases, and each worked separately. If worked at twice, it would be a sheet of octavo. And if locked up in folding-chases, they might be worked as either at the will of the machine overseer. For this reason we have given the schemes as imposition for a certain number of pages, and the information about sheets and half-sheets will be found at the head of this page. We think this method will be more easily understood by

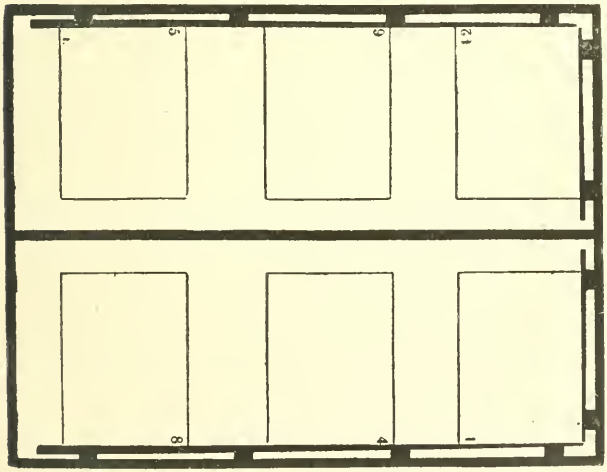
those who are not acquainted with book-work, but who need a knowledge of imposition for use in jobbing offices. We know that, to many compositors, the sheet and half-sheet schemes have been a means of confusion.

The using of cross-bar chases, too, is optional; and although we think that two bars are better than one, there is no absolute necessity for two. Many book-hands, however, think they can get better register by using chases with two bars. This, likewise, is a matter of convenience and practice.

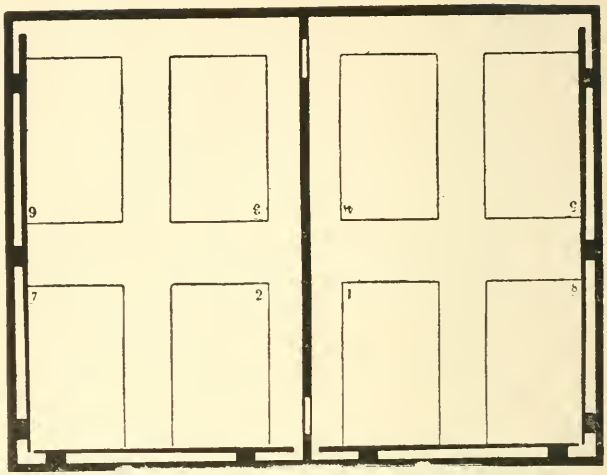


IMPOSITION FOR FOUR PAGES.

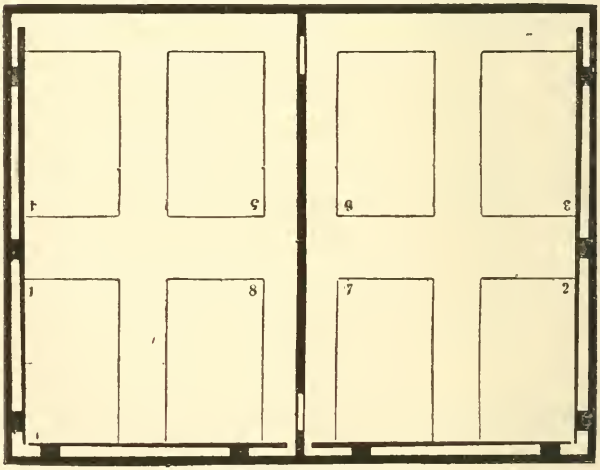




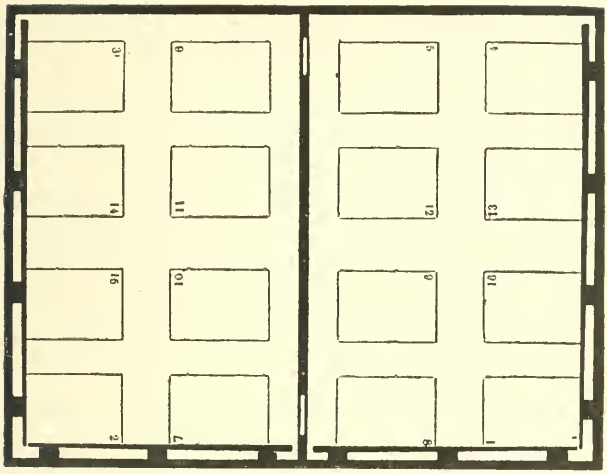
OBLONG SIXES WITH OFF-CUT.



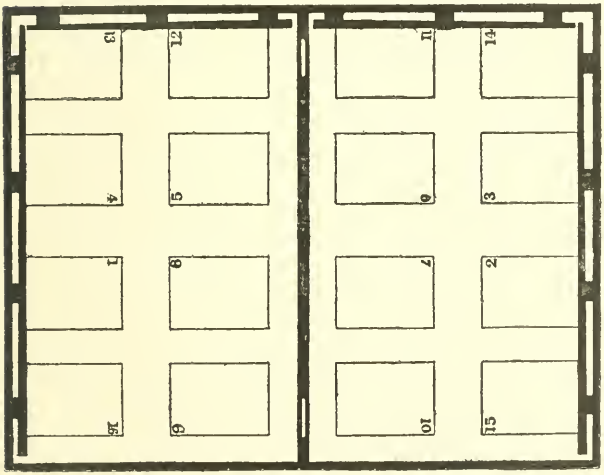
EIGHT PAGES IMPOSED FROM CENTRE.



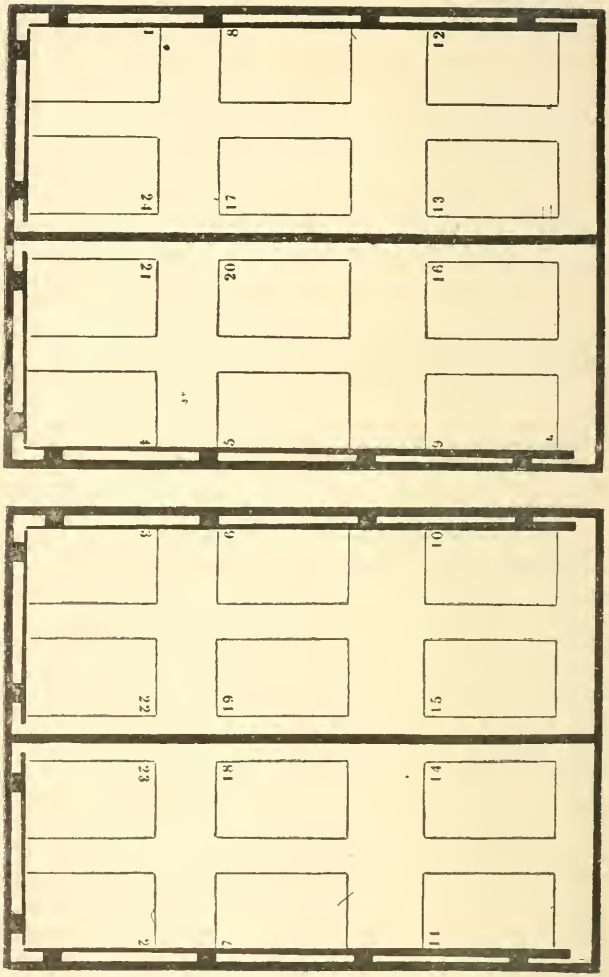
ORDINARY EIGHT PAGES.



ORDINARY SIXTEEN PAGES.

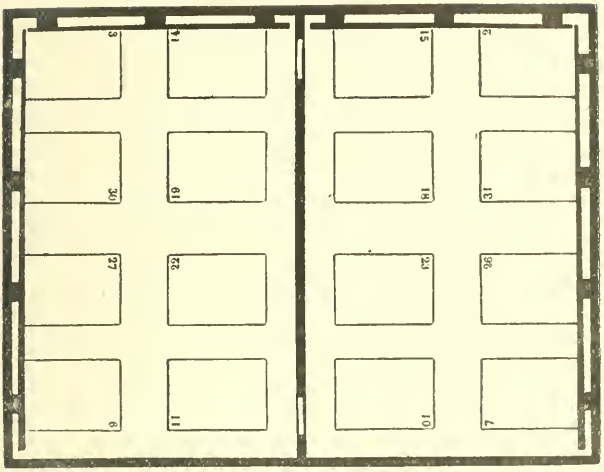


SIXTEEN PAGES IMPOSED FROM CENTRE.

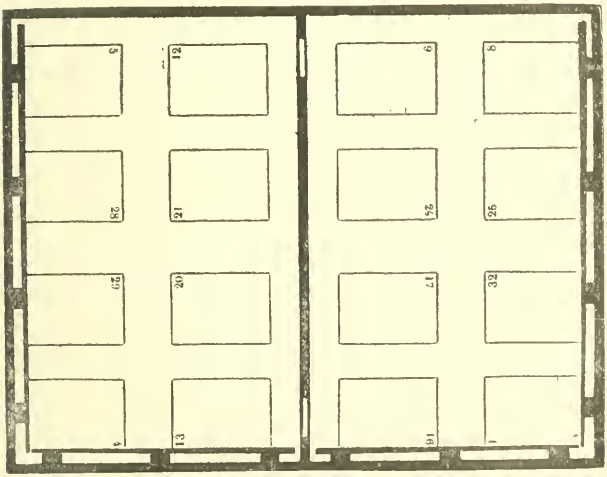


ORDINARY TWENTY-FOUR PAGES WITH OFF-CUT.

This scheme will do for folding in by simply turning the offcut pages bodily round, 12 to take place of 9, and 13 that of 16, and the other four to be treated similarly.

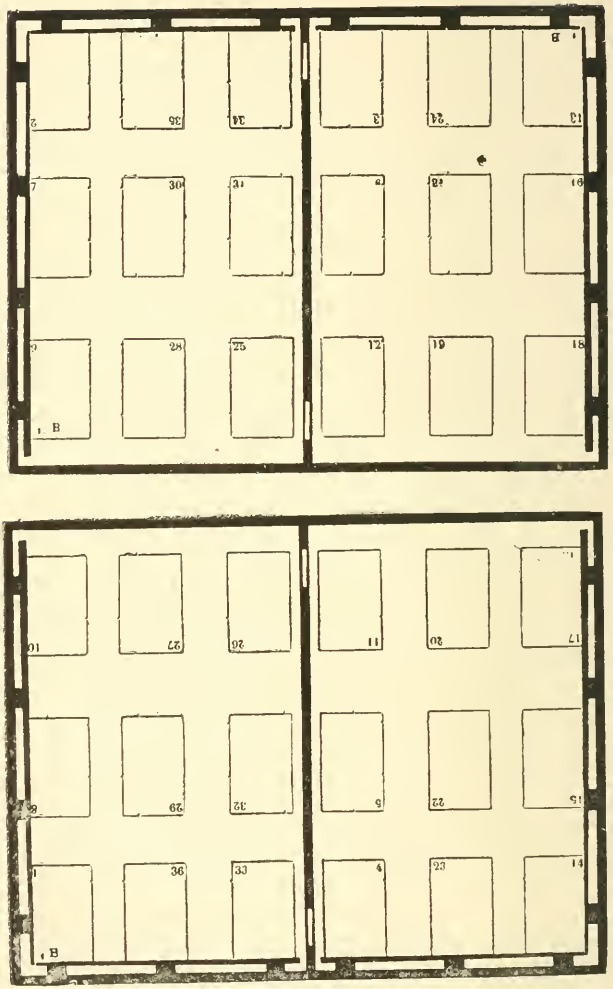


INNER FORM.



OUTER FORM.

ORDINARY IMPOSITION FOR THIRTY-TWO PAGES, IN TWO FORMS.



ORDINARY IMPOSITION FOR THIRTY-SIX PAGES.

CHAPTER VIII.

MAKING MARGIN.

WHEN the pages have been placed on the imposing surface in proper position, a chase and furniture will have to be placed round them, and the latter will have to be adjusted in such a manner that when the form is locked up the respective pages of type will print in the centre of the respective pages of the paper when folded, or nearly so; pages should always be nearer the back rather than the fore edge when printed.

The chase must be sufficiently large to hold the pages of type and the necessary furniture, and allow room to lock up. We will suppose that the pages to be locked up are for a half-sheet of sixteens. Before proceeding to place furniture round the pages, examine the folios to see that each page is in its proper position. Obtain a sheet of its own paper,—that is, a sheet of the size on which it is to be printed,—and fold it carefully to the required size.

First,—ascertain the furniture required in the *Backs*, and for this purpose take the folded sheet and place it narrow-way at the left-hand side of page 16, and extend to left-hand side of page 1, letting the sheet hang over the edge a pica or great primer, to allow for trimming by the binder. (See diagram, Backs on next page.)

Second,—to ascertain the space or white required for *Gutters*, open the sheet one fold, and place it narrow-ways at the left-hand side of page 13, and bring it even with page 1. The sheet in this case must not hang over, but must be flush with the edge of the page. Then make up the required space or white on each side of the cross-bar with wood or metal furniture. Some houses call what we have here termed the gutter, the back. There is no fixed

rule, however; and we think it is only reasonable that what is actually the back of the book should be called the

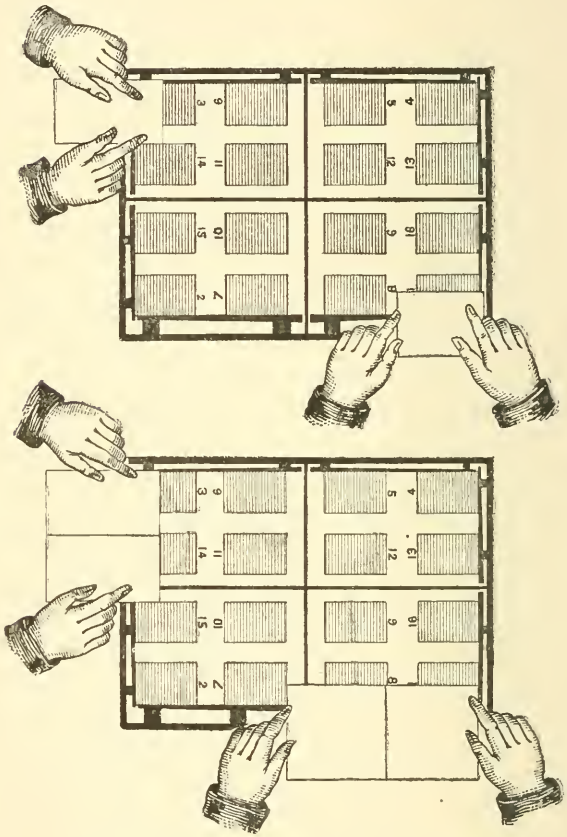


DIAGRAM SHOWING METHOD OF MAKING MARGIN.

back, and that the space between the sections of pages which the cross-bar fills should be termed the gutter.

Third,—to ascertain space for *Heads*, fold up the sheet

again to octavo, and place it long-way against the folio, say, of page 8, and extend to the bottom of page 1, letting the sheet hang over the same as for backs.

Fourth,—to ascertain space for *Tails*, open the sheet two folds, and place it the long way at the foot of page 7, and extend flush with foot of page 1, and then divide the space equally on each side of the cross-bar.

For octavos and quartos, when heads and backs only require measuring, the overhang for cutting must be allowed in both cases.

For off-cuts, the overhang must be allowed for the heads of the off-cut pages.

The same furniture must be placed in all the sections of pages, and proper side and foot sticks inserted, with requisite wood furniture, so as to fill up, with the quoins, the remaining space in the chase.

Metal furniture is preferable to wood between the pages. If, however, wood has to be used, it is advisable to use only metal for heads and tails. Furniture for gutters and backs may be a little larger than the pages, to prevent letters slipping, &c., and will also help to keep all tight and rigid. The sidesticks also may be a little longer than the page ; but the footsticks, if anything, should be a little shorter than the width of the page. The thick end of the side and foot stick should always be nearest the cross-bar.

After all the furniture has been placed in position, the cords must be taken from round the pages, commencing with those next the bars, and the matter carefully pushed up ; the quoins are then inserted, and the form is ready to lock up.

LOCKING UP.

This is a very important operation. Few men, our experience teaches us, know how to lock up a form. It is an operation which requires great care. First tighten the quoins with the fingers ; then plane the form gently, just sufficiently to send all the letters home and make the surface of type level. Next put the shooting-stick at the thick end of the footstick, and hit it with sufficient force to push the matter well together ; then serve the sidestick

in the same way. After this has been done, commence to drive home the quoins, commencing at the thick end of the footstick, and gradually tighten the whole of the quoins, but not too much at once. Do not drive one quoin tight and leave others slack. This is one cause of unevenness in register, springing, &c. Do not drive up the quoins too tight, but just sufficiently to make the form lift without fear of letters being slack and liable to be drawn out when on the machine. Some compositors seem to drive up quoins as if they thought the form would never have to be unlocked again. Let it be borne in mind that *a form can be locked up too tightly*, particularly with mechanical quoins, which exert a much greater lateral pressure than wood quoins. In respect to the use of iron quoins, an unreasonable prejudice exists on the part of some men against their use, but that arises from ignorance of their capabilities. The same prejudice has always opposed new things. Pressmen, when rollers first came into use, objected to them, and said they could produce better work with dabbers. Probably that was so; but who would dream of using dabbers now? The same with machines. Even at the present day, in some old-fashioned establishments, there obtains an opinion that press-work is superior to machine work; but that does not exist in more modern offices, and we venture to think that most machine-men with a good machine would have no difficulty in producing work quite equal to anything ever produced from any press.

We certainly think there are many iron quoins in the market superior to wooden ones, but they require a different manipulation; and considering how prejudices have had to give way in the past, we should be careful not to fall into a similar narrow way of thinking, but should try and overcome any little disadvantage which their use may at first possibly entail.

What we need to understand and bear in mind is that these iron quoins exert greater pressure than wood ones; that more care is needed in tightening them, so that they may exert an equable pressure and be not too tight; and that an iron quoin should not, if it can be helped, be placed next to the chase. Iron against iron does not bite well.

A piece of thin reglet inserted between, if nothing thicker can be used, will answer the purpose. These remarks are made from practical experience; and if the above hints be acted upon, we think that iron quoins will be found from 75 to 100 per cent. cheaper than wooden ones. The first cost will be heavier, but the advantages are great. They require much less time to manipulate; they do not wear out; they do not warp; and who has not experienced this latter difficulty with wooden quoins? Even among new quoins we have seen some nearly a sixteenth of an inch out of square; and often a form gives much trouble by reason of a few warped quoins.

Before commencing to lock up, the form should be carefully examined to ascertain if the furniture is in proper position, that it does not bind, that no leads are riding, nor any letters out of position.

The form may be gently planed again, after it is locked up, to ascertain if any portion springs. Heavy planing after locking up can do no good, but may greatly damage much type. It should be remembered that it has been said, not altogether inappropriately, that the "planer hard is the typefounder's friend." But it is not the planer which is at fault, but the ignoramus, or incapable workman, who uses it without thought.

CHAPTER IX.

NEWSWORK.

THIS class of work does not call for the amount of skill in the arrangement of the types, nor for the careful and painstaking labour required for both book-work and jobbing. Owing to the great hurry that attends the production of a paper, and especially of a daily, there is no time for the work to be done with that nicety which is required in the other departments of the compositor's craft. Moreover, considering the ephemeral nature of a newspaper, there is not the same necessity for perfect work. The essential qualifications of a news compositor are principally speed and accuracy; so that when a compositor feels no inclination to perfect himself in the higher branches of the business, he usually finds his way to the news department and develops into what is known in the trade as a "type-lifter." We think it is a great mistake to confine an apprentice for the whole period of his indenture to newswork alone. An apprentice in a jobbing office may, at the conclusion of his apprenticeship, if necessity require it, obtain work in a news office, and in a few weeks he will probably become as efficient as the average man. But an apprentice to news, after having served his seven years, is not competent to take a place in a jobbing office on display work; nor is he, indeed, fitted for better class work of any kind. The fact of his habits having been formed on news work, where care and taste are not essential, disqualifies him for display work. He has new habits to acquire, and, more difficult still, old habits to break off. Unfortunately, the higher remuneration of news hands causes many compositors to seek after that class of work rather than make themselves perfect in the more artistic branch.

Newswork may be divided into two branches, weekly

and daily. There is not the rush and hurry on a weekly paper which is the rule in the office of a daily paper.

The method of working a weekly and a daily paper varies somewhat. The circumstances of each call for slightly different ways of working. We shall give a broad outline of the general procedure.

In weekly news offices the early part of the week is taken up in distributing. Each man has had his letter apportioned to him for the purpose. The members of the staff take it each in turn to lay up and apportion the type. On Wednesday, as a rule, setting commences in earnest, continuing on Thursday and Friday, the working hours being in some offices extended to Saturday morning.

All the "copy" is placed under a clump. The first "take" is drawn for, and afterwards each man as he finishes copy appropriates the top piece, and this continues as long as copy is under the clump. When copy is exhausted, the men, as they finish their takes, enter their names on a slate, so that when copy is again given out they take up in the order in which their names appear on the slate. The compositor calls "copy" as soon as his last line is finished.

There are different methods of arranging for emptying matter in galleys. The general rule is to have galleys arranged on a random, on which the matter is emptied, and the copy placed in a drawer. When the galley is full it is pulled for reading; the copy being sorted and passed in to the reader with the proof. Another method, which we think an improvement, is to have the galley places numbered, so that each galley, for the time being, takes one particular number. Spikes are arranged at the head of the random with corresponding numbers to those of the galleys, so that the copy for matter on No. 1 galley is placed on the spike numbered 1; or pigeon-holes similarly numbered may be used for reception of copy. By this means much time is saved in sorting copy. This is a better system than placing all the copy indiscriminately in a drawer.

When the galley is read, the reader marks the names of the respective compositors on the proof, to distinguish the different takes. These proofs are kept and afterwards cut up, each compositor taking out his own proofs and pasting

them together for the purpose of measuring and checking. This may be done in different ways, by the column at so much per column, or by the hundred lines, or by the number of lines to a thousand, each size of type, of course, being measured separately. Another method is to mark a copy of the paper with each compositor's name or number on the matter which he has set, and on a separate slip, similar to table below, enter the first and last word of the take and the number of lines it contains under each head respectively.

COMPOSITORS' DOCKET SHEET.

Compositor's Name _____

„ No. _____.

Name of Article.	First Word.	Last Word.	Number of Lines Set.			
			Nonp.	Minion.	Brevier.	L. P.
Leader	It	none	...	...	...	20
Parl.	There	came	...	40	...	...
Council	which	to	...	20	...	...
		TOTAL ...	...	60	...	20

DAILY PAPERS.

Daily news offices are conducted in much the same way as those of weeklies, with the exception that instead of having a rush of work only on one day in the week, there is the same high pressure every day. Copy is usually started at about 6 p.m., and setting proceeds leisurely until about 9 o'clock, when copy arrives in large quantities. There is a gradual increase of pressure after that time until the moment of going to press.

The practice of "making even" has more frequently to be resorted to in daily than in weekly newswork. It is often necessary to get up some article speedily, the copy is then given out in short takes, and as it is impossible always to give a take ending a paragraph, it is necessary to make the line end even, and to accomplish this, very wide space has often to be placed between the words, and sometimes, where it is impossible thus to make even, some lines will have to be overrun, in order to attain this object. In cases of extreme urgency four-line and even three-line takes are given out, by which means a column of matter may be set in a very few minutes.

DISPLAY OF NEWS ADVERTISEMENTS.

The most important part of a news compositor's work is that of setting advertisements. Each paper has usually some definite style for displaying definite classes of advertisements. Auctions, Situations, Theatrical and Musical, Parliamentary, and Election advertisements have all to be set in definite styles.

There are certain principles of display which should be borne in mind in setting news advertisements, apart from the special rules of the house in regard to definite classes of advertisements. There are many business and general announcements which need to be displayed on proper theoretical principles. Sometimes the style of the house is such that real display is out of the question, and all that can then be done is to arrange the words in lines so as to get the best effect.

Suppose the compositor were to ask himself the question, What is the object of this advertisement? For the object should have the principal line and position. The chief items of display may be ranged as follows:—What? Who? Where? When?

The first head covers the object of the announcement. Suppose it is a sale of dress goods, &c. Then these items will need to be as prominent as possible, so as to catch the eye. When larger type cannot be used it will be necessary

to gain the effect desired by arranging the lines in diagonal order across the column, thus :—

IMPORTANT SALE OF
SILKS,
SATINS,
DRESS GOODS.

Using a two-line initial to each word will add to the effect, if to do so be consonant with the style of the house. Another plan would be to have a few short lines preceding and following the important line. This plan will generally be found the best if the advertisement is crowded.

After the object comes the subject, the name of the firm by whom the goods are being sold. This may usually be made a line by itself, and be in capitals, with a two-line initial. Next in order is where,—the locality, the street; and, lastly, when,—the date. All other matters are subsidiary to these, and, if set up with the due regard to making these chief lines to stand out from the detail contained in the advertisement, the whole cannot fail to make an attractive announcement.

The advertisement may include several matters which will have to be "thrown up," as, for instance, such words as "Manufacturers' Stock!" "Clearing last Season's Goods!" "Great Sacrifice!" &c.

UNIFORMITY IN STYLE, CAPITALING, ETC.

In order to ensure uniformity in the work executed in an office, it is usual to adopt a fixed "style," which must be strictly adhered to by all employed in such office. The rules as to "style" are sometimes embodied in a small book, giving examples of all peculiarities or deviations from the usual method of spelling, &c.; the use of figures, capitals, &c.; and use of italics in foreign phrases, &c.

The following is given as a fairly good example of such rules, suitable for use on a newspaper :—

"Walker's Dictionary" to be the authority on spelling and the division of words.

Leading Matter.—In leaders the first line to be full out, with the first word in small capitals. The names of the Deity, titles of rulers, peers, dignitaries of Church and State, and the names of all real personages to be in small capitals. Names of supposititious persons, as characters from books or plays, to be in lower case. Where any name takes an adjectival form, as "Reuter's telegram," &c., such names to be in lower case.

Book Notices.—The heading of each notice to be a hanging indention of one em; the title of book, name of author, translator, commentator, illustrator, &c., to be in small capitals; publisher's name in lower case, within brackets. The first line following heading to be set full out. Extracts, when set in smaller type than the body, not to be quoted; when in the same type as the body to be quoted.

Picture Notices.—Names of pictures to be quoted, with the catalogue number within parentheses—as "The Ship on Fire" (173). When several notices are included in one paragraph, an em rule to divide such notices.

Inquests.—No italics. Verdicts quoted, the first word only with a capital letter.

Hyphens.—Use a hyphen after the syllables "re" and "co" only when they are prefixed to a word commencing with the same vowel, as "re-elected," "co-operation," &c. Compound such words as "odd-looking," "old-fashioned"; also, when coming before a noun, such words as "well-bred," "much-needed." In cases where two nouns form a word, and the first noun has only one syllable, no hyphen to be used; as "gasworks," "cabman," "schoolboy," &c.; except where two similar consonants come together, as "coach-house," &c. Where there are two syllables in either noun, the hyphen to be used; as "sitting-room," "public-house," &c.

General.—Avoid capitals as much as possible, keeping all adjectives lower case, except such words as Imperial, Royal, Parliamentary, &c.

Names of songs and pictures quoted, with capital letters.

Capitals.—Bench (of magistrates), Court (judges speaking or spoken to, not the building), Council, Town Council, Executive, Corporation, Socialist, Monarchist, Fenian, Democrat, Boards of Guardians, &c.

Lower Case.—Battalion, army, navy, mission, society, boycotter, crofter, moonlighter, morocco leather, albert chain, &c.

Figures.—Numbers up to and including ninety-nine to be in words; also indefinite numbers, as "nearly a thousand," "about a million," &c. In measurements and statistical matter figures to be always used.

Italics.—French, Latin, or other foreign words, up to and including three words, to be in italic; beyond that number of words to be in roman quoted. In cases of foreign words, such as are in frequent use and thereby becoming Anglicised, as, for instance, employé, post mortem, rôle, début, viâ, en route, to be in roman, and not quoted. Names of characters in plays, and of newspapers and magazines, to be in italic.

Extracts set in smaller type than the body not to be quoted, unless it is conversational matter. In poetry, if quoted, the inverted commas to stand clear of the type.

Parliamentary.—The name of members speaking to be in small caps. Each word of Titles of Bills and Acts of Parliament to commence with capitals; the word next preceding Act or Bill not to be made possessive, and consequently no apostrophe to be used, as Companies Act. "Act," as applied to Act of Parliament, always with a capital letter; and the same remark applies to the word Bill when referring to a Parliamentary Bill in distinction from other bills.

CHAPTER X.

DISPLAY, OR JOBBING WORK.

THIS is the most difficult branch of the compositor's art, and a jobbing-hand should possess many special qualifications. A compositor employed on book-work requires a fair amount of general knowledge, while a news hand requires in addition swiftness in the mechanical operation of lifting type, but for display work there is needed over and above this, good taste, originality of design, and a knowledge of what is correct from an artistic point of view. The true apprehension of the possibility of letterpress work has made great advances during the last ten years. What was considered impossible a decade ago, has now become a matter of every-day practice.

It is an acknowledged fact that the majority of apprentices of the present day are a failure. There are many reasons for this, but it is not our intention to discuss them here. We may state our opinion, however, that the principal cause lies in the great change which has come over the printing business in its commercial arrangements. In olden days a master looked personally to it that his apprentice obtained a proper knowledge of the business. The youth generally lived in the master's house, ate at his table, and worked under his eye. Now all this is changed: the practice of dividing labour tends to keep apprentices in one groove, there is no attempt made to *teach*: in fact, under existing circumstances, no one is specially charged to look after the apprentice. The master rarely enters his composing-room, confining himself to looking after work; and an overseer has enough to do in getting the best paying results out of his men, without troubling himself to teach an apprentice.

The remedy for this deplorable state of things is, we think, to establish Technical Schools, where apprentices and journeymen may learn the theory of the business. Employers would do well to see to this, and forward this movement by holding out inducements to their boys and men to attend such classes,—such as offering prizes to all who succeed in obtaining a certificate of efficiency. In fact, there should be some definite understanding that an apprentice is not fully qualified as a journeyman unless he has obtained a certificate of efficiency.*

In giving hints concerning this branch of the business, we shall endeavour, as far as possible, to confine ourselves to the theoretical principles of display, which the compositor should endeavour to work out in practice. Some men have a natural gift and correct taste for display, whilst others who can produce creditable, and occasionally even excellent work, have no rule to guide them; they work simply by rule of thumb, so that sometimes, almost by chance, a first-class job is produced, whilst at other times a complete failure is the result. To such men a few theoretical and practical rules are likely to prove of great value. By studying these, and following their teaching, the element of chance will be done away, and the work will proceed on principles which cannot fail to produce the best results. We will commence first with

POSTERS.

A Poster or Placard should be so displayed that the gist of its contents can be discovered by the chief display lines. The first consideration is, WHAT is the subject of the bill? If it be an auction bill it may be FREEHOLD PROPERTY, and the freehold property may have certain advantages in the shape of a RESIDENCE, STABLING, PLANTATION, and PARKS, or various other attractions which should be "brought up." All these will, however, be of

* Encouragement should be given to journeymen and apprentices to contribute to the "International Specimen Exchange," conducted by Mr. Robert Hilton. This excellent work has now been published for a number of years, and to its influence must be attributed much of the great advance in artistic printing which has been witnessed during recent years. The thanks of the printing profession are equally due to the originator of the scheme, Mr. Thos. Hailing, of Cheltenham.

minor importance to the principal line, and will require to be arrayed so as not to detract from the clearness of such line.

Next in order of importance will come the auctioneer's name (who), then the place of sale (where), and next the date of auction (when).

There should not be too narrow a margin in poster work, nor should the lines be too close together, as it will detract from the clearness and distinctness of the wording. The whiting also should be very carefully regulated ; there should be an *apparently* even white between each line.

Whatever the description of poster to be set, the compositor should have a clear idea what he intends to do before he commences the job. He should mentally select his principal lines, and set everything else in harmony with them. It is not advisable to have too many short lines, though full lines should be relieved with lighter lines and catch lines.

Ornaments in poster work should be used very judiciously and sparingly ; too many of them completely spoil the appearance and take away from the clearness of the poster. Ornaments, if properly employed, may be made very effective and telling. The use of Initials can also be made to give character and tone to the work.

Sometimes it may happen that for work of this class a letter will be required larger than the resources of the office can boast. In such a case a ready means to get over the difficulty will be to cut out the letter required in strawboard. The way to do this is to get a letter similar to the one required, even though of smaller size, and then draw the design in pencil on strawboard ; the board should be about a great primer in thickness. In many cases this will be easy enough ; for instance, the figure 1, or any letter with straight lines can be produced without difficulty. Others, such as the figure 8, for instance, will be found more difficult. However, with care in sketching and cutting this may be got over. First cut the outline of the design into the strawboard with a sharp-pointed shoemaker's knife, to the depth of about a nonpareil, then with a mallet and chisel cut the design right through. The letter can then be fastened to stereo mounts with

tacks, any hollow place caused by the tacks being filled up with beeswax, and the whole coated over with strong shellac varnish, and allowed to dry for three or four hours. Any number of impressions may be taken of such extemporised letters, either at machine or press. The varnish can be made by putting ½ oz. of shellac into a bottle with 2 oz. methylated spirits.

CIRCULARS.

On receiving copy for a Circular it will be best to read carefully over the MS., note the points to be brought out in display, and decide on the style to be adopted.

There are certain rules in choice of type which should be borne in mind. In choosing type for a builder's or ironmonger's trade announcement, heavy or plain type is most suitable. A draper's or grocer's circular may be somewhat ornate in character ; while circulars concerning concerts and similar public announcements may combine both styles.

The compositor has to decide first the object of the circular, and should ask himself, What does the customer want?—and in all cases judgment must be used to secure the best effect, and to attain the object which the customer has in view.

Harmony should prevail throughout. Old style and modern types should not be mixed. Too many kinds of faces should not be used ; a neater and more harmonious effect is obtained by limiting the range of style of type employed. Novelty alone should not be aimed at, unless it be tempered with judgment and discretion. Too often every other consideration is sacrificed to the desire to produce something new and startling, and the result is *bizarre* in the extreme.

To gain a novel or unique effect without using fancy types, it will be necessary to study the manipulations of brass rule, as well as the arrangement of lines, &c. Many novel and pretty effects may be brought about by the thoughtful employment of brass rule. Twisting rules and giving them a curve at the end, or by finishing them off with bits of ornament, often enhances the *tout-ensemble* of a circular or advertisement.

BORDERS.

Borders are now very much used in high-class printing, and the variety available is very extensive. In selecting a border, endeavour to get one that will harmonise with the character of the job. Always allow ample margin between the type and the inside of border. Do not, if it can be avoided, select a border which will require much time to build up, but rather choose one that will make up effectively with the fewest pieces. It is a mistake to suppose that it is necessary to have a lot of pieces in a border in order to secure something striking. The best effects are often obtained by a judicious arrangement of a few pieces, simple and unimportant in themselves.

When building up a border of various combinations, be sure to separate each kind of border with a rule ; and for gold printing have a heavy design, as hair-lines do not show to advantage either in gold or silver.

Borders having all four sides alike are not now the rule ; in fact, every side of a border may have a different combination without infringing modern canons of taste. An examination of some of the samples embodied in the "Specimen Exchange" referred to on page 78 will be worth whole chapters of explanation, and we strongly recommend printers who are desirous of doing high-class work, to obtain a copy of one of those excellent volumes.

When a border is required round a circular or card it will be advisable first to design the border and set up on the galley the head and the left-hand side. In forming the design the following points should be borne in mind :— 1st, The amount of matter ; if the circular or card is crowded a heavy or wide border will be out of place ; a rule and corner, or a half or three-quarter border, will be best. 2nd, The nature of the matter ; the border, as well as the inner matter should be in harmony with the subject of the matter. 3rd, To gain the greatest effect with the least amount of labour. 4th, The effect of light and shade. The mitreing machine illustrated on p. 86 will be found useful for rule-borders where no corners are used, and the corner-pieces on page 86 are invaluable for keeping the border or rules well together at the corners.

CARDS.

Business Cards are best displayed as far as possible in one or two kinds of type. The most effective and telling cards are those set in plain type with little ornament. A judicious use of initials and rules will give a much better result than fancy type or the grouping together of a lot of different faces.

BRASS CIRCLES.

In setting matter in a brass circle great care and nicety are required. Suppose there is one line round the inside, and an inner circle separating it from the inside matter, a thin lead would require to be placed all round the inside of the circle, and the line then inserted with the inner circle in its place, and unless there be a beard on the letter a thin lead would have to be placed after the line, or between it and the inner circle. Of course, to some extent, the space on each side the line will depend on the size of the type used. The matter inside the circle would then be best set, and if a bold line were required in the centre between rules it would be advisable to set that next, and fill in the top and bottom lines afterwards. It will be found necessary sometimes to use cardboard to justify the lines tight; it is, however, preferable to do without such if possible, and use only leads; the backing metal, such as machine-rulers use for making pens, is extremely useful for this purpose. Brass circles are obtainable cast in one piece ready for use. If, however, an improvised circle has to be made to fit some particular size, the following hints will prove useful. The circumference of a circle is nearly three times its diameter. By obtaining a piece of rule in length equal to three times the diameter of the circle required, a brass circle may be made from it. First hold the rule in a flame until red hot, then allow it to cool, and with a mallet beat on some round projection, such as the bar-handle of the press, commencing at one end and gradually going round to the other; the circle will thus gradually form, and with a little management it can be made perfectly true. A piece of paper may be pasted round it to hold it in its place.

CURVED LINES.

Curvilinear quadrats are sometimes useful, but generally they do not exactly answer the momentary requirements, the curve being either too acute or the other way. A curved line, to look well, must have just the proper radius for the place it has to fit. Nine times out of ten curvilinear quadrats do not meet these requirements. When a curved line is required it will be a good plan first to set up the remainder of the matter, and have it placed in the chase with a piece of furniture where the curve should be ; place furniture round the matter and quoin up the form. Next take a lead and bend it to fit the place where the curve has to come, then set the type for the line, placing spaces of a much smaller fount at the head of the letter, using spaces of such a thickness as to allow the letters just to meet at the bottom ; thicker or thinner spaces will alter the radius of the line. If a great primer line, nonpareil thick spaces or en quads might be used. Another lead bent to fit the inside of the curve should next be added, and the line put in its place in the form, and the vacant space built up with quads, very careful justification being required, or the locking-up will knock the curve out of place.

The brass-rule bender illustrated on page 86, *post*, will be found very useful for bending leads and brass to any required curve.

GENERAL HINTS.

The great object to aim at in all display work should be to keep harmony throughout, and by the effect of arrangement of types to give character to the work. First decide on the style, and then endeavour to keep to it in working out the design.

In all work of an elaborate character, where great effect is required, it is advisable first to sketch out the design with a lead pencil upon a sheet of its own paper. If a design be thus drawn and worked out a good result can scarcely fail to follow. For this reason we would urge on all printers, both young and those of maturer years, to acquire the art of drawing. Its many advantages to the compositor can only be realised by those who have practised it.

It is essential for the good appearance of display work that there should be plenty of white. In cases, however, where there is a large amount of matter to get in, good effect will have to depend largely upon the arrangement of lines and paragraphs, while under-lining with brass rule a few words which need bringing out will also help to give relief and prevent monotony.

Catch Lines do not require so much white on each side as other lines. The whiting out with leads between the lines should be done so as to give an *apparent* equality of white between each line, allowance being made for the beard on letters; this being a point the importance of which is far too little appreciated by compositors, and many an otherwise good job is spoiled for want of a due regard to whiting.

Exceptionally large letters, equal in depth to two or three of the other lines of type, may be used with good effect at the commencement of a line, but they should not, as a rule, be used at the end as well, except for poster work, when sometimes a large letter may be inserted at both ends of a line, the two being joined by plain or waved rules, thus forming, so to speak, a panel or tablet for the other letters of the line.

An expanded letter and a condensed one should never be used immediately adjoining each other, as they produce an incongruous effect.

It is best to select for the text of a display job type that will allow of leading, even though a smaller body will have to be employed. Leaded brevier, for instance, looks better than solid long primer.

Indented paragraphs do not look well in display work. They are best arranged in a half-diamond form. When a border is used, do not put a full line at the head of the matter, next to the border.

Many painstaking and careful compositors who happen to work in offices where only a poor stock of material is provided feel discouraged when they see some beautiful specimen of printing, probably produced in an office the equipment of which is of the very best. To such we would say, "Don't be disheartened, but try what can be done in the way of obtaining novel and pleasing effects

with the material at command." Good and tasteful work can be done with the simplest forms of type faces and ordinary brass rule; in fact, there is a wide scope for ingenuity in the combination which can be made with only common-place and every-day materials. We have seen very pleasing effects produced by the judicious use of some ordinary lower case sorts and rules. Do not strive after a grand effect; but carefully think out some design which will be tasteful, suitable to the work in hand, and yet at the same time give it character and originality. It is mostly by endeavouring to attain the impossible that mistakes are made. Endeavour to give variety and originality without descending to absurd and extravagant attempts at ornamental compositions, and thus you will be able to produce attractive and commendable, as well as paying work.

USE OF ORNAMENTS.

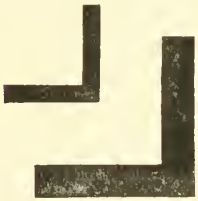
The use of ornaments in display work is often carried to absurd lengths. If the fundamental principle were always borne in mind, that it is better to ornament construction than to construct ornament, we should not see so many of these arrangements of type and border, which are really "wonderful and fearful to behold."

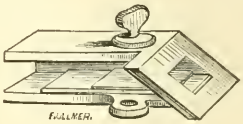
Ornaments should be used only to give grace to and enhance the effect of the types employed. Fanciful arrangements of ornaments and ornamental letters should not under ordinary circumstances be made the feature of a job. They are not intended to supply the place of neat display, but merely to heighten effect.

Care should always be taken to keep ornaments in harmony with the nature of the work, and all such ridiculous arrangements as a tree or shrub growing on nothing, or a boat floating on a pond which hangs in mid-air, or a flight of steps leading to a blank wall, &c., should be strenuously avoided. The extravagant combinations of rules and borders made by inexperienced typos are often of such a nature as to offend against every canon of good taste, and prove an eyesore to every one who has an appreciation of what is appropriate and symmetrical.

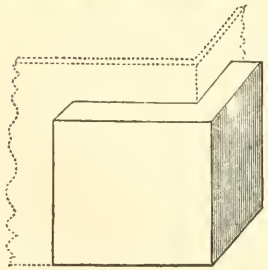
Ornamentation should always be subordinate to the subject matter. Type-founders' sheets occasionally lead printers astray somewhat. They give a large variety of designs; and as there is no matter to interfere with the effect of the borders, ornaments, &c., they always look well. Perspective designs, with water, ships, boats, islands, &c., may look well on the outside page of a ball programme, or some page where only a line or two of type has to be displayed. In circulars and business cards, however, which are usually full, the better way will be to obtain effect by the use of corner-pieces, dashes, &c.

Ornamental work, to be successful, should first be outlined on paper, so as to form a good working plan. The effect of light and shade must be studied. The use of heavy borders and ornaments exclusively, or even of light ones, does not give a satisfactory result; and a due regard to light and shade will help to obviate this difficulty.

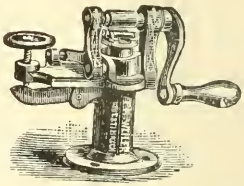




MITREING GAUGE.



CORNER BENDERS.



RULE-BENDER.

CHAPTER XI.

COLOUR WORK.

IN setting up designs for working in colours, fancy or hair-line types should be avoided. Coloured ink requires a fair amount of type backing to show to advantage. Sanseriffs, antiques, and heavy-stemmed letters are best. When rules are used for printing in gold, it is better to have them thick side up.

The following, from the "Modern Printer," now extinct, but recently published by Messrs. Green & McAllan, the eminent colour printers, contains some practically useful information on colour printing :—

"In setting up a job for colour it is advisable to leave out fine-lined or shaded letters, because the full effect of the colour will not be obtained, as the white or other groundwork of the paper used will show through and diminish, or negative, the effect.

It should be remembered that shaded and lined type is intended for black work, and the peculiarity of this class of letter is, that it reduces the intensity of black, giving the effect of a grey, and thus offering good contrast, and an additional tone in black in the same working, when worked on a white ground. There, however, are some positions in colour work where lines of this class serve a useful purpose.

Another style of type that should be avoided is extra condensed letters; they have the peculiarity of being almost indistinct when worked in colour. In this respect they are not more undesirable than light lines. There are few places in colour work where light lines are effective. They are designed for black work, and are almost useless when worked in colours. When worked in anything but black they lose all their character, grace, and elegance, which the intensity of the black brings out with just

sufficient decision. With less than this decision their beauty and effectiveness fades, and printers will find it a good general rule to leave them entirely out of colour work. The lines we mean are undeniably effective in black, but we think most printers will agree with us that they are not nearly so effective in colour, as will be seen by using a line of Eastlake or Norman type.

The class of lines most suitable for colour work are those which are strong and decided in character. Lines that may look harsh to the eye in black, when toned down by colour, give a prominence to the colour, wherein the crudeness of the letter is diminished, and in most cases completely obscured. The most useful lines to the colour printer are those that, while giving the necessary boldness requisite for colour, are sufficiently ornate or tasteful in general appearance to alleviate their decision, when worked in black. Letters of this class, useful alike in colour and black work, are above all things the desideratum in the jobbing office. Letters that work well either as capital or lower case lines in black, without diminishing their usefulness for colour work, are, perhaps, the most useful of all."

It should be the compositor's endeavour, in making up forms for colour work, to have everything made up to picas, so that each line, whatever its thickness, should be so justified with leads or quads, that in lifting lines for dissecting purposes their places can be filled readily with pica quads. Thus, for instance, a great primer might be made up to two ems pica, and a double-english to three ems. Quadrats should be used as far as possible throughout, rather than leads, so as to prevent any spring in the form. Having made up the form complete, a proof should be pulled and the colours marked. The first form should remain in chase, and the lines in colour be lifted out, their place being supplied with pica quadrats. After the first line is deposited on the galley, the whole space between it and the next line should be noted, and the requisite number of picas added at the bottom of the first line lifted. Then the second line should be lifted and placed on the galley, and so on until each distinct colour form is completed. It takes but very little extra time to make up a form in this manner, and the amount of time saved in

registering at press will more than compensate for it. Printers, after they get initiated in this method of working, are enabled to make up their forms as they set the lines, setting up the two forms simultaneously, and by reducing everything to picas they will have little or no trouble in securing true register.

Stereotyping is sometimes resorted to for colour work. In this case two plates are cast, and the stereotyper, according to instructions, cuts away the lines required for one colour in one plate and the reverse in the other. Dissecting forms for working from type is a long and tedious operation, apart from the amount of time required to secure register, so that stereotyping is usually found the cheapest.

HARMONY OF COLOURS.

If the theory of colours be studied scientifically, and then in accordance with the existing practical views, the student is apt to become greatly confused at the variance of the terms used in the scientific and practical views. Thus, scientifically, the colours violet, indigo, blue, green, yellow, orange, and red, are the elementary colours, because each of these colours is incapable of being split or decomposed into others. The numerous essays which have lately been written for the guidance of printers concerning the theory of colours, almost unanimously agree in confining the term "elementary colours" to the colours black and white. This view has been adopted in these pages, as it affords a means of dividing the colours into groups, and thereby facilitating and simplifying the study of their action.

White light may be obtained by the combination of the three colours, blue, red, and yellow. These three colours are therefore called PRIMARY COLOURS. Black may also be obtained by the combination of the three primary colours. The effects of this may be seen when red ink is printed upon green paper; the red ink appears much darker than it would if printed upon white paper.

From these primary colours, depending on the proportions in which they are mixed, all other colours may be produced. Any two primary colours, if mixed in a proper proportion, produce a colour which harmonises with that

colour not used in producing it. The colours so produced are called SECONDARY COLOURS, and are green, orange, and purple. Their formation is thus :—

Primary Colours.	*Secondary Colours.*	*Harmonising Colours.*
Blue and Yellow	produce Green.	Red.
Blue and Red	,, Purple.	Yellow.
Red and Yellow	,, Orange.	Blue.

Another series of colours may be formed by mixing any two of the secondary colours ; the colours thus produced harmonising with that secondary colour which has not entered into the composition of the colour produced. The colours citrine, russet, and olive are produced in this manner, and are known as TERTIARY COLOURS.

Secondary Colours.	*Tertiary Colours.*	*Harmonising Colours.*
Green and Orange	produce Citrine.	Purple.
Orange and Purple	,, Russet.	Green.
Purple and Green	,, Olive.	Orange.

Thus from the three primary colours we obtain six others by combinations, making nine well-defined colours in all. Besides these different colours, however, there are different *tones* of colour (degrees of intensity) ; *tints* (mixtures with white) ; *hues* (mixtures with other colours) ; and *shades* (mixtures with black).

A colour and its harmonising (or complementary) colour are the two that give the greatest contrast to one another. Thus, as stated before, red and green harmonise with each other ; but if red were printed on green, or green on red, the result would be disastrous as far as harmony is concerned, for the colour then produced would approximate to black. So that the colour-printer must never print upon a coloured paper in that coloured ink which would harmonise with the colour of the paper.

Vermilion ink should never be used to print from electros. Vermilion ink is a compound of sulphur and mercury (mercuric sulphide) ; the copper of the electro acts chemically upon this mercuric sulphide, combining with the sulphur to form copper sulphide, which is black and comes off on to the paper, and liberating mercury from combination with the sulphur. Not only is the appearance of the printing spoiled, but the electro itself will be damaged.

TINT GROUNDS.

Colour work is often very much improved by the printing of tints. To be successful with this class of work, it is necessary that the tints should be so cut as to accurately register with the type. The method to obtain this is first to take an impression from the form with plenty of ink upon it. Place the impression face downwards upon the material from which the tint is to be cut, and pass both through the press. It will then be found that a transfer has been obtained of the type form upon the material to be used for the tint. The design may be then cut out accurately as required.

There are numerous materials of which tint-blocks may be made. An ivory card or glazed board, mounted on strawboard, and glued on to a stereo mount, and varnished with copal varnish after the design is cut, will do very well. Many beautiful grounds may be made from bookbinder's cloth, either by glueing on to a mount and varnishing, after being cut out, or by casting a stereo plate, using the cloth as a mould. Capital grounds may be produced by casting plates from sand paper and emery paper.

Kampe's process of making tint-blocks is another excellent contrivance, and saves much time and labour. All printers who have work of the class which requires tint grounds will do well to secure the right to use it. The process is very simple, and requires no experience. The material can be cut with a knife supplied for the purpose, be mounted, and varnished with a special varnish, also supplied by the makers, and a beautiful and inexpensive printing surface is the result.

Great care is requisite in cutting tint-blocks, so as not to leave a ragged or uneven edge. A very sharp knife, with a long sharp point and a thin blade, should be used. In making up a design, care should be taken to surround the tint with a rule, so that the block may be cut a shade larger, the rule thus preventing the unsightly appearance of white between the tint and the outline.

Owltype, Dadotype, Chaostype, and other processes with strange-sounding names, are produced by a species of tint-printing. A pretty effect is obtained by the following process :—Print first a band of some bright colour, say

vermilion, about three ems wide, and, after it is well dried, take a piece of stereo metal, cast in a cold or nearly cold box, without any paper. A stereo clump, three ems wide, will answer the purpose. Print this on the top of the first printing, and bronze; the holes in the metal will allow the first colour to show through. Next print the stereo again on the top of the gold, altering the lay about a thin lead, in some strong colour,—say, green. A rule should be placed on each side of the stereo for the last working, so as to give a finished appearance to the whole.

The following process has been recommended by an American paper for making Owltype :—

Take a very heavy coloured railroad board, or thick glazed millboard, and if very smooth pass a damp sponge or rag over the surface, to take off any heavy gloss. Then take China white, or any fine clay, mix it with water to make a paste about as thick as common molasses, adding a few drops of mucilage to a wine-glassful of the softened clay. The less mucilage the better, though some is required to prevent the clay peeling off the cardboard too easily. Use a rag, spatula, or small pencil brush in applying the softened clay to the cardboard, of course leaving spaces or spots on the cardboard uncovered by the clay. These spots will produce the solid parts when printed. The clay dries rapidly, so that the matrix may be placed in the stereotyping backing-up pan and cast almost immediately. Then block and trim and put on press. This is the original method of making Owltype plates.

Another method of producing a tint plate for this description of work has been given as follows :—

Saturate thoroughly a piece of blotting-paper with water, after which put it in a stereotype casting-box, and pour in melted type metal as though making a stereotype plate. The hot metal coming in contact with the wet paper will cause a peculiar formation, which will give a "weird effect" when printed. Great care should be exercised to prevent the hot metal from splashing over the operator. Use a very long-handled ladle to pour from, and stand well back from the casting-box. The most attractive and unique borders, tint plates, and designs for colour printing can be produced in this way.

The following lines on the harmony of tint and the mixing of inks, from an American paper, are practical and instructive :—

Tints are used either to bring forward single parts of a job or to serve as a background to the whole, as well as for single sections of it. As regards harmony, the tints which are least liable to violate it are those in which the principal colours do not appear in a pure state,—such as grey-green, tan, blue-grey, &c. In fact, for a large surface, it is very rarely that a tint made from a principal colour can be used with good effect. If a job is printed in several bright colours, the tint must always be quiet and dull.

If we print the form in blue, we should use a warm tan for the tint ; for green, a rose tint, &c. In most cases grey for the neutral colour, in various gradations, as blue-grey or green-grey, will produce a good effect.

To be effective, a tint surface, especially if it be faint and light, should be surrounded by outlines printed in a heavier colour than the tint, as otherwise the tint will lose itself in the fundamental colour of the paper. Accuracy of register is, of course, absolutely necessary, since nothing looks uglier and is more disturbing than a tint form which does not match exactly.

It is not to be recommended to procure tint inks ready for use from the manufacturer. The best method is to mix the colours yourself. This may be done in two ways. First, reduce the colour with white. For this purpose take of the best dry white and grind the same on the inkstone (that is, if you do not procure it already ground) ; then add a small quantity of weak varnish, enough to form a dough-like mass, which must be ground and mixed thoroughly, meanwhile adding more varnish until the desired consistency is obtained. To this add very small portions of the colour desired for the tint. In doing this be very careful. A quantity of colour the size of a pea (especially of the darker shades) will give the tint quite a decided tinge. Should this be insufficient, add extremely small parts of the colour until the desired tint is arrived at, in the meantime constantly grinding the mass. This is better than to risk adding too much colour all at once, in which case an addition of more white or varnish would be

necessary to bring the combination down to the required degree of tint that is wanted.

The second method of obtaining tint colours is that of adding varnish without the white. This method is to be preferred to the former. Firstly, because we are not in danger of spoiling the colour through the addition of impure white ; secondly, because the tint lies clear and transparent upon the paper, and does not appear (as is often the case in the use of the white) as if it were covered by a layer of chalk ; thirdly, because we are enabled to print such a tint easily over nearly all dark colours, excepting perhaps red, without affecting the form colour of the rules, borders, or type faces, when these are printed beforehand, which is of great advantage in obtaining a correct register. In this method we can also change the depth of the tint much easier and better, and bring it into greater harmony with the form colour, than if we print the tint first and are then obliged to alter the principal colour to match the tint. The mixing is accomplished in the same manner as with ordinary colours, except that the quantity of varnish added is much larger. It is not so easy, however, to judge the exact shading of the tint, because the colour does not, as in cases where we add the white, become lighter, but appears almost as dark on the stone as the form colour. The best way to judge the depth of the tint is to spread it smoothly over the stone. The more transparent it appears, the lighter is the tint.

In printing the tint be careful to see that the shade is of the proper depth, and do not try to make it heavier by adding more ink, as this would affect the purity of the tint.

If we wish to avoid the danger of arriving at a result contrary to our wishes, we should not begin the printing of a chromatic job until we have first made a complete proof, showing the effect of the colour combinations, as often a colour which harmonises perfectly with one or two others will greatly offend the eye when a third enters into the combination.

CHAPTER XII.

CASTING-OFF COPY.—RELATIVE SIZES OF TYPE.

SUPPOSING we wish to ascertain the difference in pages which would result by setting a work in different sized types. This cannot be done without knowing the different sizes of type, and their relative standards to the foot. There are two ways of obtaining this information; one by averaging the number of words in a line, and another by averaging the number of words on each folio. The following methods will sufficiently explain what is required.

First of all, let us consider how to proceed in casting-off copy; *i.e.* how to ascertain what a certain amount of manuscript will make in print. Suppose we have 350 folios of MS., and wish to find out how many pages they will make in long primer type, each page being 22 ems wide and 40 lines long, exclusive of heads and whites; the way to ascertain this would be as follows:—

First set a stick to the above measure by placing in the stick 22 pica m's, ranging them on their sides; then set up from the copy 10 lines of type. We will suppose that the 10 lines of type have taken up 15 lines of the copy; then count up the whole of the lines of the MS. If one folio of the MS. contains 20 lines and there are 350 folios, we say $350 \times 20 = 7{,}000$ lines of MS. Next multiply the lines of MS. by the number of lines of type set (10), and divide the product by the number of lines of MS. (15) taken up by the 10 lines of type: the result gives the total number of lines of type which the MS. will make. To obtain the number of pages the whole will make,

divide the number of lines of type by the number of lines in a page. The following is the method of working out :—

7000 lines of MS.
10 lines of type set.

Number of lines of MS. taken up by type set. 15)70000(4666 lines of type in the whole of the MS.
60
100
90
100
90
100

Lines in page 40)4666(116 and 26 lines over = 117 pages.
40
66
40
266
240
26

Answer, 117 pages.

If the manuscript be uneven, and this method of calculation cannot be relied upon, then the best way will be to count the number of words in the whole of the manuscript. We will suppose that the following problem has to be solved : a manuscript of 35,000 words requires casting-off, how many pages will it make in pica type, each word averaging, say, 5 letters, and the size of the page being 20 ems wide, and 38 lines long, exclusive of head and white lines ?

The answer will be obtained as follows :—Reckoning each letter as an en in width, and that each word will require a space, multiply the number of words in the manuscript by 6 (5 ens being allowed to a word and 1 for space, as the spacing throughout will probably average an en), and the product gives the total number of ens in the whole of the MS.

To ascertain the number of pages, proceed as follows :—Suppose that the page is 20 ems or 40 ens wide, and 38

ems deep; multiply 38 by 40 which gives 1520 ens in the page. Next divide the total number of ens in the MS. by 1520 (the number of ens in the page), and the result will show the total number of pages the MS. will make. The following is the method of working:—

35000 words in MS.
6 (5 ens to a word and 1 for space).

210000 number of ens in MS.

38 ems depth of page.
40 ens width of page.

1520 number of ens in page.

1520)210000(138 and 240 ens over = 139 pages.
1520

5800
4560

12400
12160

240

If in the above problem the copy had required to be cast-off for long primer instead of pica, the working out would have been different and more complicated. In order to be able to ascertain the answer in long primer, or any other size of type than pica, it is necessary to understand the relative sizes of type, and under that heading will be found instructions and examples of how to proceed.

Sometimes copy is so badly arranged that it is almost impossible to cast-off accurately, owing to erasures, interlineations, &c., and it cannot be too strongly urged upon authors that copy, in being prepared for estimating, should be evenly written, and, if possible, not mixed with reprint.

In casting-up allowance must be made for chapter-heads, &c. To provide for this a certain number of lines should be added to the MS. for each chapter-head required.

RELATIVE SIZES OF TYPE.

The following table gives the standards to the foot of

type cast by the principal typefounders, showing the variations in size of the same descriptions of type :—

——	Miller and Richards.	Stephenson and Blake.	Figgins.	Caslon.	Sir Charles Reed & Son.
Pica	71½	72	72	72	72
Small Pica	83	83	83	83·2	83
Long Primer ..	89	89	90	89·5	91
Bourgeois.....	102⅓	102½	102	102	102
Brevier.....	111	111	108½	111·3	111
Minion	122	123	122	122·4	122
Emerald	138	129	128	128·5	128
Nonpariel.....	143	144	144	144	144
Ruby Nonpareil	160	161	160	..	160
Ruby	166	166	166	..	166
Pearl	178	179	183	178·6	181
Diamond	207	..	204	203	204
Gem	222	..	..	..	..
Brilliant	237	..	..	..	..
Semi-Nonpareil	286	..	288	..	..

The above figures may be taken as thoroughly trustworthy, the measurements having been kindly verified by each of the respective firms named.

The following are the standards to the foot of types larger than pica :—

Canon	18½	Two-line Pica	35
Two-line Double Pica...	20¾	Double Pica	41½
,, Great Primer .	25½	Great Primer	51¼
,, English ...	32	English	64¼

It will be advisable to bear in mind the number of ems to the inch, lineal and square, of sizes of type, from pica to nonpareil, as given in the following table, which is calculated to Messrs. Stephenson, Blake, & Co.'s standard :—

Size of type.	Number to lineal inch.	Number to square inch.
Pica	6 ...	36
Small Pica	6 1/1 1/2 = 7 ...	47
Long Primer	7½ ...	56
Bourgeois	8½ ...	72
Brevier	9 ...	84
Minion	10 ...	105½
Emerald	10⅔ ...	114
Nonpareil	12 ...	144
Ruby	13¾ ...	188
Pearl	15 ...	225

The preceding tables will be found useful in calculating what number of extra pages a book would make if set in a size larger type than was originally intended.

For illustration's sake we will suppose that the following question has to be answered:—A book makes 200 pages in bourgeois, how many pages would it make in small pica?

To obtain the answer, multiply 200 by the number to the square inch of bourgeois, and divide by the number to square inch of small pica. This would have to be worked out as follows:—47 : 72 :: 200 : x.

72 number to sq. inch of bourg.
200 number of pages.

Number to square of s. pica 47)14400(306 and a little over = 307.
141

300
282

18

Answer, 307 pages.

This is supposing that the size of the page is the same in both instances. However, as a book set in small pica would probably have a margin different to one set in bourgeois, we might have to work out the following question:—

A book set in bourgeois makes 200 pages, each page being 22 ems pica wide, and 34 ems pica deep, how many pages would it make in small pica, each page being 20 ems pica wide and 30 ems pica deep?

First ascertain the number of ems or ens bourgeois in the 200 pages. In this case we will say ems, to save figures. Multiply 22 by 34, and multiply the result by the number to square inch of bourgeois, and divide the product by the number to square inch of pica. This will give the number of bourgeois ems in the page. This multiplied by 200 gives the total number of ems in the whole book.

The matter will make the same number of ems in small pica, only they will, being larger, cover more space than bourgeois. Next ascertain the number of ems, small pica, in the given page according to the method by which the bourgeois was obtained ; that is, multiply 20 ems pica wide by 30 ems pica deep, and multiply the product by 47 and then divide by 36. This will give the number of small pica ems in the page. If the total number of ems of bourgeois, previously ascertained, be divided by the number of ems small pica in the page, the result will give the correct total.

The whole is worked out as follows :—

Width of bourgeois page 22 ems pica.
Depth do. do. 34 ,, ,,

88
66

748 size of page in pica ems.

The next thing is to obtain the relative proportion of bourgeois to pica :—

748 picas in page.
72 bourgeois to square inch.

1496
5236

Picas in sq. inch 36)53856(1496
36 200 number of pages.

178 299200 total bourgeois ems in the whole
144 of the work.

345
324

216
216

Now ascertain the number of small pica ems in the given page, 20 × 30 pica :—

```
  20  pica ems wide.
  30  ,,   ,,  deep.
 ---
 600  picas in page.
  47  small picas to square inch.
 ---
4200
2400
 ---
Picas to square inch 36)28200(783 small pica ems in page.
                     252
                     ---
                      300
                      288
                      ---
                       120
                       108
                       ---
                        12

Small pica in given page 783)*299200(382 and a little over = 383 pp.
                             2349
                             ----
                              6430
                              6264
                              ----
                               1660
                               1566
                               ----
                                 94
```

Answer, 383 pages.

In the preceding examples the problem has had to be worked out from the square ; and the difference between small pica and pica has had to be taken into account both ways. In the following question, however, the difference lineally and not to the square has to be ascertained :—

A manuscript, we will suppose, contains 30,000 words, how many pages would it make in long primer type, each page being 22 ems pica wide and 40 lines long primer long. This is the same problem as the one on page 97, excepting that long primer type is substituted for pica.

* Bourgeois ems in whole of work.

In this case we have the depth of the page given in long primer, not pica, as previously, so that we have to take into account the relative difference between long primer and pica in width only.

The way to obtain the answer would be first to multiply the 30,000 words by 6, giving 180,000 ens in the manuscript, then to multiply the number of ens pica (44) in the width by the number of long primer to the foot (90), which would give 3,960; then divide this by the number to the foot of pica (72), and the result will be the number of long primer ens in the width of the page. If this be multiplied by the number of lines in depth of the page, the result will be the number of ens long primer in the given page, and if the total number of ens in the manuscript be divided by this, the answer will be obtained.

The whole is worked out as follows:—

```
  30000  words in MS.
      6  (5 ens to each word and 1 for space.)
 ------
 180000  total number of ens in MS.

        22  ems pica, width of given page.
         2
       ---
        44  ens pica, width of given page.
        90  long primer ems to foot.
       ----
Pica ems to foot 72 ) 3960 ( 55  ens long primer in one line.
                      360    40  lines in given page.
                     ----   ----
                      360   2200  long primer ens in page.
                      360
                     ----

2200)180000(81, nearly 82 pages.
     17600
     -----
      4000
      2200
      ----
      1800
```

Answer, 82 pages.

This principle of working will be found to answer for any size of type by merely substituting its number to the foot or the square inch, as the case may be. The square

may be worked to the square foot ; but it is obvious that much more time will thus be occupied in working out than if worked to the square inch, as in the foregoing illustration.

To obtain the number to square inch of any type multiply the number to the foot by itself and divide by 144. For example, pica has 72 ems to the foot, $72 \times 72 = 5{,}184$, and this divided by 144 yields 36. On reference to the table in this chapter it will be found that 36 ems make 1 square inch of pica :—

```
                    72
1 lineal inch of pica 72
                   ----
                   144
                  504
                  ----
144)5184(36
     432
     ----
      864
      864
```

In making these calculations of proportion, allowance must be made for fatness or leanness of type. In the above problem, if the small pica were fat and the bourgeois lean, the difference in pages would be still greater, and about 15 to 20 pages more would have to be added. In the question following, if the long primer were fat or lean the total would correspondingly vary, and be more or less accordingly ; if fatter, there would probably be four or six pages more. In ascertaining the fatness or leanness of type for calculation, take the letter "n" and compare it with an en quad, and as it is thicker or thinner, so will the whole of the letters be in proportion. In fact, a separate standard may be made for each size which varies from the common. By way of illustration, we may mention that 15 long primer en quadrats measure one inch, and if we use a long primer that only takes 14 such quadrats to the inch, we know that the long primer is what is termed a fat letter, and we can make a standard for it for the purpose of calculation, as follows :—For lineal measure multiply 14 by 12 = 168 ens to the foot, or 84 ems, and for the square multiply $7\frac{1}{2}$ by $7 = 52\frac{1}{2}$ to the square inch.

WORKING OUT LABOUR VALUE.

In casting up the labour value of any of the sheets above mentioned, the whole of the matter, including heads and whites, would be reckoned. Thus the page of long primer, forty lines long, would need three lines added to it,—one for head-line and two for the whites at head and foot.

It is customary in casting up the number of ens in a page to set up quadrats to the measure, reckoning a thick space as an en when needed to fill up the measure, while, on the other hand, less than a thick space is not taken into account. By multiplying this with the lines in depth of the page, the total number of ens is obtained. When the matter is leaded it will be necessary also to set up quadrats to the measure of the depth of the page; and here, again, an en or over will count as an em, but a less space is not reckoned.

When this method cannot be resorted to, then the way to ascertain the required information will be by finding the relative size to pica.

In order to ascertain the money value of a sheet we proceed as follows :—Supposing a sheet of 8vo. (16 pp.), each page consisting of forty-three lines (including heads and whites) and forty-seven long primer ens in width :—

43	lines in page.
47	long primer ens in width.
301	
172	
2021	ens in page.
16	pages in sheet.
12126	
2021	
32336	total number of ens in 16 pp.

32 thousand at 7d. per thousand.

7

12)224

18/8 and the $\frac{1}{4}$ over at 2d. would give 18/10.

The ready-reckoner given in this work will be found useful in casting up the value of type. On reference it will be seen that, on placing the finger on 32 in the first column, and running along to the right under the head 7d., the amount 18s. 8d. is given.

The custom of different towns varies in the manner of making charges. Some places reckon nothing under 500, while over 500 counts 1,000. Others count a quarter and even an eighth of 1,000. The customs of the trade, on this and many other heads, in all parts of the kingdom are given at length in the "Printing Trades Diary and Reference Book," published annually, since 1877, at the office of "Wyman's Technical Series." Many News offices have tables giving the number of lines to the 1,000 for each size of type, and others have the number of thousands calculated in 100 lines of each type, so that 100 lines of brevier represent a certain amount, and similarly 100 lines of other types, fractions being reckoned as 50 and 25 lines respectively. Another way is to have a tabulated list of the prices per line ranging from one up to several hundreds of all the types in use.

Where the price per 100 lines system is adopted and odd lines are made, a proportion sum will be useful in determining their value. Supposing long primer is 2s. 6d. per 100 lines and 156 lines have been set, first reduce 2s. 6d. to pence, which gives 30, and multiply the number of lines set (156) by the 30, and divide the product by 100, which will give the answer, worked as follows :—

$$100 : 156 :: 2/6 : x$$

$$30 \qquad 12$$

$$46,80 \qquad 30 \text{ pence per 100 lines.}$$

By cutting off the two last figures the price of the lines is left in pence, in this case 46 pence, or 3s. 10d.

Compositors should have some knowledge of the relative labour value of different types in the same size sheet. If a sheet of small pica costs 35s. what would the same size sheet cost in brevier. If the cost of setting up brevier and small pica were the same the result could be easily and quickly obtained by a proportion sum ; using the number

to the square inch of brevier. Taking Stephenson & Blake's standard, it would be 47 : 84 :: 35 : x.

35 price of sheet in sm. pica.
84 number to square inch of brevier.

140
280

Number to sq. inch of sm. pica 47)2940(62/7 value of brevier.
282

120
94

26

If, however, the prices are different, and the brevier is 8d. per 1,000 and the small pica 7d., then a different method will have to be adopted.

First ascertain the number of thousands of small pica in the sheet by reducing 35s. to pence and dividing the pence by 7: this will give the thousands of small pica in the sheet. Next multiply the thousands of small pica by the number of ems to the square inch of brevier and divide the product by the number of ems to square inch of small pica: this will give the thousands of brevier in the sheet. Multiply the brevier by 8 (the price per 1,000 of brevier), and this divided by 12 will give the answer in shillings. Worked out in full thus:—

35 price of sheet of sm. pica.
12

Price per thousand of sm. pica 7)420

60 thousand.
84 breviers to square inch.

240
480

Number to square inch of sm. pica 47)5040(107 thousand breviers in
47 sheet at 8d.

340 —107
329 8
11 12)856 pence.

Answer, 71/4. 71/4

RELATIVE SIZES OF TYPE TO PICA.

We will suppose that the following question required answering :—

Reckoning pica as the standard at 20, what would be the relative sizes of small pica, long primer, brevier, &c.?

The answer would be obtained by multiplying pica (72) by 20, and dividing the product by whatever size of type was required. Taking long primer, the answer would be worked out as follows :—

```
  72
  20
 ---
90)1440(16 exactly.
  90
 ---
 540
 540
```

WEIGHT OF LEADS.

It will be necessary sometimes to ascertain what weight of leads would be required to lead out a certain amount of matter. To work out problems of this description it will be necessary to bear in mind that one foot of thick or four-to-pica lead weighs 2 oz., so that in a pound of thick leads we should have 576 pica ems in length. Supposing an answer had to be worked out to the following question :—

What weight of thick leads would be required to lead out 20,000 Long Primer ens of type?

The answer would be obtained by dividing the sum of 20,000 by 90, the number of long primer ens in 6 inches, or 1 oz. of leads, and the resulting figures would give the correct amount in ounces. It would be worked out as follows :—

```
90)20000(222 oz. of thick leads required.
  180
 ---
  200
  180
 ---
   200
```

```
16)222(13 = 14 lb.
  16
 ---
  62
  48
 ---
  14
```

Or, for variation's sake, we will suppose that the following question would have to be answered :—

What weight of leads will be required to lead out a book of 200 pages, set in bourgeois type, 21 ems pica wide and 30 ems pica deep, and how many extra pages would the matter make if leaded ?

First ascertain the number of bourgeois lines in the page, by a proportion sum, multiplying the number of bourgeois to the foot (102) by 30, and divide this by the number to the foot pica (72) :—

72 : 102 : : 30 : x

30 depth of page.

Picas to foot 72)3060(42 bourgeois lines in page.
288
180
144
36

As there are 42 bourgeois lines in a page, 42 leads will be required to each page. If we multiply 42 by 200, and multiply the product by 21, we shall then have the total length of pica ems of lead in the whole. If this be divided by 576 (the number of pica ems of thick leads in 1 lb.) we get the weight in pounds. The manner of working out will be as follows :—

42 leads to each page.
200
8400
21 ems width of page.
8400
16800

576)176400(306, say 307 lb.
1728
3600
3456
144

The number of extra pages will be ascertained by

dividing the total number of leads required (8,400) by 4 times 30 (each page being 30 ems pica deep, and 4 thick leads being equal to 1 pica) or 120, which will be an equivalent to a page. The problem is worked out thus :—

120)8400(70 pages extra exactly.
8400

The answer would be that the weight of leads required would be 306 lb., and that there would be 70 pages of matter driven out.

Another method of ascertaining the number of extra pages would be by weight. Each page measures say, 21 by 30 ems ; these, multiplied together and divided by 144, would give the weight of each page in pounds, and if the total weight of leads were divided by this, the result would give the number of extra pages, worked out as follows :—

21
30
—
144)630(4 lb.
576
—
54

Weight of page $4\frac{1}{2}$)306 total weight of leads.
—
70

If the question were given in the following manner, the process of calculation for ascertaining the number of extra pages would have to be varied. We will suppose the following problem :—A book of 200 pages set in bourgeois type, 21 ems pica width, and 42 lines long, what weight of leads would be required to lead it out, and how many extra pages would it make if leaded ?

In this case the lines are given, so there would be no necessity to work the proportion for that part of the question. But in ascertaining extra pages, it would be necessary to first get the depth of the page in pica. The sum would require stating as follows :—102 : 72 : : 42 : x. The depth in this case would be 30 picas.

Table showing Number of Ems to an Inch, a Foot, and a Square Inch.

Size of Type.	Ems to an Inch	Ems to a Foot.	Ems in Square Inch.	Size of Type.	Ems to an Inch.	Ems to a Foot.	Ems in Square Inch.	Size of Type.	Ems to an Inch.	Ems to a Foot.	Ems in Square Inch.
Half-Nonpareil...	24	288	576	Nonpareil	12	144	144	Pica	6	72	36
Half-Emerald ...	$21\frac{1}{3}$	256	455	Emerald	$10\frac{2}{3}$	129	114	English	$5\frac{1}{3}$	64	$28\frac{1}{2}$
Half-Minion	$20\frac{1}{4}$	244	413	Minion	$10\frac{1}{6}$	123	$105\frac{1}{2}$	Two-line Minion	$5\frac{1}{12}$	$61\frac{1}{2}$	27
Gem	$18\frac{1}{3}$	220	336	Brevier	$9\frac{1}{6}$	111	84	Albion	$4\frac{1}{2}$	55	21
Diamond	17	204	289	Bourgeois	$8\frac{1}{2}$	102	72	Great Primer.....	$4\frac{1}{4}$	51	18
Pearl	15	178	225	Long Primer.....	$7\frac{1}{2}$	89	56	Paragon.....	$3\frac{3}{4}$	$44\frac{1}{2}$	14
Ruby	$13\frac{2}{3}$	166	188	Small Pica.....	$6\frac{5}{6}$	83	47	Double Pica	$3\frac{1}{2}$	$41\frac{1}{2}$	$13\frac{1}{4}$

These figures are based upon Messrs. Stephenson, Blake, & Co.'s standard, and may be taken as correct, as they are reduced to the simplest numbers, very small fractions only having been disregarded in the calculations.

It is only necessary to commit to memory the number of ems to the foot of the sizes from nonpareil to small pica: all the other sizes bearing a simple definite relation to these. Thus, paragon is two-line long primer, and will consequently have but half the number of ems to the foot; while pearl, which is half long primer, will have double the number of ems to the foot. The manner of finding the number of ems to an inch, knowing the number to the foot, is obvious. The number of ems to the square inch is found by multiplying the number of ems to the foot by itself. Thus, to obtain the number of ems in a square inch of minion, multiply 122 × 122, and divide the product by 144 (12 × 12), and the answer will be $103\frac{1}{2}$.

CHAPTER XIII.

MANAGEMENT.

THE management of printing businesses of the present day requires great care and watchfulness, minute attention to detail, and economy of administration. The keen competition and the great facilities for producing work cheaply call for constant attention and close supervision in every department.

It is essential for good management that the *Overseer* should be a person of regular and reliable habits, punctual to arrive in the morning, and the last to leave at night. He should endeavour to deal justly and equitably both with master and man. He should have his temper under constant control and yet firmly and unflinchingly insist that what he considers best be carried out without question or gainsaying.

He should endeavour to ascertain the capabilities of his men, and employ them accordingly. A man of taste he will employ on artistic and high-class work, whilst those not so endowed will be engaged on other classes of work, where they may be equally valuable servants. It is well, for the purpose of getting work out with expedition, to give certain classes of work to those best suited to do it quickly. By constant practice on one class of composition men naturally become more efficient in that branch. This division of labour is becoming more and more common, and hence we have hands specially adapted respectively for bills, fancy work, circulars, law work, solid matter, &c. &c. This system of working certainly gives the best-paying results. At the same time, it must be admitted it has a

tendency to keep men in one beaten track, and has a bad effect on the training of apprentices. The remedy for this will be found in the establishment of Technical Classes, where a theoretical knowledge is acquired, which will assist men to push their way into other branches of the craft. Theory, be it remembered, is the foundation of all practice, and without it the workman becomes a mere machine, working only by rule of thumb.

In selecting a place for carrying on the business of printing it will be well, as far as possible, to have the whole operation performed on one floor. However, as that is not generally possible, and a building of three or more stories has to be occupied, we would say use the top room for composing, the first floor as a machine-room, and the ground floor as offices, warehouse, &c. However, this, we must confess, is mere theory, since, as a rule, local circumstances control the whole arrangement.

The *Composing-room* should be arranged so as to minimise waste of time in getting things to hand. The composing surfaces should be placed so as to be easily accessible from all parts of the room; and the lead and furniture racks should also be handy to the "stones," and equally so to the workmen generally.

Proper accommodation should be made for forms, in the shape of racks, as well as for galleys. Unless special racks are supplied for galleys, they will be placed on frames, and much time will be lost in moving them about. See illustrations (on pages 14 and 18) of galley and form racks, both of which are lleexcent in their way.

There should be a systematic arrangement for keeping good and bad matter; forms for distribution should also have a recognised place, as well as forms of matter, proofs of which are in authors' hands, &c.; and, in fact, everything in the room should have a recognised place, and everything should be kept in its place when not in actual use.

Where possible it is a good plan to keep mounted on spare frames such founts as antiques, italics, and letters which are largely used. Brass-rule cases, and cases of ornaments and borders, will be best kept in order if mounted.

All standing matter should be tied up and placed on

boards set apart for the purpose. Some system should be adopted in this respect, each class being kept separate, and a list or index kept for ready reference.

Blocks should be stored on trays or boxes, electros being rubbed over before they are put away with a greasy rag to prevent oxidation ; and a list of these must also be kept, recording the date when each block was received and when given out again, and for what purpose. In all cases the signature should be obtained from the person receiving the block when returned to a customer.

In buying *Type* it is well to keep to one foundry. Owing to the different standards of types of the same name by the various type founders, it is not advisable to have two body founts,—say, for instance, Stephenson's long primer, which ranges 89 to the foot, and one of Sir Charles Reed's, which ranges at about 91 to the foot ; or those of any other two founders. Of course, it does not matter much for fancy founts, since a few lines do not give much trouble if well justified.

It is better to have fewer founts of type and well-filled cases than a large variety of faces and small founts. A large variety of faces is no improvement to work, and if a good assortment of best faces be selected the result will be eminently satisfactory from a paying point of view. It is also better to have the whole of a series of faces rather than a few picked out here and there.

There is one important matter often lost sight of, viz., the necessity for a good supply of leads, furniture, quoins, and brass rule. In our experience we have often witnessed three times the value of the materials lost in time which had to be spent hunting up what was required to finish a job. It is a mistake to allow an office to be pinched in this respect.

Brass rule and leads are sometimes wasted to a large extent when every compositor is allowed at his own will to mutilate these useful, and, in the case of brass rule, expensive articles. To prevent this we suggest that one person be made responsible for the cutting of all rules and leads, and to have charge of the cutters. It will be found a good plan to fix the gauge of the cutter at, say, 40 ems, and if rules have to be cut of shorter dimensions to place

pica quads in the gauge, and thus reduce it to required length ; if a 20-em rule were needed, then 20 ems in pica quads would be placed on the gauge, and the rule cut to the space left. This plan saves much time in altering and re-setting the gauge.

COMPOSING-ROOM RULES.

The following rules will be found suitable for the composing-room :—

1. The time for commencing and leaving off work is as follows:—(Time to be arranged as required.)

2. The work-ticket must be filled in regularly every day with all necessary particulars.

3. Each person will be responsible for the cleanliness and orderly state of the frame he occupies.

4. All whistling, singing, stamping, knocking cases, &c., is strictly prohibited.

5. Each case, as soon as done with, must be returned to its proper place.

6. Cases must not be piled up on frames.

7. Saw-block, saw, letters, brush, shears, bellows, &c., must be returned to their proper places as soon as done with.

8. On receiving copy the compositor must not proceed unless he clearly understands the instruction given him ; otherwise he should ask for further instruction before commencing.

9. A compositor must not turn for letters if he has choice to set the line in another type.

10. Compositors must justify their lines so that they will stand unsupported in the stick. The compositor will be held responsible for "a draw" at the machine, or any damage owing to improper justification.

11. Forms must not be planed down heavily, and a compositor will be held responsible for damage arising from an infringement of this rule. The violent planing down of a form will be regarded as evidence of the incompetence of the workman.

12. Each compositor is responsible for the safety of the copy or proof in his keeping.

13. A compositor making any flagrant alteration from copy will be held responsible for such mistake.

MACHINE ROOM.

The manager of a machine-room should be a man of firm character, and one who has a large amount of mechanical ingenuity and practical experience. The management of the machine department needs careful watchfulness so to arrange the work as to produce the largest amount from the machines available. Every effort must be made to avoid "lifting," or to have to change colour, or quality of ink.

Much valuable information in regard to this department will be found in "Printing Machines and Machine Printing," forming one of "Wyman's Technical Series."

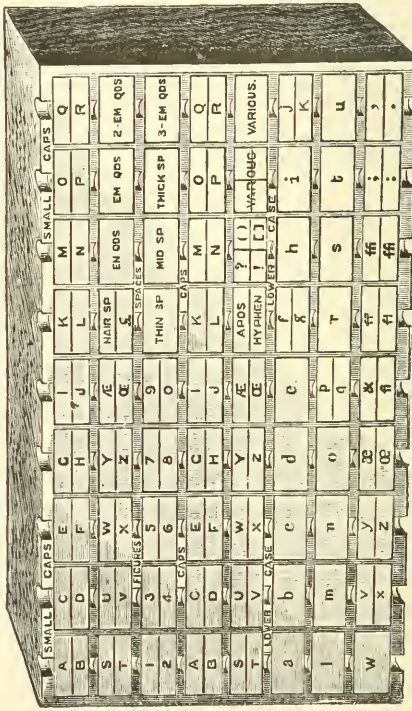
It is not within our province to give particulars in this work on Machine Printing, excepting as regards general management; and we therefore confine ourselves to the following:—

RULES FOR MACHINE ROOM.

Rules as to time, &c., should come first.

1. No one but the person specially appointed is to touch the engine or to be in the engine-room.
2. Each form when finished to be washed *immediately* and put in the appointed place.
3. No litter or waste paper to be thrown on the floor, but put into the box or sack provided for the purpose.
4. No part of a machine must on any account be cleaned whilst in motion.
5. No machine boy or layer-on must touch any machine but the one to which he is appointed.
6. A form must not on any account be worked off without the signature having been previously obtained of the reader or some responsible person.
7. A form must not be "lifted" before the correctness of the sheets worked, as to numbers, has been ascertained.
8. The machine-minder will be held responsible for the work being good and clean, and the number correct.
9. Each machine to be oiled all round before commencing work.

Of course there will be many local circumstances which will require allowing for in forming a code of rules. Rules, too, should be enforced judiciously, so as not to make them objectionable to well-meaning and good workmen. Rules or laws are made for law breakers, and in some cases a not too literal rendering will be best.



SORT CABINET.

CHAPTER XIV.

WORK-TICKETS AND TIME-TICKETS.

WORK and time-tickets are now a recognised feature in all well-regulated establishments. They are essential for checking estimates, and as a means of ascertaining whether work is being produced at a profit or loss.

The form outlined on the following pages (pp. 118 to 123) may be modified to meet the requirements of different establishments. This form is intended to fill three pages of foolscap paper. The first page contains spaces for name of firm, description of job, particulars and instructions for carrying out the work in all departments, and details of cost and quantity of paper; the second page should be blank; the third page contains a list of every item of labour the job will possibly have to pass through; and the fourth page affords room for the totals of the whole particulars to be entered, and for the cost of the job to be charged, and this page contains also spaces marked off for keeping a record of the time spent on the job in each department.

This sheet, which should be filled up by the respective employés, answers the purpose of recording the time spent on each job, and forms also the record of time worked by the employé, and by which wages are paid.

The time-sheets should be checked off and signed by the overseer. And before passing them on into the counting-house he should see that each item of time has been transferred to its respective work-ticket.

WORK-TICKET, I.

(This Ticket must accompany the Job all through.)

No. _____ Customer's Order No. _____ Estimate or Price _____ Paid _____

Date _____ Date Required _____ 1st Proof sent _____

Description _____

_____

Colour of Ink _____ Proof wanted _____ Numbered _____

Ruled _____ Perforated _____

FOR _____

ADDRESS _____

REMARKS.	PAPER LAID OUT.			£	s.	d.	SIZE AND QUALITY OF PAPER.
	Reams.	Quires.	Sheets.				

COMP.

PRINTER.

LITHO.

RULER.

BINDER.

LETTERPRESS.

COMPOSITORS.

	Hours.	Min	s.	d.
Composition .....up.....				
Proof—First.....Second....Third....				
Author's Alterations				
Standing Form				
Imposition				
MOULDING & STEREO. Casts..				
Casts from old Mould.....				
Reading				
.....				
Electros				

RULER.

Proof—First.....Second....Third....				
Man				
Girls				

BINDER.

Paper.....Boards.....Cloth.....				
Card Cutting				

	MEN.		GIRLS.	
	Hours.	Min.	Hours.	Min.
Folding				
Collating				
Sewing.....				

PRINTERS.

	Hours.	Min.	s.	d.
Proof—First....Second....Third....				
Washing up Machine				
.....Runs on No.....Up.....				
.....Runs on No.....Up.....				
INKS ....@...				
.....@...				
.....@...				
BRONZE .....@ ..				
Transfer for Litho.....				

LITHO.

ARTIST. Sketching				
Engraving				
PRINTING.				
Preparing.....Stones.....				
Transferring ..Down				
Rolling up and Proving				
Sets off on .....Stones				
Press				
Washing up Machines.....				
.....Runs on No.....				
.....Runs on No.....				
.....Runs on No.....				

Stapling .....
Numbering .....
Perforating.....
Rounding .....
Backing.....
End Papering .....
Blocking .....
Casing .....
Lettering .....
BINDING .....
Sizing .....
Varnishing .....
Gumming ....
Eyeleting.....
Stringing....Taping.. ..
Suspending .....

Bronzing Machine .....

	s.	d.
INKS .....@...		
.....@...		
.....@...		
....@...		
.....@...		
.....@...		
BRONZE.....@...		

Other help .....

.....

.....

MATERIALS.

.....Boards .....
.....Skins Leather .....
.....Yards Cloth .....
.....Leaves Gold..... ..
.....End Papers .....
.....Marbled Papers .. ..
.....Gum .....
.....Size.....
....Varnish..... .....
.....Staples .....
.....Eyelets .....
.....Tape.....String .....

WAREHOUSE.

Laying Out Paper .....
Cutting or Trimming same .....
Cutting and Packing Work .....

OTHER MATERIAL.

.....

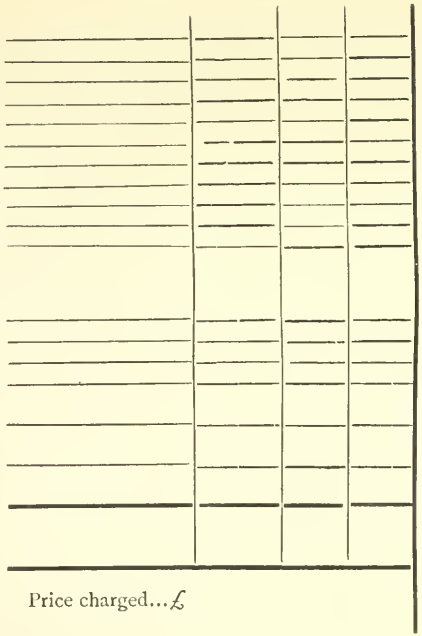
TOTAL.....

WORK-TICKET, 3.

COST TOTALS.			
DESCRIPTION.	£	s.	d.

CASE ROOM.

MACHINE ROOM.



Price charged...£

LITHO.

RULER.

BINDER.

The following is an example of an ordinary time sheet :—

Name . . . . . Date . . . . . .

Number of Work-ticket.	For Whom.	Description.	Time occupied.	
			Hours.	Min.
1204	Jones, J. W.	Order Book	1	30
——	——	Gen. dis.	1	10
1362	Harrison & Blades	Bill Head	1	0
1482	Smith, Jno.	Pamphlet	6	20
		Total	10	0

In addition there should be a day-book or journal for recording each job as it comes in, the No. of each entry to correspond with the No. of the work-ticket. There should be columns ruled as below :—

No.	Name.	Description.	Date Received.	Date Despatched.	Remarks.

This book enables the manager to trace each order, and also to know whether or not the work has been completed. Each morning he should look over the book, and notice what jobs are not completed, and make notes of them. In his journey round the establishment he can then ascertain the reason of the delay.

An alternative method to the above is to have the work-ticket in the form of a check-book, and a slip per-

forated so as to be torn out, which shall contain full particulars as to printing, binding, &c., and this ticket to accompany the job throughout. The time occupied on the job from each time-sheet is then transferred on to the counterfoil of the book each day by a clerk in the counting-house, so that when the job is finished the whole is totalled up with the material, &c., and charged in the usual way. This plan saves the time of the overseer and workpeople in filling in the time on the work-ticket.

The system of keeping time-sheets may be utilised in checking each department as to profit or loss. The time charged to customers is totalled up daily from each man's time-sheet, and one-fourth added for distribution. These sums are then entered in a book under each man's name, and every three months are added up, and a balance is struck with the actual amount of wages paid. The following example will explain this system :—

Date.	Brown.	Jones.	Robinson.	White.	Griffith.
Oct. 6	0 6 0	0 6 3	0 5 0	0 4 6	0 7 0
7	0 6 3	0 6 2	0 4 9	0 7 0	0 5 9
8	0 7 0	0 5 0	0 6 0	0 5 0	0 6 0
9	0 6 6	0 7 6	0 5 0	0 6 6	0 7 2
10	0 4 6	0 9 0	0 7 0	0 8 0	0 4 2
11	0 7 0	0 2 0	0 8 0	0 7 0	0 6 0
	1 16 9	1 15 11	1 15 9	1 17 0	1 15 10

These sums are added together, and the amount of wages paid during the same period is deducted from the total sum, and shows the amount of profit in that department. We find that the whole of the above sums amount to £9. os. 5d., and the wages paid during the same period amount to £7. 15s. 5d. There has thus been a gross (though by no means a net) profit in this department of £1. 5s. od. Of course this is over and above the profit charged in the usual way, the whole of the above items having been charged as cost to the customer.

In a small establishment there would be no need for so elaborate a scheme, and a book arranged as follows would answer the purpose of day-book and order-book :—

No.	Date.	Name.	Description.	Materials.	Composing.	Machining.	Ruling.	Binding.	Profit.	Total. £.	Total. s.	Total. d.
27	Oct 10.	Jones & Co.	1000 8vo Circulars	1/6	2/-	2/-	—	—	3/-	0	8	6

The order is entered when the job comes in, and the number written on a work-ticket containing instructions how to be printed, &c., and the particulars filled in when the job is sent home, the ticket being then returned to the office. By this arrangement a small firm may ascertain whether they are making a profit or losing. Supposing at the end of each week the amount of the work charged is totalled up, and the cost of material, and the general expenses of the place, including wages, are deducted, the balance will then show roughly how the concern is paying. The following may serve as an example :—

Total amount of work charged for the week				£50 0 0
Wages paid	£15	0	0	
Material used	10	0	0	
Expenses :—proportion of rent, rates, gas, oil, repairs, &c.	5	0	0	
				30 0 0
Profit				£20 0 0

CHAPTER XV.

ESTIMATING.

THE methods of working out *Estimates* are many, and vary in almost every establishment. We shall, therefore, endeavour to give here only some principles and illustrations of methods in use which have been found successful. The method we recommend is to have an estimate book, into which each item is entered *seriatim*, so as to afford a means of reference easy and a good check. Some houses, in place of such an estimate book, use separate sheets, which are sent into each department for the overseer to enter his price, or estimate of the cost as relates to his department. Whether for this purpose a separate sheet be used for each department or one comprehensive sheet for all is a matter of convenience. The object to be aimed at is to have an arrangement which shall be so complete as to leave no possibility for any items to be missed. We think that the draft given herewith will answer the purpose admirably whether used as a single sheet, or divided into departmental sheets, or bound up in book form. (*See* pages 130 and 131.)

Estimating should not be done by guess work, and if proper care be taken to note the cost of similiar work previously produced, and for ascertaining the outlay on every single item as here suggested, there should not be much difficulty in working out closely what the actual cost for a job will be.

In our opinion, all printers would do well to have an estimate book showing a detailed list of items sufficient to cover every part of the work, with columns in which to enter the estimated cost under each separate heading. A check could be kept on every estimate by having a second column in which to enter the actual cost as taken

from the work-ticket after the completion of the job. By this means any item showing a discrepancy could be readily detected.

The form given on pp. 130, 131, is intended as a basis for an estimate book. For special requirements it might have to be modified as circumstances required. It might be expanded to fill a foolscap folio or large post folio sheet. The estimate sent out should bear the folio number for reference, if accepted.

In making an estimate in the foregoing form we would ascertain the quantity and cost of paper required, stating the quality or make, and fill up the places required under letterpress, stating the number of hours estimated for each item. The other departments should be filled up in like manner, and the totals entered in their respective places at the foot ; the estimated average of general expenses at a certain rate per cent. should then be added, and the whole totalled up. The profit next to be added at a certain rate per cent. should then be stated, and the grand total will be the price of the estimate, which should be shown in large figures at one corner.

The general expenses, such as rent, rates, gas, and general management, clerks, &c., should be charged at a certain percentage calculated on the value of the average output of the works. This is a matter which requires great care and judgment, and should be calculated afresh from time to time, to make sure that the percentage worked upon is correct.

It may sometimes be thought advisable to make the charge for special expenses in a more direct manner by adding a specific amount to the wages charge on each job. We think, however, that the method described above is the best.

The percentage of amount to be charged as working expenses will necessarily vary with circumstances, and no rate can be fixed upon as being applicable to all cases. In making calculations as to what percentage should be added to wages charge, for composition, machine work, cost price of ink and paper, &c., it will be necessary to take into account the expenses of management, heating, rent, gas-rates, waste, bad debts, wear and tear, &c., &c. After

taking all these matters into consideration, we might add for composition, say, 50 per cent., and for machining 75 per cent. Should there be very heavy expenses in connexion with wear and tear, or a very large amount of capital invested in machinery, even a higher percentage might have to be added for general expenses, so that if, for argument's sake, the wages cost of a double-crown machine is 1s. per hour, the charge should be, with expenses, 1s. 9d.; and for a larger machine, representing more capital, a still higher rate should be charged.

Ink and paper require a smaller percentage to be added to cost, say 25 per cent. The extra expense connected with these is cost of warehousing and interest on capital invested; and in the case of ink, the unavoidable waste which takes place in using it.

As regards the quantity of *Ink* used for certain classes of work, the machine overseer should be supplied with a book in which to enter particulars of quantity and price of ink used for different kinds of work. Supposing, for instance, that an estimate is required for 1,000 double demy posters, the overseer can then turn to his book and find an entry showing the amount and quality of ink used for a similar job on a previous occasion. By this means the cost of the ink which will be required can be very closely estimated. And the same course can be adopted with other classes of work.

The foregoing examples of estimating are more particularly applicable for jobbing work. For book-work so elaborate a system is not required. All that would be required would be the cost of paper, composition, machinery, and binding.

Suppose an estimate were wanted for a 32 pp. crown 8vo. pamphlet, 1,000 copies, stitched and cut, we would suggest the following method:—First ascertain cost of setting the whole 32 pp. according to instructions given in the chapter on casting off copy, and we will suppose that all the items are ranged as on p. 132.

ESTIMATE SHEET.

No. _____. _____ 18

Name _____

Description _____

Remarks _____

* PAPER.	DESCRIPTION.	Rms.	Sheets.	£	s.	d

LETTERPRESS.	Rate. s.	d.	Hours.			
* Paper						
Composition .....up	0	8				
Stereo.....Casts						
Electro						
Engraving						
No. 1 Machine	1	6				
No. 2 Machine	1	9				
No. 3 Machine	2	0				

BINDING.	Rate s.	d.	Hours.	£	s.	d.
Paper.....						
Ruling.....	0	10				
Folding.....	0	3				
Collating	0	3				
Sewing.....	0	3				
Stapling.....	0	3				
Numbering	0	3				
Perforating.....	0	3				
Forwarding.....	0	8				
Finishing.....	0	10				
Sizing.....	0	3				
Eyeleting.....	0	3				
TOTAL.....						

Ink .....per lb.
Bronzing 0 3
Bronze .....per lb.
Transfers.....
TOTAL.....

LITHO PAPER.*
Sketching..... .....
Engraving .....
Transferring.....
Machine..... ...
Ink..... ....per lb.
Bronzing .....
Bronze .....per lb.
TOTAL.....

PRICE ESTIMATED....., }
COST OF PRODUCTION.. . }

MATERIALS. Cost.
.....Boards.....
....Skins, Leather.....
.....Yards Cloth.....
.....Gold.....
.....End Paper.....
.....Gum.....
.....Size..... ....
....Staples..... .....
.....Eyelets.....
.....Tape.....
TOTAL... .....

WAREHOUSE. Hours.
Cutting..... .. ..
Packing.....

SUMMARY.
LETTERPRESS .....
LITHO .....
BINDING .....
MATERIAL .....
WAREHOUSE .....
EXPENSES.....
TOTAL.....
PROFIT.....
PRICE ESTIMATED. ....

ESTIMATE FOR 1,000 32-PAGE PAMPHLETS.*

	£.	s.	d.
Paper, 2 reams 5 quires, at 10s. per ream	1	2	6
Setting 32 pp. in Long Primer, at 7d. per thousand ...	2	6	1
Reading and revising, 2 hours	0	1	6
Making up, 2 hours	0	1	4
Machining, 6 hours	0	6	0
Ink, 2 lb. at 1s. 6d.	0	3	0
Folding, 5 hours at 2½d.	0	1	0½
Stitching, 6 hours at 3½d.	0	1	9
Thread	0	0	3
Cutting, 1 hour at 8d.	0	0	8
Packing ditto	0	0	6
Total	4	4	7½
General expenses	1	13	6
	5	18	1½
Profit, say	1	10	0
	£6	8	7½

In filling in these items the prices will necessarily be governed by local circumstances. The estimate for machinery, for instance, would be reduced slightly if the whole 32 pages were worked in one form; and the cost of stitching would be less if wire-stitched.

* The prices given in this estimate are current in a large provincial town, and are given merely as examples; of course, everyone using this form will substitute local prices in place of those used above.

CHAPTER XVI.

ORDERING TYPE, ETC.

IN estimating for large work, such as the production of a monthly periodical, a newspaper, or a book, consideration should be given to the extra material which may be needed to produce the job. If the work has to be brought out to time, stipulations should be made as to latest time for receiving copy, and as to the prompt return of proofs for press.

If new type has to be ordered for a work, there are two ways of ascertaining the weight required. Supposing the pages of a magazine measure 6 in. × 10 in., multiply these together, which will give the size of the page in inches. One square inch of type weighs 4 oz., so that if the area of the pages in inches be divided by 4, the result will be the weight of that page in pounds. Twenty-five per cent. should be added for overmatter. Or let us suppose that the weight of type required for a pamphlet of 24 pages has to be ascertained, each page measuring 7 in. × 10 in. The following would be the method of working out the answer :—

```
  10
   7
  --
  70
  24 pages in the whole.
 ---
 280
 140
 ---
4)1680 square inches of matter in the whole.
  420 lb.
Add 105 for overmatter.
 ---
 525
```

Another way of working out the answer is to obtain the area of the type in pica ems, and to divide that total by 144, the latter being the number of picas to the pound.

The amount which should be allowed for overmatter will depend on the nature of the work. Scientific works would require probably 40 per cent. additional, but for ordinary news or bookwork we think that 25 to 30 per cent. would be sufficient.

The following points in connexion with the ordering of type should also be noted :—

When ordering fancy or display founts state whether you require quads and spaces.

When sorts are being ordered quote the name, number, nick, and founder's name ; and also send a lower-case h and a cap H as patterns. If cases are labelled with the name of the fount and the founder's name, much trouble will be saved afterwards when additional sorts are needed.

Be careful to state if the weight ordered is to include italic, or only Roman.

The boxes of the lower case hold about the following weights :—Those of the size of the "a" box 2 lb. 2 oz. each, the b box about 15 oz., and the smallest boxes hold about 6½ oz. each. A pair of empty cases weigh about 10 lb. A pair of cases hold about 56 lb. of type, and a double case about 25 lb.

In ordering leads it should be remembered that 576 ems of thick, or 4 to pica leads, weigh 1 lb., double that length of thin leads weigh 1 lb., and one-half more of middle leads weigh 1 lb., so that the number to the pound of any length of thick lead can be ascertained by dividing its length into 576. Supposing we wish to find out how many 22-em thick leads go to the pound, we simply work out the following sum and we have the answer :—

```
22)576(26
   44
  ---
  136
  132
  ---
    4
```

The answer would be 26.

We have not given a table of leads to the pound, as the above system of obtaining the information is so simple that it could be worked out in almost less time than it

would take to refer to a table, and information thus procured will be more readily retained by the memory.

As a help in ordering wood letters, we append a few useful hints from Messrs. Caslon's circular :—

Much variety of opinion has been expressed as to the assortment of founts, and many printers prefer to order wood letter according to their own scheme of proportions. The following, however, are the assortments which we have adopted, and which are generally admitted, after many years' experience, to be the best that can be devised for general posting-bill work :—

A $5\frac{1}{2}$ dozen fount consists of—

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	Æ	Œ	&	,	;	:	.	-	'	?	!
3	2	2	2	4	2	2	2	3	2	2	3	3	2	3	2	3	3	2	1	3	3	3	2	2	2	1	2	1	1	1	1	1	3	1	1	3

An 8 dozen fount consists of—

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	Æ	Œ	&	,	;	:	.	-	'	?	!
4	3	3	3	5	3	3	3	4	2	2	4	5	4	4	3	2	4	4	4	3	3	3	2	3	2	1	1	2	4	1	2	4	2	2	1	3

A 12 dozen fount consists of—

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	Æ	Œ	&	,	;	:	.	-	'	?	!
7	5	5	5	8	5	5	5	7	3	3	6	5	6	7	5	2	6	6	6	5	3	4	2	5	2	1	1	2	5	2	2	5	2	3	1	4

The addition of figures makes $2\frac{1}{2}$ dozen extra. Thus—

1	2	3	4	5	6	7	8	9	0	£
4	4	2	2	2	2	2	2	4	2	

A 12 dozen fount, capitals and lowercase, consists of the above $5\frac{1}{2}$ dozen assortment, and the following :—

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	fi	ff	fl	ffi	ffl
3	2	2	2	5	2	2	2	4	2	2	3	2	3	4	2	2	3	3	3	3	2	2	2	2	2	1	1	1	1	1

The "Bills of Type" on pp. 136 and 137, given by the courtesy of Messrs. Stephenson, Blake, & Co., will be of material assistance in ordering type. If a fount, on being newly laid, is found to be uneven in sorts, the mistake may be detected on reference to one of these tables.

The following give the weights to the respective sizes of types for the 3,000 em bill :—

Pearl	130 lb.	Bourgeois	400 lb.
Nonpareil	200 ,,	Long Primer ..	480 ,,
Minion	250 ,,	Small Pica	600 ,,
Brevier	300 ,,	Pica	750 ,,

Jobbing types vary so much that no particulars of value can be given.

MESSRS. STEPHENSON, BLAKE, & CO.'S

SCALE OF ASSORTMENT FOR JOBBING FOUNTS.

a	620	fi	50	A	300	A
b	170	ff	50	B	150	B
c	300	fl	40	C	180	C
d	400	ffi	40	D	180	D
e	880	ffl	30	E	380	E
f	250	æ	30	F	150	F
g	250	œ	20	G	150	G
h	400	,	620	H	180	H
i	620	;	80	I	300	I
j	80	:	80	J	120	J
k	150	.	620	K	120	K
l	400	-	80	L	180	L
m	250	?	40	M	150	M
n	620	!	40	N	300	N
o	620	’	150	O	300	O
p	250	(	80	P	150	P
q	80	[		Q	60	Q
r	620	1	120	R	300	R
s	620	2	100	S	300	S
t	620	3	100	T	300	T
u	400	4	90	U	150	U
v	180	5	90	V	120	V
w	180	6	90	W	150	W
x	80	7	90	X	60	X
y	180	8	120	Y	150	Y
z	60	9	90	Z	60	Z
&	80	0	120	Æ	30	Æ
		£	20	Œ	30	Œ

MESSRS. STEPHENSON, BLAKE, & CO.'S

SCALE OF ASSORTMENT FOR BOOK AND NEWSPAPER FOUNTS.

a	8,000	,	5,000	‡ †	100	A	650	A	360	á	Small assortment.
b	1,700	;	800	*		B	450	B	220	é	
c	3,300	:	600			C	550	C	270	í	
d	4,000	.	3,000	[	200	D	550	D	270	ó	
e	12,000	-	1,000			E	800	E	450	ú	
f	3,000	?	300	‖ §	100	F	450	F	220	à	
g	2,000	!	200			G	450	G	220	è	
h	6,000	’	1,000			H	450	H	220	ì	
i	8,000			¶	60	I	800	I	450	ò	
j	500	(	400	☞		J	350	J	180	ù	
k	800					K	350	K	180	â	
l	4,000	1	1,260	@		L	550	L	270	ê	
m	3,000	2	1,100	℔	100	M	600	M	300	î	
n	7,000	3	1,100	℔		N	600	N	300	ô	
o	7,500	4				O	600	O	300	û	
p	2,000	5		…		P	450	P	220	ä	
q	500	6	1,000	½		Q	200	Q	100	ë	
r	7,000	7		⅔ ¾ ¼	200	R	600	R	300	ï	
s	7,000	8				S	650	S	360	ö	
t	9,000	9				T	800	T	450	ü	
u	3,500	0	1,260	⅓		U	450	U	220	ç	
v	1,200	£	176	⅔		V	350	V	180	å	
w	2,000	$		⅛	100	W	450	W	220	ñ	
x	400			⅜		X	150	X	80	õ	
y	2,000	Spaces.		⅝		Y	350	Y	220		
z	250	thk.	20,000	⅞		Z	100	Z	60		
		thin	7,000							Rules.	
&	250	mid.	9,000	1				Æ	30	m	
		hair	3,000	2		Æ	50	Œ	20	2m	
fi	500			3		Œ	40			3m	
ff	400	Quads.		4						4m	
fl	200			5							
ffi	160	n	6,000	6		Ã					
ffl	100	m	3,000	7		Ñ					
		2m	one	8		Õ		Braces.			
æ	100	3m	tenth of	9		Ç		2m	Small assortment.		
œ	70	4m	total	0				3m			
			weight of					4m			
			fount.	£				5m			

CHAPTER XVII.

STEREOTYPING.

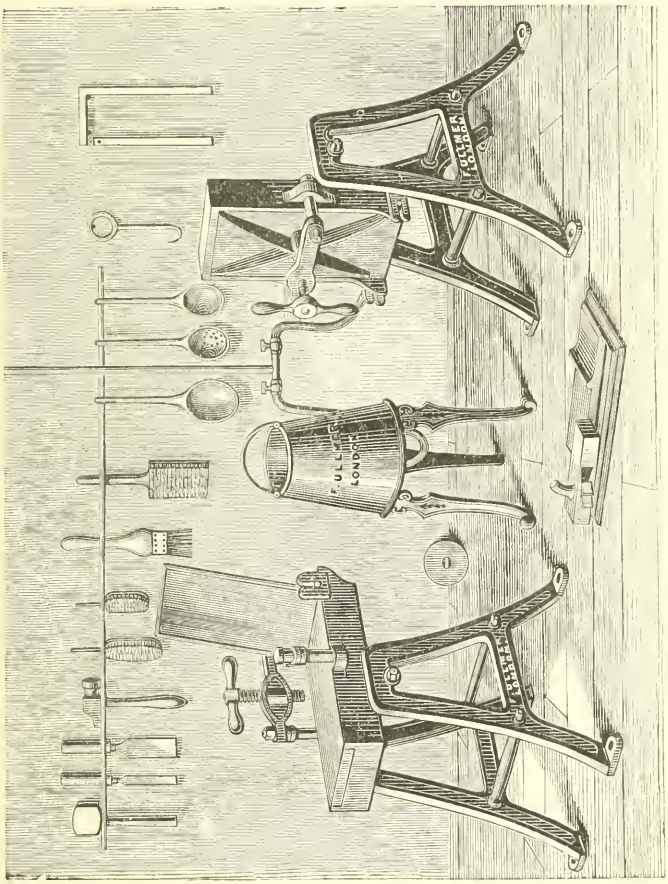
THIS process has now become of almost universal use in printing-offices. It saves type and labour, and is simple of manipulation, so that any man of ordinary intelligence may soon learn the operations.

The tools required are a casting-box, which may also be made to answer as a drying-box, a melting-pot and gas furnace, shooting plane and block, ladles, casting gauges, beating brush, while a circular saw will also be found useful.

Suppose, now, that we have a form to stereotype. The type must be surrounded by clumps, 3-em pica in thickness, and the form should then be carefully planed, and brushed over with olive oil, after which it will be ready for being moulded.

PREPARING THE FLONG.

The flong from which the mould is made is composed of several layers of tissue paper and blotting-paper, pasted together by a specially prepared composition. There are many methods of making composition, every stereotyper having a preparation of his own. Ordinary bookbinders' paste, thinned with water to the consistency of cream, and a little whiting and alum added, will answer the purpose. Another, and better composition can be made by taking, say 1 lb. of bookbinders' paste and thinning it down with water to the consistency of milk ; then add 1 oz. of crushed whiting and 2 oz. of glue ; the glue should be soaked in water, melted, and added to the paste and whiting, the whole being thoroughly mixed and put through a fine sieve. A few drops of carbolic acid might be added, or a little corrosive sublimate, for the purpose of preserving it from going bad.



STEREO FOUNDRY.

In making the flong, take a piece of wrapper, an old ream wrapper will do, one that is free from lumps, is of a soft pulpy nature, and not very stout. Give this wrapper a coating of the composition and place on it a piece of blotting-paper—thin blotting is best. Then another coat of paste, and add a tissue, and next another layer of blotting-paper (if the blotting-paper is thick only one layer will be necessary). Next add three tissues, with a layer of paste between each. The flong may then be placed between damp blankets, and under a weight until required Immediately before using another tissue should be added.

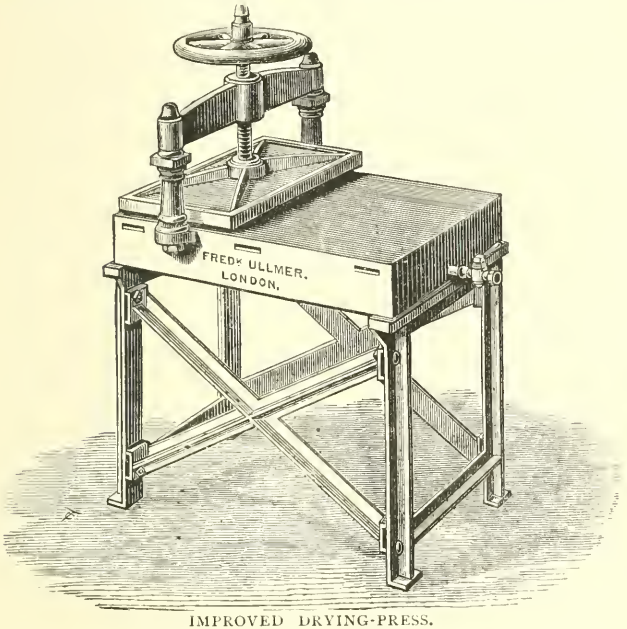
MAKING THE MOULD.

Take a piece of flong, large enough to cover the form dust it over with powdered French chalk, and brush over with a soft brush, place face or tissue side downwards on the form, and beat it down with the flat brush until a sufficient depth is obtained. This may be ascertained by lifting a corner of the mould up. After this, paste the back of the mould, and fill in the whites or hollows with strips of straw board, about the thickness of a 10-sheet paste-board, then paste a sheet of brown paper and place over the whole, and beat again with the brush; this keeps the packing in its place and strengthens the mould. Now place the form, with the mould upon it, in the drying-box, taking care to place it in the centre, then put one or two thicknesses of blanket on the top of mould and form (a piece of machine blanket will do), bring down the lid, and screw down more or less as may be necessary. For a heavy or solid form more pressure will be needed than for a light or open one. An atmospheric burner must be applied to the drying-box to give the necessary heat. After being in the box about 15 minutes, the form may be removed and allowed to stand for 10 minutes, so as to permit the moisture to evaporate; pieces of stereo metal being placed on the edges of the mould to prevent warping. The mould may then be trimmed round with shears, and placed face downwards on the casting-box, in order to drive out any moisture still remaining. A lip must be added to the mould, by pasting

to one end a piece of brown paper, sufficiently long to hang over the end of the casting-box, when the mould is placed ready for casting.

CASTING THE PLATE.

Place the mould with its back on the bed of the casting-box, and let the lip hang over the fore end, then put the casting gauges round, place over the whole a piece of



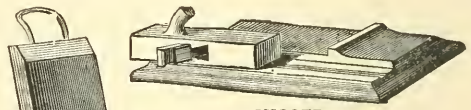
IMPROVED DRYING-PRESS.

smooth brown paper, to come over the fore edge of the box; bring down the lid, apply the screw, and place the box in a vertical position. Next take a ladleful of metal from the melting-pot, and pour steadily but quickly between the two pieces of brown paper. After standing for a few minutes, place the box again in a horizontal position, loose the screw, lift up the lid, and the plate and mould will be ready for being separated.

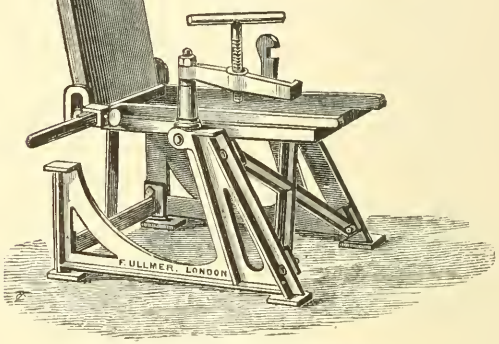
With a piece of blanket, take hold of the plate and turn over, release the mould, and the plate will then be ready for trimming.

PREPARING THE PLATE.

To trim the mould first cut off the tang or pour with a chisel and mallet, or a circular saw, and plane off any superfluous metal with the shooting-plane. Cut out any



SHOOTER.



IMPROVED CASTING-BOX.

hollows which need to be made deeper with a chisel; punch the necessary pin-holes, and fasten with rivets to wood; or where stereo mounts are used similar to those illustrated on page 143, the edges of the plate will have to be bevelled: this can readily be done by lifting it to an angle of 45 degrees when trimming the edges.

To test the metal whether it is of the proper heat for pouring, dip a piece of white paper into the molten metal; if the paper be scorched black, the metal is too hot; but if it turn a straw colour, the right heat is attained.

If metal does not run well, the cause may be impurity, and it should then be fluxed, by putting into it and stirring well in, a piece of tallow. The impurities will then come to the surface, and may be removed.

Zinc is a bad element in stereo metal. If plates appear indistinct and are full of small holes, it will probably be found that zinc is the cause. Being of lighter specific gravity than lead, zinc comes to the top. It is, moreover, of a lighter colour. If a red-hot iron be inserted into the molten metal and comes out with patches sticking to it, it is a sure sign that zinc is present.

CASLON'S PATENT STEREO MOUNTS AND CATCHES.

Stereo metal may be made by mixing tea-lead and type-metal, say 10 lb. of lead to 24 lb. of type-metal, or 14 lb. of lead to 3 lb. of antimony. Antimony is, however, difficult to melt, and the lead will need to be of a red heat for the purpose, the antimony being added in small pieces.

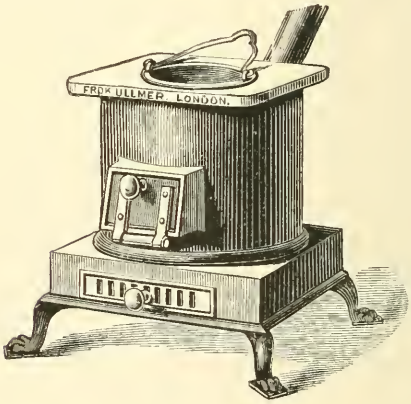
As heat has a deteriorating effect upon type, a process has been invented of cold-drying the mould. This may be done by taking the mould after it has been under pressure a short time, and placing it, whilst wet, face downwards in a tray of sand, heated by a gas-burner, a flannel being placed over the mould, and a perforated iron-plate on the top. About two minutes is the time required by this process to dry a mould.

An older process is that of stereotyping by use of plaster of Paris; but, as the advantages of the papier-mâché process are so great that it is universally preferred, we need not describe the plaster process, more especially as it is practically obsolete.

A full description of both processes, as well as Electrotyping, will be found in "Stereotyping and Electrotyping,'

by F. J. F. Wilson; forming one of the volumes of "Wyman's Technical Series," published by E. Menken.

As Electrotyping is a much more elaborate process, not so generally practised by printers, we abstain from giving a description of the same, but refer the reader to Mr. Wilson's excellent work.



STEREO FURNACE.

CHAPTER XVIII.

PROCESS BLOCKS.

THE art of producing raised surface blocks for letter-press printing from zinc is termed Zincography. The process is not difficult, and the expense for plant, &c., trifling. Hence this process has been made to replace much of the work hitherto done by the wood-engraver. We will endeavour briefly to explain in what the process consists, our information being derived from the excellent hand-book on "Zincography, or Process Blockmaking," in which work the whole process is much more fully explained, as well as illustrated. This handbook forms one of the manuals comprised in "Wyman's Technical Series."

The materials required are as follow:—Etching-box, which must be so arranged that it can be given a rocking motion, either by hand or mechanically; a litho. transfer press; a washing-trough; hot plate; various brushes and etching tools; five rollers, litho.,—three leather-covered, one cloth, and one velvet-covered.

The drawing or print must first be obtained on a specially-prepared paper, ordinary litho. retransfer paper will do. The drawing should be made with ordinary litho. writing ink, or ordinary printing ink, thinned down. The sheet of transfer containing the drawing upon it is placed between damp sheets of paper, and, when sufficiently moist, is taken and placed, drawing side downwards, on a prepared zinc plate, a few sheets of paper placed on the top, and a glazed board; and the whole is then put through the press, at first with light, and then with gradually increasing pressure. The drawing should be examined several times, and damped with a wet sponge. When sufficiently pressed, the plate is immersed in water for a short time,

when the paper may be taken away, the composition washed off, and the design will be found transferred to the zinc plate.

The plate next requires rolling up, preparatory to etching; the design is first washed, and the hard roller used with hard resisting ink. It is dried, and then dusted with powdered resin.

The plate is then immersed in a bath composed of 60 parts of water and 20 of nitric acid, and rocked for a quarter of an hour, then it is taken out, rinsed, and dried, and rolled up again, and all places, which are not required to be acted upon by the acid are stopped out with shellac varnish. The plate is again immersed in the acid bath for some minutes, and then taken out, rolled up, and heated so as to cause the ink to run down the sides. This is done to prevent the acid from eating away the foundation of the design.

The plate undergoes this treatment for the two last immersions; the cloth-covered and velvet-covered rollers are used in rolling up, and softer ink, so as to go down the sides of the design, and only allow the acid to act in making the whites deeper. The lines in a design should be wide at the bottom. After the requisite etching has been done, the plate is dried, trimmed, and mounted.

The zinc plate, before being transferred upon, should be thoroughly cleaned. It should also have the surface roughened by being immersed in a weak acid bath.

This brief outline is sufficient to give some idea of the principles of the process, but the student or printer who may wish to master the art of Process Block-making should not fail to procure the manual on "Zincography, or Process Block-making," by Josef Bock; for, as the *Printers' Register* pointed out a short time ago, "Mr. Bock's book enables any one of ordinary capacity to make zinco-blocks effectively, readily, and economically."

CHAPTER XIX.

PAPER AND ITS MANUFACTURE.

PRINTERS would do well to familiarise themselves somewhat with the subject of paper manufacture. They would then know better how to use it, and how to buy it.

The suitability of the paper employed plays an important part in the production of a tasteful job. To thoroughly understand how to choose paper for any particular kind of work, it is necessary to know of what it is made, and how it is made ; and without some knowledge of the manufacturing processes, it is scarcely possible to understand the judicious selection of paper. We shall endeavour to give in this chapter such information as will be of use to printers in buying paper, and we shall also indicate for what classes of work the various qualities are most suitable.

RAW MATERIALS.

The first requisite in all raw materials used for the manufacture of paper is that they yield a sufficiency of fibre. Vegetable fibres are found the most suitable. The materials principally employed for the purpose are cotton and linen rags, hemp, jute, sailcloth, esparto, wood, ropes, tow, cotton waste, manilla, refuse of sugar-cane, straw, and flax. Cotton and linen rags are, however, preferable to all other raw materials, and from them the best papers are manufactured.

Linen rags are used principally for account-books and drawing papers, bank notes, &c. They yield a strong crackling paper.

Worn rags, owing to their softness, make the best printing papers.

Esparto fibre is used largely for manufacturing writing papers and good printings. Esparto is a plant of the rush tribe, and is imported into this country principally from Spain, where it grows in large quantities. It is a very important fibre to the modern paper manufacturer, and holds a middle place between rags on the one hand, and wood and straw on the other.

Straw is not a very satisfactory material, for, owing to its hard coat, its yield of fibre is but small. Paper made from it has a hard harsh feel, is not tough, and soon breaks.

Wood, although used extensively, is not a good material for paper-making. There are two methods of making paper from wood, the mechanical and the chemical. The former method, owing to the natural impurities inherent in the fibre, yields a paper which soon loses colour on exposure to sunlight, turning a dirty yellow tint. Moreover, paper containing a large proportion of wood-pulp, soon breaks.

Chemically treated wood-pulp is far superior to the above, producing a strong paper, only inferior to that made of rags.

Wood is now extensively used in paper manufacture, and traces of it may be found in even some of the hand-made papers.

CONVERTING RAW MATERIAL INTO PULP.

After the rags are sorted they are passed through a machine which frees them from dust, and at the same time cuts them up into smaller pieces. They are then ready for the boiling process.

After boiling, the rags are washed by means of the washing and breaking engine, in which they are made to pass under a revolving paddle; at the same time a revolving drum, set with knives, cuts them up still further. After leaving the breaking engine the material is in the state technically known as "half stuff."

The bleaching of the stuff is done while in the breaking engine, by the use of chemicals, such as chloride of lime. The stuff is next run out into perforated zinc troughs, to allow the bleaching liquid to draw off.

The material is then passed on to the beating engine, a machine similar to the breaking engine, where it is still further cut up. Here the sizing is added, as well as any adulterant, or loading material, such as china clay. Clay is not, however, to be looked upon altogether as an adulterant, since its admixture allows of a higher finish being given to the paper, and also increases bulk.

Alum is first mixed with the stuff, and then the materials for sizing, such as resin, starch, flour paste, &c., are added. If for coloured paper, the colouring matter is also now added.

THE PAPER-MAKING MACHINE.

After leaving the beating engine, the stuff is ready for being made into paper, and is conveyed accordingly to the stuff chests of the paper-making machine.

This chest is a large round tub, in the centre is a revolving shaft, with wooden arms, which serve to keep the stuff in motion and prevent the solid part from settling at the bottom.

The stuff is delivered to the machine by a pump which works at regular intervals, and the amount supplied is regulated according to the thickness of the paper required. The flow of pulp is regulated by an adjustable ductor blade, and is known as the "slice." The pulp next falls on to a cloth or rubber, which conveys it to an endless wire gauze which runs on rollers fixed at each end. The size of the mesh of the wire gauze or woven wire is regulated according to the quality of paper to be made.

The wire generally travels with a shaking motion, which causes the fibres of the pulp to interweave with each other. The wire cloth extends about 6 yards. Straps of leather, called "deckle" straps, run along with the woven wire and regulate the width of the paper.

Vacuum boxes are fixed under the woven wire for drawing away moisture from the pulp as it travels.

After leaving the wire gauze, the paper is passed through the dandy-roll, which gives the marks to the paper, at the same time compressing and levelling the fibre. The marks of the dandy-roll can be made either "wove" or "laid" as may be desired.

The paper next passes to the couching rolls, consisting of a pair of heavy rolls covered with felt; these still further compress the fibre and reduce moisture.

Finally, the material is passed through the finishing and calendering rolls according to the quality of paper.

HAND-MADE PAPER.

The method of preparing pulp for hand-made paper is the same as described for machine-made. The process of making is as follows :—The operator takes in his hands the mould, consisting of a wooden frame, with a wire woven bottom. These wires give the water-mark found on paper. The design of the water-mark is sewn on the cross wires with fine wire. The deckle, also a frame of wood, and when small sheets are being made is divided into two or four compartments, is placed in the mould. The workman dips them into a vat of pulp, and takes up as much as will be required to make a sheet, he then shakes the mould sideways and in front of him, thus interlocking the fibre. He next takes out the deckle, gives the mould to his assistant, and uses a duplicate mould to make another sheet. The assistant turns the mould over on a sheet of felt and removes the mould, and covers the sheet thus deposited with another piece of felt, and then returns the mould to the vat-man. After having thus emptied a pile of sheets and inserted the felts, as described, the whole is put into a press. Hand-made paper goes through several forms of pressing, which need not be described, after which the sheets are dried by being hung on ropes of cowhair.

SIZING AND FINISHING.

Hand-made papers are animal-sized, which is done by passing the sheets through a tub or vat containing gelatine size. Hence the name "tub-sized." Machine-made sized papers usually have the size imparted to them while the stuff is in the machine, hence the name "machine-sized" paper. Only vegetable size is used in this case; sometimes, however, a machine-made paper is sized afterwards, when it is run through a vat of animal size and is called tub-sized machine-made, except when, as is sometimes done, it is sold as hand-made paper.

The high finish of paper is no indication of its quality, or of its being sized. Finish or polish on paper is merely a question of calendering, and a highly-finished surface can be given to the commonest paper.

For ordinary bookwork purposes a paper made of esparto and rags, with moderate sizing, will be found to answer very well. Too highly-sized paper is not good for printing upon, as the sizing gives an impervious or impenetrable surface, and thus prevents the ink from being absorbed into the paper. For illustrated work, a highly-finished, undersized paper, fairly well loaded with china clay, will give the best results, and a fair body of ink may be printed on it without fear of its not drying properly.

Sizing gives a hard surface to paper. Starch and flour paste impart a hard crackling sound to paper.

THE QUALITIES OF PAPER.

A laid paper is sometimes regarded as being uniformly of a better quality than a wove. With regard to hand-made papers this may perhaps be the case, but not necessarily so.

With regard to the marks, wove and laid, in the machine-made papers, they do not indicate any difference in quality. The dandy-roll, which gives the marks, may be changed at will, so that sometimes wove and laid papers are made of the same stuff. In fact, in many cases printings and writings are made from the same stuff, the only difference being that the writing has a slightly extra calendered surface.

The commonest papers are made almost entirely from mechanically-prepared wood-pulp, which is imported largely from Germany, Sweden, and Norway. Such paper is widely used for hand-bills and "news." Wood paper is not suitable for poster-work, owing to its changing colour on exposure to sunlight. Esparto grass mixed with rags yields a good hard paper, and the best writings are made from the two materials combined.

The best printings are made from old rags.

In distinguishing the difference between machine and hand-made papers, we may be guided largely by the run of the fibre. In machine-made paper the fibre naturally runs all one way, whilst in hand-made papers the fibre runs in all directions.

When papers are blue or azure laid, if machine-made the colour will be darker on the wrong side, and if hand-made, on the right side.

Good white paper has no smell. The best papers on burning should leave a very small amount of ash.

To ascertain the amount of adulterants present in paper, take a piece of the paper and ascertain its exact weight. Then reduce it to small pieces, place in a test tube and apply sufficient heat to reduce it to ashes, and weigh the latter. Supposing now that the paper weighs 5 drachms, and that the ash weighs only 2 drachms, we arrive then at the following result :—

5 : 100 : : 2 : 40

or, in other words, we discover that 40 per cent. of clay or some other adulterant is present.

To ascertain the right or wrong side of paper remember the following rule :—The lettering of the water-mark can be read only from the right side. A ream of paper flat has right side uppermost. The wire gauze mark is on the wrong side in machine-made paper, and on the right side in hand-made. When folded in quires the right side is outside.

RELATIVE WEIGHTS OF PAPER.

The following will enable any one to determine the relative weights of paper. We will suppose that the

problem to be solved is:—If a ream of double-crown weighs 30 lb. what will a ream of double-demy weigh, of same quality?

To answer this question, proceed as follows:—Multiply the area of double-demy by 30, and divide the product by the area of the double-crown, and the result will be the answer. It will be worked out thus:—

787 area of Double Demy.
30 weight of Double Crown.

Area of Double Crown 600)23610(39 lb. about.
1800

5610
5400

210

Sizes of paper in America are slightly different from those in use in this country; and the following table of sizes of papers will be interesting:—

Imperial Broadside		22 × 32 inches.
Super Royal Broadside		20 × 28 ,,
Royal, printing	20 × 24	20 × 25 ,,
,, writing		19 × 24 ,,
Medium, printing		22 × 24 ,,
,, writing		18 × 23 ,,
Demy		16 × 21 ,,
Crown		15 × 19 ,,

SIZES OF CARDS.

Large	$4\frac{1}{2}$	by	$3\frac{1}{16}$
Carte de Visite	$4\frac{1}{8}$	,,	$2\frac{1}{2}$
Small	$3\frac{9}{16}$	,,	$2\frac{7}{16}$
Reduced Small	$3\frac{1}{2}$	,,	$2\frac{1}{8}$
Extra Thirds	$3\frac{1}{16}$	,,	$1\frac{7}{8}$
Thirds	$3\frac{1}{16}$	,,	$1\frac{1}{2}$
Half Small	$2\frac{1}{16}$	,,	$1\frac{5}{4}$
Town Size	3	,,	2
Half Large	$3\frac{1}{16}$	,,	$2\frac{1}{4}$
Double Small	$4\frac{15}{16}$	,,	$3\frac{3}{16}$
Double Large	$6\frac{1}{2}$	,,	$4\frac{1}{2}$
Quadruple Small	$7\frac{1}{8}$	,,	$4\frac{15}{16}$
Quadruple Large	9	,,	$6\frac{1}{8}$

SIZES OF WRITING AND PRINTING PAPERS AND CARTRIDGES.

Description.	Writings.	Printings.	Cartridges.
Emperor	72 × 48	...	...
Antiquarian	53 × 31	...	...
Double Imperial	...	...	44 × 30
Double Elephant	40 × 26½	...	40 × 26
Atlas	33 × 26	...	...
Colombier	34½ × 23½	...	...
Imperial	34 × 22	30 × 22	30 × 22
Elephant...	28 × 23	30 × 23	28 × 23
Super Royal	27 × 19	27½ × 20½	27½ × 19½
Cartridge or Log	...	...	26 × 21
Royal	24 × 19	25 × 20	25 × 20
Medium	22 × 17½	24 × 19	...
Demy	20 × 15½	22½ × 17½	22 × 17½
Music Demy	...	20¾ × 14⅜	...
Large Post	21 × 16½	...	...
Copy	20 × 16	...	20 × 16¼
Post...	19 × 15¼	19¼ × 15½	...
Foolscap...	17 × 13½	17 × 13½	...
Pott...	15 × 12½	...	...
Sheet and Half Pott	22½ × 12½	...	...
Sheet and Third Cap	22 × 13¼	...	...
Sheet and Half Cap	24½ × 13½	...	...
Sheet and Half Post	...	23½ × 19½	...
Double Foolscap	26½ × 16⅝	27 × 17	...
Double Crown	...	30 × 20	30 × 20
Double Post	...	31½ × 19½	...
Double Demy	...	35 × 22½	35½ × 22½

CHAPTER XX.

INK AND ITS MANUFACTURE.

IF the ink-user had a better idea of the constituent parts of ink, he would know how to treat it in the various changes of condition which different seasons and temperatures entail. To be of help in this respect we give some particulars of its manufacture.

In the manufacture of ink, first we have the pigment which is to give body, and the vehicle in which the pigment is to be conveyed to the types and thence to the paper. Linseed-oil highly refined is placed in an iron pot, and boiled until inflammable vapours are given off, when it is fired and allowed to burn for a short time, after which the pot is closed by an air-tight lid and the flame extinguished. The oil is further boiled until a skim forms on the surface, when tested by a drop being placed on an iron table. Rosin-oil is added, to give more body and gloss. The compound is then what may be termed a varnish. The next operation is to place the varnish in the mixing machine, and add the colouring matter ; the machine is fitted with an agitator for mixing the ingredients, after which the mixture is drawn out from the bottom, and ground by passing between hard stone-rollers under great pressure.

The linseed-oil, before using, is refined by being mixed with diluted sulphuric-acid at a high temperature, when the impurities subside, while the acid is washed away with hot water. The oil then clarifies, and can be drawn away and stored ready for use. The rosin-oil is refined by re-melting and clarifying. In common inks common black carbon is used, but for best inks higher qualities are necessary.

Charcoal, carbon-black, and lamp-black are the principal ingredients for the manufacture of black ink. The quality of the ink depends very largely on the excellence of these materials. Indigo and Prussian-blue are used to intensify the colour and neutralise any brown appearance.

American inks are noted for the intensity of their colour, which is to be accounted for by the advantage of utilising the products of the natural wells of oil; special processes being invented for the production from these oils of carbon of exceptional purity and intensity of colour.

Different classes of work require ink of different consistency. News, Book, Jobbing, and Platen machines are each fed with a special class. A quick-running machine, for instance, will have a thinner ink than one of less speed.

News inks should be thin and of good colour. Book-work requires a heavier-bodied ink, but not too stiff. A thin paper, again, needs a thin ink of intensity of colour. A heavy stout paper will absorb more ink than a thinner one; consequently, a heavier-bodied ink will be best. Inks for art-work should be of the finest quality, not too stiff, but free-working.

In regard to the use of ink for general jobbing work, it is not always economical to use cheap inks. A really cheap ink is the one with the largest covering capacity. An intense black ink of light body will cover more paper, or give more impressions than one of less intense colour, though of thicker or heavier body.

To some extent the distributing capacity of a machine will determine the quality or kind of ink to be used. A full-bodied ink, made with strong varnish, would be out of place on a Minerva or Arab machine. The heavier-bodied inks require more distributive power to properly break them up. Distributing ink means the tearing asunder of the atoms contained in the ink, and the more thoroughly this can be done the better, and the more readily will the rollers give off the ink in a manner that will cover the heavy parts and not fill up the light parts of the form. The thinner the coating of ink can be made commensurate with the desired result, so will the work be correspondingly sharp and clear, and the ink will also dry more quickly.

Ink exposed to the air deteriorates rapidly, and care

should be taken to keep dust out of it. For this reason a large quantity should not be placed in the duct at once.

When ink requires to be thinned down owing to changes of temperature or other causes, care should be taken to thoroughly mix the varnish in. Many printers fail to realise what is required in this respect.

Lightly-sized unglazed papers need a full-bodied ink; being of an absorbent nature, ink may be " piled " on without detracting from the sharpness of the printing.

Ordinary engine-sized paper, if damped, will need thinner ink.

Hand-made and all animal or tub-sized papers need a strong, full-bodied " Dryers " ink. In these cases the ink really remains on the surface and is not absorbed, so that a sort of skin has to be formed. This kind of ink requires careful treatment because of its quick-drying propensity. If standing for only a short time the machine should be " washed up " before recommencing to print.

Black ink on toned or brownish paper has a tendency to make the ink appear brown; to remedy this a little bronze blue may be mixed with the black.

When ink is taken out of a can care should be exercised to take it from the top, and keep the surface even. Ink allowed to accumulate at the sides hardens and becomes unworkable. All skim should be removed and never used.

CHAPTER XXI.

HAND PRESSES AND PRESSWORK.

THERE are two types of hand presses now in general use: the Columbian and the Albion.

The *Columbian* has the following parts:—the frame, the feet, the table, the ribs, the tympan, the rounce, the pillar, the main lever, the platen, the piston, the elbow-joint, the links, the bar-handle, the connecting-rod, the counterpoise levers, guide-pieces, etc.

To put up a press of this description proceed as follows:—First fix the feet in such a position that the frame can be dropped into the sockets; next fix the ribs, taking care that all is level; a spirit-level should be used, and the ribs packed with pieces of tin or sheet iron until level, and the pillar under the fore-part of the ribs should also be packed. The rounce should now be fixed and followed by the table, to which the girths of the rounce must be attached. The bar-handle had now better be placed, or it will not be possible to get in the bolt afterwards. The main lever may next be placed in position, and the bolt inserted in the near cheek of the frame. The piston should next be fixed to the main lever, and the platen placed on the table and run under the piston, and then the pins inserted and screwed up. The elbow-joint, links, and counterpoise levers are next fitted in their places, and the tympan put on. The platen should then be levelled; to do this, place four large wood letters of equal height on the table, one at each corner, put down the tympan, run in, and pull the bar handle. The screws at the foot of the piston may then be tightened, packing being put between the piston and the platen; sufficient packing should be put under the piston to allow of about fifteen sheets of 18 lb. double crown or its equivalent being used inside the tympan.

The *Albion Press* is of lighter build and capable of quicker manipulation than the Columbian. Its leverage is obtained through the knuckle joint and the chill. The knuckle joint is fixed in the head of the press, and is held

in its place by a bolt which passes through it, and on which it works. The chill is a wedge-shaped piece of steel, with a hollow place at the thick end, into which the knuckle joint fits. The thin end of the chill fits into the top of the piston. The chill, when the press is at rest, is in a slanting, or diagonal position, and when the knuckle joint is put in motion by the pulling of the handle-bar to which it is connected by a shaft, it is brought into an upright or vertical position, and forces down the piston and platen.

COVERING TYMPANS.

The covering for tympans may be of parchment, calico, or paper. The material should be two inches larger than the outside measurement of the frame. The outside edge of the material should be well pasted with thick paste, and laid flat on the stone or a table, paste side upwards, and the frame placed on it. The pasted edges should next be turned over and pushed under the sides of the frame. The material will require cutting so as to allow the hooks to pass through, and also to fit the point slides. The material should be drawn as tight as possible, and when finished, sponged over with a wet sponge, and afterwards allowed to dry, when it will become tight.

MAKING READY A FORM.

There is not now much necessity for making ready at press; it will be well, nevertheless, for a compositor to understand how the work should be done for the purpose of pulling proofs, transfers, &c.

To commence with, the form should be exactly in the centre of the press table, or a shade nearer the platen than the tympan; the form, however, must be exactly under the centre of the piston when pulled, so that the running in of the carriage must be regulated accordingly. The form must be fastened to the table, and a sheet of the job taken and placed on the form, the back is then slightly pasted and the tympan brought down on it; the sheet will now stick to the tympan and will require further fastening at the corners with paste. The inside of the tympan will need

packing with paper to suit the job. The form may next be rolled and a sheet pulled, a thin sheet will be best. The inequalities of the impression should be noted, and the low places must be cut out and pasted on the tympan-sheet; and this must be repeated until the impression comes out even. When much overlaying is required it will be best to place the sheet containing overlays on the inside of the inner tympan: to do this, run four pins from the back of the tympan right through so as to pierce the tympan-sheet on the front, then take out the inner tympan leaving in the pins, and take off the tympan-sheet from the front and place in on the inner tympan, guiding the pins through the corresponding holes in the sheet of overlays. This will be found an excellent means of getting rid of slurring and creasing. Another tympan-sheet must now be used, pins inserted as guides, the frisket put on, and the job may then be worked.

GENERAL REMARKS.

Owing to the little use of the press, the race of practical pressmen is fast dying out, and the press is now abused rather than used. So little accustomed are compositors to press pulling, that if good proofs are required it is often thought best to have them done at machine.

We are of opinion that more type is damaged at press than at machine in consequence of great carelessness or inexperience in using the press. Very often proofs are brought to the overseer that are perfectly embossed, and in some cases pulled quite through the paper. Nor does the overseer, as a rule, know to what extent this sort of thing goes on unless he examines the waste sheets about the press; on looking at the tympan he will probably find it cut through in all directions by brass rules, and perhaps a large gash which has been caused by the table being run in whilst a bearer was overturned.

Compositors, for the most part, know next to nothing of the practical use of the press, and do not trouble to learn; so long as they succeed in obtaining a passable proof after repeated attempts, they are satisfied, although they may have broken several kerns and serifs off the type in the operation.

One habit, which is far too general, is to us incomprehensible. When a compositor has a proof to pull of a small form, he places it in the centre of the press, and a bearer at each corner of the table, and next, which is the incomprehensible part, he puts *on the form only* half a quire of paper. That the bearers can be of no use under such circumstances does not seem to suggest itself to the typo., although a moment's reflection would show the absurdity of the proceeding.

So great has been the abuse of the press in the manner indicated, that in some offices the tympan has been discarded altogether, and to obtain proofs, sheets of paper have to be placed over the form. This system, of course, saves the waste of tympan coverings, but adds greatly to the difficulty of getting a good proof, or, in fact, any proof at all; and does not prevent the embossing process, and the consequent breaking off of kerns and serifs from the type.

We think it a mistake to discard the tympan entirely, but recommend that, instead of parchment, glazed manilla brown paper be used as a covering. Cotton is sometimes employed, but is very unsatisfactory, as it soon becomes baggy, and it is impossible to obtain a clear proof with a baggy tympan. Parchment is undoubtedly the best material, but it is expensive, and if once cut with rule, much difficulty will needs be experienced in getting a good proof.

Brown paper yields as good a surface as parchment, and is in all respects quite equal to it, except in point of durability. A paper tympan, when cut through with brass rules or broken by bad usage, can be replaced at a small cost. A *good* tympan can by this means be always ensured at a cost of less than one halfpenny per week.

One effectual way of putting a stop to the above evils would be to select the man most skilled in press-work to pull all proofs, take charge of the press, and be responsible for its condition. There are some drawbacks to this plan, and we recommend, where this rule cannot be adopted, that a card be hung on the press cautioning users not to overpull, and to use care so as not to damage the tympan.

We also offer the following hints :—

1. Have the ink-table periodically washed and the roller cleaned. It is a good plan to have the roller and table cleaned each evening on leaving off work.

2. Keep the press clean and free from dust and accumulation of pye, furniture, quoins, etc., on the platen.

3. Have the press oiled once a week.

4. Change the sheets in the tympan at least weekly.

5. Instead of parchment, use a stout sheet of glazed manilla brown paper, as before recommended.

6. For small forms, use bearers, say stereo clumps, or some old metal letters.

7. Let the bearers be *broad*, so as not to be easily overturned.

The majority of forms pulled at press are small ones, so that the inside sheets of the tympan are soon worn thin by the repeated impressions, with the result that, when a larger form is attempted to be pulled, it is impossible to get an even impression. Changing the sheets will remedy this. Sheets of paper are better to use than a woollen blanket for the inside of tympans ; a sharper impression may be got, and the serifs are not so often worn or broken off.

By constant use, the centres of the platen and table become hollow. This may be remedied to some extent by placing on the inside of the inner tympan, pieces of paper, say, first, a piece about the size of a man's hand, then another two inches larger, and lastly, one three inches larger than the middle sheet. If these be pasted as recommended, they will last a long time, and will help materially in getting good proofs, at the same time saving much patching.

CHAPTER XXII.

TYPE AND TYPE-FOUNDING.

THE metal of which types are made is an alloy of lead, antimony, tin, and copper, in the following proportions :—Lead 70, antimony 25, tin 3, copper 2. Different foundries vary in their mixture, some making a harder metal than others. Lead gives bulk; antimony, hardness or brittleness; tin, toughness, and also assists in amalgamating the other metals more completely; copper, too, gives hardness and toughness. Copper is a good ingredient for type metal, but difficult to amalgamate with the other metals, and as a rule not more than 2 per cent. can be added.

Hardness alone in type metal is of no advantage in itself without toughness. If the metal be merely hardened with antimony, the type will be very brittle and will soon break.

Zinc has been tried and abandoned as an alloy in type metal, as it rapidly oxidises when damped, and the types become thus fastened together.

In mixing the metals, the lead and tin are first put into the melting-pot and mixed, the antimony being next added in small lumps. Antimony requires much more heat to fuse than lead or tin. Tin fuses at 442°, lead at 613°, and antimony at 812° Fahr.

The characteristics which distinguish good type are :—

1. Hardness and toughness.
2. The outline of the letters should be sharp and well defined.
3. It should be smooth and well finished, free from bur or inequality in thickness.
4. The stems should be of a good depth down to the shoulder and counter.

5. Each letter should be of exactly the same height to paper; the height of type being 11-12ths of an inch, or exactly the diameter of a new shilling.

6. There should be a good support to the overhanging kerns.

7. Each type should be throughout of one thickness, not thinner or thicker at the top than at the bottom.

The operation of type-founding or the manufacture of type may be briefly described as follows :—

First the outline of the letter is cut at the end of a piece of steel, whilst the latter is in a soft state. After cutting, the steel is hardened, and when finished, this piece of steel is called the punch. Great care is requisite in cutting the punch to ensure accuracy of appearance in the letters of the whole alphabet, since even the slightest variation would be detrimental to the type.

The *Strike.*—After the punch has been tested and passed, it is, by the aid of a machine, impressed on to a piece of copper; the pressure has to be nicely adjusted so as to send the punch into the copper the required depth.

The *Matrix.*—The strike is next passed to the justifier, who trims and finishes it off so that it shall fit exactly the machine and bring the letter in the right position when cast.

The *Mould* in which the types are cast is made of hardened steel, in two parts, the one fixed and the other movable. The mould, when fitted with the matrix, is attached to the machine, which latter is an ingenious combination of mould, matrix, injector, furnace, etc., and it may be worked by either hand or steam power.

The *Machine* consists of a furnace, on the top of which is a small reservoir of metal, kept in a fluid state. In this reservoir is a pump, the plunger of which operates in a cylinder in the bottom and projects, at each stroke, a small quantity of the molten metal from a small hole in a spout or nipple in the front face. The mould in which the body of the type is formed is of steel, and is movable, being set in place in front of the reservoir, and worked by the action of the same machinery which operates the pump. The copper matrix, containing any special letter stamped into it with the punch, rests with its face against the bottom open-

ing of the mould, being held in position by a curved steel spring. The method of operation is as follows:—The initial movements of the machine bring the upper opening in the mould opposite to the matrix exactly against the hole in the nipple. A simultaneous action of the pump projects a stream of the liquid metal into the mould with considerable force, at the same time stopping the opening in the nipple by a small plug from behind to prevent the further escape of the metal. The next movement draws the mould away from the nipple and opens it, throwing back the matrix, extricating the type and dropping it by a slide into the box below. This operation is repeated over and over again, as rapidly as the crank or wheel of the machine is turned, and a type is cast each time. On the rapidity of the motion depends the quantity produced. Such is the modern type-casting machine,—turning out one hundred types per minute, or sixty thousand per working day of ten hours. A jet or waste end is broken off by the machine immediately on being released from the mould.

The types are next set up in long lines, put into a stick, face downwards, made tight, and the groove at the bottom, forming the feet, is made by a plane. Each letter is carefully inspected with a magnifying glass, and every faulty one is rejected. The height of type, too, is carefully tested, even to the five-thousandth part of an inch.

Kerned letters are passed over a revolving flat file to remove the metal below the kern.

FIVE-LINE PICA ROMAN, NO. 3.

MOTern

CANON, NO. 1.

HIT Court

TWO-LINE GREAT PRIMER, NO. 4.

MOULD from

TWO-LINE ENGLISH, NO. 5.

CARMEN Charter

TWO-LINE PICA, NO. 5.

MODERN notication

DOUBLE PICA, NO. 8.

BUILDINGS determine

GREAT PRIMER, NO. 9.

HUNTINGDON attention

ENGLISH, NO. 10.

ENCOURAGEMENT Free Education

PICA, NO. 24.

THE REIGN OF JAMES I.

On the origin of letters among the Greeks, the genius of poets and orators, as might naturally be expected, was distinguished by an amiable simplicity, which, whatever rudeness may sometimes attend it, is so fitted to express the *genuine movements* of nature and of passion that the compositions possessed of it must ever appear valuable to the discerning part of mankind. The glaring figures of discourse, the pointed antithesis, the jingle of words: such false ornaments were not employed by the earlier writers; not because they were unknown, but because they scarcely ever occurred to them. Through all their compositions

SMALL PICA, NO. 19.

LEARNING IN THE REIGN OF JAMES I.

On the origin of letters among the Greeks, the genius of poets and orators, as might naturally be expected, was distinguished by an amiable simplicity, which, whatever of rudeness may sometimes attend it, is so fitted to express the *genuine movements* of nature or of passion, that the compositions possessed of it must ever appear valuable to the more discerning portion of mankind. The glaring figures of discourse, the pointed antithesis, the unnatural conceit, the jingle of words: such false ornaments were not employed by early writers; not because they were rejected, but because they scarcely ever occurred to them. An easy, unforced strain of sentiment runs through their compositions: though at the same time

PICA OLD STYLE.

THE REIGN OF JAMES I.

On the origin of letters among the Greeks the genius of poets and orators, as might naturally be expected, was distinguished by an amiable simplicity, which, whatever rudeness may sometimes attend it, is so fitted to express the *genuine movements* of nature and of passion, that the compositions possessed of it must ever appear valuable to the more discerning portion of mankind. The glaring

LONG PRIMER OLD STYLE.

LEARNING IN THE REIGN OF JAMES I.

On the origin of letters amongst the Greeks, the genius of poets and orators, as might naturally be expected, was distinguished by an amiable simplicity, which, whatever rudeness may sometimes attend it, is so fitted to express the *genuine movements* of nature and also of passion, that the compositions possessed of it must ever be valuable to the more discerning portion of mankind. The glaring figures of discourse, the pointed antithesis, the unnatural conceit, the jingle of words:

BREVIER OLD STYLE.

LEARNING IN THE REIGN OF JAMES I.

On the origin of letters among the Greeks, the genius of poets and orators, as might naturally be expected, was distinguished by an amiable simplicity, which, whatever rudeness may sometimes attend it, is so fitted to express the *genuine movements* of nature and of passion, that the compositions possessed of it must ever appear valuable to the more discerning part of mankind. The glaring figures of discourse, the pointed antithesis, the unnatural conceit, the jingle of words: such false ornaments were not employed by early writers; not because they were rejected, but because they scarcely ever occurred to them. An easy, unforced strain of sentiment runs through the whole of their compositions, though at the same time we may observe that, amidst

LONG PRIMER, NO. 21.

LEARNING IN THE REIGN OF JAMES I.

On the origin of letters among the Greeks, the genius of poets and orators, as might naturally be expected, was distinguished by an amiable simplicity, which, whatever rudeness may sometimes attend it, is so fitted to express the *genuine movements* of nature and also of passion, that the compositions possessed of it must ever appear most valuable to the more discerning part of mankind. The glaring figures of discourse, the pointed antithesis, the unnatural conceit, the jingle of words: such false ornaments were not employed by early writers; not because they were rejected, but because they scarcely ever occurred to them. An easy, unforced strain of sentiment runs through their compositions; though at the

BOURGEOIS, NO. 25.

LEARNING IN THE REIGN OF JAMES I.

On the origin of letters among the Greeks, the genius of poets and orators, as might be expected, was generally distinguished by an amiable simplicity which, whatever of rudeness may sometimes attend it, is so fitted to express the *genuine movements* of nature and of passion, that the writings possessed of it must appear most valuable to the more discerning portion of mankind: the glaring figures of discourse, the pointed antithesis, the unnatural conceit, the jingle of words, such spurious ornaments were not employed by early writers, not that they were rejected, but because they rarely occurred to them. There runs throughout their compositions an easy, unforced strain of sentiment: at the same time though we must observe that amid

BREVIER NO. 24.

LEARNING IN THE REIGN OF JAMES I.

On the origin of letters among the Greeks, the genius of poet, and orators, as might be expected, was distinguished by amiable simplicity, which, whatever rudeness may sometimes attend it, is so fitted to express the *genuine movements* of nature and of passions that the compositions possessed of it must ever appear valuable to the more discerning part of the human race. The glaring figures of discourse, the pointed antithesis, the unnatural conceit, the jingle of words: such false ornaments were seldom used by the earlier writers; not because they were rejected, but because they hardly ever occurred to them. Throughout the whole of their compositions there runs an

MINION, NO. 24.

LEARNING IN THE REIGN OF JAMES I.

ON THE ORIGIN OF LETTERS amongst the Greeks, the genius of poets and orators, as might naturally be expected, was distinguished by amiable simplicity, which, whatever rudeness may at times attend it, is so fitted to express the *genuine movements* of nature and passion, that the compositions possessed of it must always appear valuable to the discerning part of mankind: the glaring figures of discourse, the pointed antithesis, the unnatural conceit, the jingle of words; such false ornaments were not employed by the early writers, not because they were rejected, but because they scarcely ever occurred to them. An unforced strain of sentiment runs through their writings, though at the same time we observe that amid the most elegant simplicity of thought and expression, one is sometimes surprised to see a poor conceit which had presented itself quite unsought for, and which the author had not acquired enough of critical observation to condemn. Bad taste seizes with avidity these frivolous beauties, and even perhaps a good taste, before it is surfeited by them; they multiply every day

NONPAREIL, NO. 24.

LEARNING IN THE TIME OF ELIZABETH AND JAMES I.

ON THE ORIGIN OF LETTERS among the Greeks, the genius of poets and orators as might naturally be expected, was distinguished by an amiable simplicity, which whatever rudeness may sometimes attend it, is so fitted to express the *genuine movements* of nature and of passion, that the compositions possessed of it must ever appear most valuable to the more discerning part of mankind: the glaring figures of discourse, the pointed antithesis, the unnatural conceit, the jingle of words; such false ornaments were not employed by the early writers, not because they rejected, but because they rarely ever occurred to them. An easy, unforced strain of sentiment runs through their compositions, though at the same time we may observe that amid the most elegant simplicity of thought and expression, we are sometimes surprised to meet with a poor conceit which had presented itself unsought for, and which the author had not as yet acquired critical observation enough to condemn. Bad taste seizes with avidity these frivolous beauties, and even perhaps a good taste, ere surfeited by them; they multiply every day more and more in the fashionable compositions, nature and good sense are neglected, laboured ornaments are studied

PEARL, NO. 24.

LEARNING IN THE TIME OF ELIZABETH AND JAMES I.

ON THE ORIGIN OF LETTERS among the Greeks, the genius of poets and orators, as might naturally be expected, was distinguished by an amiable simplicity, which, whatever of rudeness may at times attend it, is so fitted to express the *genuine movements* of nature and of passion, that the compositions possessed of it ever appear most valuable to the more discerning part of mankind. The glaring figures of discourse, the pointed antithesis, the unnatural conceit, the jingle of words, such false ornaments were never employed by early writers, not because they were rejected, but because they scarcely ever occurred to them. An easy unforced strain of sentiment runs through their compositions, though at the same time we must but observe that amidst the most elegant simplicity of thought and expression, one is at times surprised to meet with a poor conceit, which had presented itself unsought for, and which the author had not acquired critical observation enough to condemn. Bad taste seizes with avidity all these frivolous beauties, and even perhaps good taste, before it is surfeited by them. They multiply more and more in the modern compositions, nature and good sense are alike neglected, laboured ornament studied and admired, and a total degeneracy of style and language prepares the way for barbarism and ignorance. Hence the Asiatic manner was found to depart so much from the simple purity of Greece; hence that tinsel eloquence which is so observable in many of the Roman writers, from which Cicero is not exempt, and which much prevails in Ovid, Lucan, and the Plinys. On the revival of letters, when the judgment of the public is yet raw and unformed,

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11	4 7	4 9	5 0	5 3	5 6	5 8
12	5 0	5 3	5 6	5 9	6 0	6 3
13	5 5	5 8	5 11	6 2	6 6	6 9
14	5 10	6 1	6 5	6 8	7 0	7 3
15	6 3	6 6	6 10	7 2	7 6	7 9
16	6 8	7 0	7 4	7 8	8 0	8 4
17	7 1	7 5	7 9	8 1	8 6	8 10
18	7 6	7 10	8 3	8 7	9 0	9 4
19	7 11	8 3	8 8	9 1	9 6	9 10
20	8 4	8 9	9 2	9 7	10 0	10 5
21	8 9	9 2	9 7	10 0	10 6	10 11
22	9 2	9 7	10 1	10 6	11 0	11 5
23	9 7	10 0	10 6	11 0	11 6	11 11
24	10 0	10 6	11 0	11 6	12 0	12 6
25	10 5	11 11	11 5	11 11	12 6	13 0
26	10 10	11 4	11 11	12 5	13 0	13 6
27	11 3	11 9	12 4	12 11	13 6	14 0
28	11 8	12 3	12 10	13 5	14 0	14 7
29	12 1	12 8	13 3	13 10	14 6	15 1
30	12 6	13 1	13 9	14 4	15 0	15 7
31	12 11	13 6	14 2	14 10	15 6	16 1
32	13 4	14 0	14 8	15 4	16 0	16 8
33	13 9	14 5	15 1	15 9	16 6	17 2
34	14 2	14 10	15 7	16 3	17 0	17 8
35	14 7	15 3	16 0	16 9	17 6	18 2
36	15 0	15 9	16 6	17 3	18 0	18 9
37	15 5	16 2	16 11	17 8	18 6	19 3
38	15 10	16 7	17 5	18 2	19 0	19 9
39	16 3	17 0	17 10	18 8	19 6	20 3
40	16 8	17 6	18 4	19 2	20 0	20 10
41	17 1	17 11	18 9	19 7	20 6	21 4
42	17 6	18 4	19 3	20 1	21 0	21 10
43	17 11	18 9	19 8	20 7	21 6	22 4
44	18 4	19 3	20 2	21 1	22 0	22 11
45	18 9	19 8	20 7	21 6	22 6	23 5
46	19 2	20 1	21 1	22 0	23 0	23 11
47	19 7	20 6	21 6	22 6	23 6	24 5
48	20 0	21 0	22 0	23 0	24 0	25 0
49	20 5	21 5	22 5	23 5	24 6	25 6
50	20 10	21 10	22 11	23 11	25 0	26 0

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1,000	@ 6½d.		@ 6¾d.		@ 7d.		@ 7¼d.		@ 7½d.		@ 7¾d.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
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12	6	6	6	9	7	0	7	3	7	6	7	9
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15	8	1	8	5	8	9	9	0	9	4	9	8
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23	12	5	12	11	13	5	13	10	14	4	14	10
24	13	0	13	6	14	0	14	6	15	0	15	6
25	13	6	14	0	14	7	15	1	15	7	16	1
26	14	1	14	7	15	2	15	8	16	3	16	9
27	14	7	15	2	15	9	16	3	16	10	17	5
28	15	2	15	9	16	4	16	11	17	6	18	1
29	15	8	16	3	16	11	17	6	18	1	18	8
30	16	3	16	10	17	6	18	1	18	9	19	4
31	16	9	17	5	18	1	18	8	19	4	20	0
32	17	4	18	0	18	8	19	4	20	0	20	8
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38	20	7	21	4	22	2	22	11	23	9	24	6
39	21	1	21	11	22	9	23	6	24	4	25	2
40	21	8	22	6	23	4	24	2	25	3	25	10
41	22	2	23	0	23	11	24	9	25	7	26	5
42	22	9	23	7	24	6	25	4	26	3	27	1
43	23	3	24	2	25	1	25	11	26	10	27	9
44	23	10	24	9	25	8	26	7	27	6	28	5
45	24	4	25	3	26	3	27	2	28	1	29	0
46	24	11	25	10	26	10	27	9	28	9	29	8
47	25	5	26	5	27	5	28	4	29	4	30	4
48	26	0	27	0	28	0	29	0	30	0	31	0
49	26	6	27	6	28	7	29	7	30	7	31	7
50	27	1	28	1	29	2	30	2	31	3	32	3

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1,000.	@ 8d.	@ 8¼d.	@ 8½d.	@ 8¾d.	@ 9d.	@ 9¼d.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
10	6 8	6 10	7 1	7 3	7 6	7 8
11	7 4	7 6	7 9	8 0	8 3	8 5
12	8 0	8 3	8 6	8 9	9 0	9 3
13	8 8	8 11	9 2	9 5	9 9	10 0
14	9 4	9 7	9 11	10 2	10 6	10 9
15	10 0	10 3	10 7	10 11	11 3	11 6
16	10 8	11 0	11 4	11 8	12 0	12 4
17	11 4	11 8	12 0	12 4	12 9	13 1
18	12 0	12 4	12 9	13 1	13 6	13 10
19	12 8	13 0	13 5	13 10	14 3	14 7
20	13 4	13 9	14 2	14 7	15 0	15 5
21	14 0	14 5	14 10	15 3	15 9	16 2
22	14 8	15 1	15 7	16 0	16 6	16 11
23	15 4	15 9	16 3	16 9	17 3	17 8
24	16 0	16 6	17 0	17 6	18 0	18 6
25	16 8	17 2	17 8	18 2	18 9	19 3
26	17 4	17 10	18 5	18 11	19 6	20 0
27	18 0	18 6	19 1	19 8	20 3	20 9
28	18 8	19 3	19 10	20 5	21 0	21 7
29	19 4	19 11	20 6	21 1	21 9	22 4
30	20 0	20 7	21 3	21 10	22 6	23 1
31	20 8	21 3	21 11	22 7	23 3	23 10
32	21 4	22 0	22 8	23 4	24 0	24 8
33	22 0	22 8	23 4	24 0	24 9	25 5
34	22 8	23 4	24 1	24 9	25 6	26 2
35	23 4	24 0	24 9	25 6	26 3	26 11
36	24 0	24 9	25 6	26 3	27 0	27 9
37	24 8	25 5	26 2	26 11	27 9	28 6
38	25 4	26 1	26 11	27 8	28 6	29 3
39	26 0	26 9	27 7	28 5	29 3	30 0
40	26 8	27 6	28 4	29 2	30 0	30 10
41	27 4	28 2	29 0	29 10	30 9	31 7
42	28 0	28 10	29 9	30 7	31 6	32 4
43	28 8	29 6	30 5	31 4	32 3	33 1
44	29 4	30 3	31 2	32 1	33 0	33 11
45	30 0	30 11	31 10	32 9	33 9	34 8
46	30 8	31 7	32 7	33 6	34 6	35 5
47	31 4	32 3	33 3	34 3	35 3	36 2
48	32 0	33 0	34 0	35 0	36 0	37 0
49	32 8	33 8	34 8	35 8	36 9	37 9
50	33 4	34 4	35 5	36 5	37 6	38 6

At from 9½d. to 10¾d. per 1000.

1,000	@ 9½d.	@ 9¾d.	@ 10d.	@ 10¼d.	@ 10½d.	@ 10¾d.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
10	7 11	8 1	8 4	8 6	8 9	8 11
11	8 8	8 11	9 2	9 4	9 7	9 10
12	9 6	9 9	10 0	10 3	10 6	10 9
13	10 3	10 6	10 10	11 1	11 4	11 7
14	11 1	11 4	11 8	11 11	12 3	12 6
15	11 10	12 2	12 6	12 9	13 1	13 5
16	12 8	13 0	13 4	13 8	14 0	14 4
17	13 5	13 9	14 2	14 6	14 10	15 2
18	14 3	14 7	15 0	15 4	15 9	16 1
19	15 0	15 5	15 10	16 2	16 7	17 0
20	15 10	16 3	16 8	17 1	17 6	17 11
21	16 7	17 0	17 6	17 11	18 4	18 9
22	17 5	17 10	18 4	18 9	19 3	19 8
23	18 2	18 8	19 2	19 7	20 1	20 7
24	19 0	19 6	20 0	20 6	21 0	21 6
25	19 9	20 3	20 10	21 4	21 10	22 4
26	20 7	21 1	21 8	22 2	22 9	23 3
27	21 4	21 11	22 6	23 0	23 7	24 2
28	22 2	22 9	23 4	23 11	24 6	25 1
29	22 11	23 6	24 2	24 9	25 4	25 11
30	23 9	24 4	25 0	25 7	26 3	26 10
31	24 6	25 2	25 10	26 5	27 1	27 9
32	25 4	26 0	26 8	27 4	28 0	28 8
33	26 1	26 9	27 6	28 2	28 10	29 6
34	26 11	27 7	28 4	29 0	29 9	30 5
35	27 8	28 5	29 2	29 10	30 7	31 4
36	28 6	29 3	30 0	30 9	31 6	32 3
37	29 3	30 0	30 10	31 7	32 4	33 1
38	30 1	30 10	31 8	32 5	33 3	34 0
39	30 10	31 8	32 6	33 3	34 1	34 11
40	31 8	32 6	33 4	34 2	35 0	35 10
41	32 5	33 3	34 2	35 0	35 10	36 8
42	33 3	34 1	35 0	35 10	36 9	37 7
43	34 0	34 11	35 10	36 8	37 7	38 6
44	34 10	35 9	36 8	37 7	38 6	39 5
45	35 7	36 6	37 6	38 5	39 4	40 3
46	36 5	37 4	38 4	39 3	40 3	41 2
47	37 2	38 2	39 2	40 1	41 1	42 1
48	38 0	39 0	40 0	41 0	42 0	43 0
49	38 9	39 9	40 10	41 10	42 10	43 10
50	39 7	40 7	41 8	42 8	43 9	44 9

At from 11d. to 12¼d per 1000.

1,000.	@ 11d.	@ 11¼d.	@ 11½d.	@ 11¾d.	@ 12d.	@ 12¼d.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
10	9 2	9 4	9 7	9 9	10 0	10 2
11	10 1	10 3	10 6	10 9	11 0	11 2
12	11 0	11 3	11 6	11 9	12 0	12 3
13	11 11	12 2	12 5	12 8	13 0	13 3
14	12 10	13 1	13 5	13 8	14 0	14 3
15	13 9	14 0	14 4	14 8	15 0	15 3
16	14 8	15 0	15 4	15 8	16 0	16 4
17	15 7	15 11	16 3	16 7	17 0	17 4
18	16 6	16 10	17 3	17 7	18 0	18 4
19	17 5	17 9	18 2	18 7	19 0	19 4
20	18 4	18 9	19 2	19 7	20 0	20 5
21	19 3	19 8	20 1	20 6	21 0	21 5
22	20 2	20 7	21 1	21 6	22 0	22 5
23	21 1	21 6	22 0	22 6	23 0	23 5
24	22 0	22 6	23 0	23 6	24 0	24 6
25	22 11	23 5	23 11	24 5	25 0	25 6
26	23 10	24 4	24 11	25 5	26 0	26 6
27	24 9	25 3	25 10	26 5	27 0	27 6
28	25 8	26 3	26 10	27 5	28 0	28 7
29	26 7	27 2	27 9	28 4	29 0	29 7
30	27 6	28 1	28 9	29 4	30 0	30 7
31	28 5	29 0	29 8	30 4	31 0	31 7
32	29 4	30 0	30 8	31 4	32 0	32 8
33	30 3	30 11	31 7	32 3	33 0	33 8
34	31 2	31 10	32 7	33 3	34 0	34 8
35	32 1	32 9	33 6	34 3	35 0	35 8
36	33 0	33 9	34 6	35 3	36 0	36 9
37	33 11	34 8	35 5	36 2	37 0	37 9
38	34 10	35 7	36 5	37 2	38 0	38 9
39	35 9	36 6	37 4	38 2	39 0	39 9
40	36 8	37 6	38 4	39 2	40 0	40 10
41	37 7	38 5	39 3	40 1	41 0	41 10
42	38 6	39 4	40 3	41 1	42 0	42 10
43	39 5	40 3	41 2	42 1	43 0	43 10
44	40 4	41 3	42 2	43 1	44 0	44 11
45	41 3	42 2	43 1	44 0	45 0	45 11
46	42 2	43 1	44 1	45 0	46 0	46 11
47	43 1	44 0	45 0	46 0	47 0	47 11
48	44 0	45 0	46 0	47 0	48 0	49 0
49	44 11	45 11	46 11	47 11	49 0	50 0
50	45 10	46 10	47 11	48 11	50 0	51 0

WAGES TABLE

At per Hour for a Week of Fifty-four Hours.

54 Hours.	5s.		6s.		7s.		8s.		9s.		10s.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1	0	1	0	1	0	1½	0	2	0	2	0	2
2	0	2	0	2½	0	3	0	3½	0	4	0	4½
3	0	3	0	4	0	4½	0	5	0	6	0	6½
4	0	4½	0	5	0	6	0	7	0	8	0	9
5	0	5½	0	6½	0	8	0	9	0	10	0	11
6	0	6½	0	8	0	9	0	10½	1	0	1	1
7	0	8	0	9	0	11	1	0½	1	2	1	3½
8	0	9	0	10½	1	0½	1	2	1	4	1	6
9	0	10	1	0	1	2	1	4	1	6	1	8
10	0	11	1	1	1	3½	1	6	1	8	1	10
11	1	0	1	2½	1	5	1	7½	1	10	2	0½
12	1	1	1	4	1	6½	1	9	2	0	2	2½
13	1	2½	1	5	1	8	1	11	2	2	2	5
14	1	3½	1	6½	1	10	2	1	2	4	2	7
15	1	4½	1	8	1	11	2	2½	2	6	2	9
16	1	6	1	9	2	1	2	4½	2	8	2	11½
17	1	7	1	10½	2	2½	2	6	2	10	3	2
18	1	8	2	0	2	4	2	8	3	0	3	4
19	1	9	2	1	2	5½	2	10	3	2	3	6
20	1	10	2	2½	2	7	2	11½	3	4	3	8½
21	1	11½	2	4	2	8½	3	1	3	6	3	10½
22	2	0½	2	5	2	10	3	3	3	8	4	1
23	2	1½	2	6½	3	0	3	5	3	10	4	3
24	2	2	2	8	3	1	3	6½	4	0	4	5
25	2	4	2	9	3	3	3	8½	4	2	4	7½
26	2	5	2	10½	3	4½	3	10	4	4	4	10
27	2	6	3	0	3	6	4	0	4	6	5	0
28	2	7	3	1	3	7½	4	2	4	8	5	2
29	2	8	3	2½	3	9	4	4	4	10	5	4½
30	2	9	3	4	3	10½	4	5	5	0	5	6½
32	2	11½	3	6½	4	2	4	9	5	4	5	11
34	3	2	3	9	4	5	5	0½	5	8	6	3½
36	3	4	4	0	4	8	5	4	6	0	6	8
38	3	6	4	2½	4	11	5	7½	6	4	7	0½
40	3	8½	4	5	5	2	5	11	6	8	7	5
42	3	10½	4	8	5	5	6	2½	7	0	7	9
44	4	1	4	10½	5	8½	6	6	7	4	8	2
46	4	3	5	1	5	11½	6	10	7	8	8	6
48	4	5	5	4	6	2½	7	1	8	0	8	10½
50	4	7½	5	6½	6	6	7	5	8	4	9	3
52	4	10	5	9	6	9	7	8½	8	8	9	7½
53	4	11	5	10½	6	10½	7	10	8	10	9	10

WAGES TABLE

At per Hour for a Week of Fifty-four Hours.

54 Hours.	12s.	14s.	15s.	16s.	18s.	20s.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1	0 2½	0 3	0 3	0 3½	0 4	0 4½
2	0 5	0 6	0 6½	0 7	0 8	0 9
3	0 8	0 9	0 10	0 10½	1 0	1 1
4	0 10½	1 0½	1 1	1 2	1 4	1 6
5	1 1	1 3½	1 4½	1 6	1 8	1 10
6	1 4	1 6½	1 8	1 9	2 0	2 2½
7	1 6½	1 10	1 11	2 1	2 4	2 7
8	1 9	2 1	2 2½	2 4½	2 8	2 11½
9	2 0	2 4	2 6	2 8	3 0	3 4
10	2 2½	2 7	2 9	2 11½	3 4	3 8½
11	2 5	2 10	3 0½	3 3	3 8	4 1
12	2 8	3 1	3 4	3 6½	4 0	4 5
13	2 10½	3 4½	3 7	3 10	4 4	4 10
14	3 1	3 7½	3 10½	4 2	4 8	5 2
15	3 4	3 10½	4 2	4 5	5 0	5 6½
16	3 6½	4 2	4 5	4 9	5 4	5 11
17	3 9	4 5	4 8½	5 0½	5 8	6 3½
18	4 0	4 8	5 0	5 4	6 0	6 8
19	4 2½	4 11	5 3	5 7½	6 4	7 0½
20	4 5	5 2	5 6½	5 11	6 8	7 5
21	4 8	5 5	5 10	6 2½	7 0	7 9
22	4 10½	5 8½	6 1	6 6	7 4	8 2
23	5 1	5 11½	6 4½	6 10	7 8	8 6
24	5 4	6 2½	6 8	7 1	8 0	8 10½
25	5 6½	6 6	6 11	7 5	8 4	9 3
26	5 9	6 9	7 2½	7 8½	8 8	9 7½
27	6 0	7 0	7 6	8 0	9 0	10 0
28	6 2½	7 3	7 9	8 3½	9 4	10 4½
29	6 5	7 6	8 0½	8 7	9 8	10 9
30	6 8	7 9	8 4	8 10½	10 0	11 1
32	7 1	8 3½	8 10½	9 6	10 8	11 10
34	7 6½	8 10	9 5	10 1	11 4	12 7
36	8 0	9 4	10 0	10 8	12 0	13 4
38	8 5	9 10	10 6½	11 3	12 8	14 1
40	8 10½	10 4½	11 1	11 10	13 4	14 10
42	9 4	10 10½	11 8	12 5	14 0	15 6½
44	9 9	11 5	12 2½	13 0½	14 8	16 3½
46	10 2½	11 11	12 9	13 7½	15 4	17 0½
48	10 8	12 5	13 4	14 2½	16 0	17 9
50	11 1	12 11½	13 10½	14 10	16 8	18 6
52	11 6½	13 6	14 5	15 5	17 4	19 3
53	11 9	13 9	14 8½	15 8½	17 8	19 7½

WAGES TABLE

At per Hour for a Week of Fifty-four Hours.

54 Hours.	22s.	24s.	25s.	26s.	28s.	30s.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1	0 5	0 5	0 5½	0 6	0 6	0 6½
2	0 10	0 10½	0 11	0 11½	1 0½	1 1
3	1 2½	1 4	1 4½	1 5	1 6½	1 8
4	1 7½	1 9	1 10	1 11	2 1	2 2½
5	2 0½	2 2½	2 4	2 5	2 7	2 9
6	2 5	2 8	2 9	2 10½	3 1	3 4
7	2 10	3 1	3 3	3 4½	3 7½	3 10½
8	3 3	3 6½	3 8½	3 10	4 2	4 5
9	3 8	4 0	4 2	4 4	4 8	5 0
10	4 1	4 5	4 7½	4 10	5 2	5 6½
11	4 6	4 10½	5 1	5 3½	5 8½	6 1
12	4 10½	5 4	5 6½	5 9	6 2½	6 8
13	5 3½	5 9	6 0	6 3	6 9	7 2½
14	5 8½	6 2½	6 6	6 9	7 3	7 9
15	6 1	6 8	6 11	7 2½	7 9	8 4
16	6 6	7 1	7 5	7 8½	8 3½	8 10½
17	6 11	7 6½	7 10½	8 2	8 10	9 5
18	7 4	8 0	8 4	8 8	9 4	10 0
19	7 9	8 5	8 9½	9 2	9 10	10 6½
20	8 2	8 10½	9 3	9 7½	10 4½	11 1
21	8 6½	9 4	9 8½	10 1	10 10½	11 8
22	8 11½	9 9	10 2	10 7	11 5	12 2½
23	9 4½	10 2½	10 8	11 1	11 11	12 9
24	9 9	10 8	11 1	11 6½	12 5	13 4
25	10 2	11 1	11 7	12 0½	12 11½	13 10½
26	10 7	11 6½	12 0½	12 6	13 6	14 5
27	11 0	12 0	12 6	13 0	14 0	15 0
28	11 5	12 5	12 11½	13 6	14 6	15 6½
29	11 10	12 10½	13 5	13 11½	15 0½	16 1
30	12 2½	13 4	13 10½	14 5	15 6½	16 8
32	13 0½	14 2½	14 10	15 5	16 7	17 9
34	13 10	15 1	15 9	16 4½	17 7½	18 10½
36	14 8	16 0	16 8	17 4	18 8	20 0
38	15 6	16 10½	17 7	18 3½	19 8½	21 1
40	16 3½	17 9	18 6	19 3	20 9	22 2½
42	17 1	18 8	19 5	20 2½	21 9	23 4
44	17 11	19 6½	20 4½	21 2	22 10	24 5
46	18 9	20 5	21 3½	22 2	23 10	25 6½
48	19 6½	21 4	22 2½	23 1	24 10½	26 8
50	20 4½	22 2½	23 2	24 1	25 11	27 9
52	21 2	23 1	24 1	25 0½	26 11½	28 10½
53	21 7	23 6½	24 6½	25 6	27 6	29 5

WAGES TABLE

At per Hour for a Week of Fifty-four Hours.

54 Hours.	32s.	34s.	35s.	36s.	38s.	40s.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1	0 7	0 7½	0 8	0 8	0 8½	0 9
2	1 2	1 3	1 3½	1 4	1 5	1 6
3	1 9	1 10½	1 11	2 0	2 1	2 2½
4	2 4½	2 6	2 7	2 8	2 10	2 11½
5	2 11½	3 2	3 3	3 4	3 6	3 8½
6	3 6½	3 9	3 10½	4 0	4 2½	4 5
7	4 2	4 5	4 6½	4 8	4 11	5 2
8	4 9	5 0½	5 2	5 4	5 7½	5 11
9	5 4	5 8	5 10	6 0	6 4	6 8
10	5 11	6 3½	6 6	6 8	7 0½	7 5
11	6 6	6 11	7 1½	7 4	7 9	8 2
12	7 1	7 6½	7 9	8 0	8 5	8 10½
13	7 8½	8 2	8 5	8 8	9 2	9 7½
14	8 3½	8 10	9 1	9 4	9 10	10 4½
15	8 10½	9 5	9 8½	10 0	10 6½	11 1
16	9 6	10 1	10 4½	10 8	11 3	11 10
17	10 1	10 8½	11 0	11 4	11 11½	12 7
18	10 8	11 4	11 8	12 0	12 8	13 4
19	11 3	11 11½	12 4	12 8	13 4½	14 1
20	11 10	12 7	12 11½	13 4	14 1	14 10
21	12 5	13 2½	13 7	14 0	14 9	15 6½
22	13 0½	13 10	14 3	14 8	15 6	16 3½
23	13 7½	14 6	14 11	15 4	16 2	17 0½
24	14 2½	15 1	15 6½	16 0	16 10½	17 9
25	14 10	15 9	16 2½	16 8	17 7	18 6
26	15 5	16 4½	16 10	17 4	18 3½	19 3
27	16 0	17 0	17 6	18 0	19 0	20 0
28	16 7	17 7½	18 2	18 8	19 8½	20 9
29	17 2	18 3	18 9½	19 4	20 5	21 6
30	17 9	18 10½	19 5	20 0	21 1	22 2½
32	18 11½	20 2	20 9	21 4	22 6	23 8½
34	20 2	21 5	22 0½	22 8	23 11	25 2
36	21 4	22 8	23 4	24 0	25 4	26 8
38	22 6	23 11	24 7½	25 4	26 9	28 2
40	23 8½	25 2	25 11	26 8	28 2	29 7½
42	24 10½	26 5	27 2½	28 0	29 6½	31 1
44	26 1	27 8½	28 6	29 4	30 11½	32 7
46	27 3	28 11½	29 10	30 8	32 4½	34 1
48	28 5	30 2½	31 1	32 0	33 9	35 6½
50	29 7½	31 6	32 5	33 4	35 2	37 0½
52	30 10	32 9	33 8½	34 8	36 7	38 6
53	31 5	33 4½	34 4	35 4	37 3½	39 3

Lengths and Widths of Pages for Ordinary Bookwork,

With the number of Ens contained in each page, from Pica to Nonpareil inclusive.

Length.	Width.	Size.	Pica.	Small Pica.	L. Primer.	Bourgeois.	Brevier.	Minion.	Nonpareil.
Picas.		*F'cap.*	Ens.	Ens.	Ens.	Ens.	Ens.	Ens.	Ens.
41	30	4to.	2460	3243	3825	4988	5796	6900	9840
32	18	8vo.	1152	1517	1800	2346	2695	3180	4608
28	15	12mo.	840	1088	1295	1680	1978	2350	3360
19	15	16mo.	570	748	888	1134	1334	1600	2280
21	12	18mo.	504	672	780	1020	1184	1400	2016
		Crown.							
48	34	4to.	3264	4290	5040	6693	7696	9120	13056
36	21	8vo.	1512	1968	2340	3060	3520	4200	6048
32	16	12mo.	1024	1369	1600	2116	2401	2809	4096
23	16	16mo.	736	962	1160	1518	1715	2014	2944
23	15	18mo.	690	884	1073	1419	1610	1900	2760
		Demy.							
54	42	4to.	4536	6014	6968	9240	10707	12600	18144
42	24	8vo.	2016	2640	3120	4080	4810	5600	8064
36	19	12mo.	1368	1804	2115	2754	3190	3780	5472
26	20	16mo.	1040	1380	1600	2109	2440	2838	4160
28	16	18mo.	896	1184	1400	1840	2107	2491	3584
21	12	32mo.	504	672	780	1020	1184	1400	2016
		Royal.							
64	48	4to.	6144	8140	9401	12604	14652	17120	24576
48	27	8vo.	2592	3410	4020	5313	6142	7290	10368
40	21	12mo.	1680	2208	2600	3420	3968	4690	6720
29	21	16mo.	1218	1584	1872	2520	2880	3430	4872
32	18	18mo.	1153	1517	1800	2346	2695	3180	4608
24	14	32mo.	672	896	1050	1360	1591	1880	2688

The above figures are subject to the slight variations in founts from different foundries.

Number of Leads in a Pound.

Lgths.	4 to Pica.	6 to Pica.	8 to Pica.	Lgths.	4 to Pica.	6 to Pica.	8 to Pica.
4 ems	144	216	288	26 ems	22	33	44
5 ems	112	168	224	27 ems	21	31	42
6 ems	96	144	192	28 ems	20	30	40
7 ems	82	123	164	29 ems	20	30	40
8 ems	72	108	144	30 ems	19	29	38
9 ems	64	96	128	31 ems	19	28	38
10 ems	56	84	112	32 ems	18	27	36
11 ems	52	78	104	33 ems	17	26	34
12 ems	48	72	96	34 ems	17	25	34
13 ems	44	66	88	35 ems	16	24	32
14 ems	41	61	82	36 ems	16	24	32
15 ems	38	57	76	37 ems	15	23	30
16 ems	36	54	72	38 ems	15	22	30
17 ems	34	51	68	39 ems	15	22	30
18 ems	32	48	64	40 ems	14	21	28
19 ems	30	45	60	41 ems	14	21	28
20 ems	28	42	56	42 ems	14	21	28
21 ems	27	40	54	43 ems	13	20	26
22 ems	26	39	52	44 ems	13	19	26
23 ems	25	37	50	45 ems	13	19	26
24 ems	24	36	48	46 ems	12	18	24
25 ems	23	34	46	47 ems	12	18	24

Leads required to Justify with Type,

from Pearl to Great Primer inclusive.

Pearl ..... One four and one eight-to-pica.
Ruby ..... One four and one six-to-pica.
Nonpareil .. Two fours; three sixes; or four eights.
Emerald .... One four, one six, and one eight.
Minion ..... One four and two sixes.
Brevier..... Two fours and one six.
Bourgeois .. Three eights and two sixes.
Long Primer. Three fours; or six eights.
Small Pica .. Two fours and two sixes.
Pica ..... Four fours; or six sixes.
English .... Three fours and two sixes.
Great Primer Four fours and two sixes.

HINTS ON THE PREPARATION FOR THE CITY AND GUILDS OF LONDON EXAMINATIONS.

ARGUMENTS have been and are still being used to the effect that Technical Classes are not needed, that sufficient opportunity is or ought to be afforded to apprentices to learn their trade whilst at work. To this argument we need only reply by pointing to the many apprentices who are being turned out at the present time who know very little of the business they are supposed to have mastered during their time of service.

From our own experience in conducting Technical Classes, and the good effects that we have seen in the improvement, intellectually and practically, of those who have devoted the necessary time and attention to the work, we can say emphatically that Technical Classes are very beneficial in the proper training of competent workmen. Our own opinion is backed up by that of those who have attended a course of lessons and have thus practically experienced the benefits to be derived from a thoughtful and careful study of the theory of Typography. We think that master printers would do well to encourage the promotion of this work, and the granting of certificates, for by this means will they ensure to themselves good and competent workmen.

Full particulars for forming Technical Classes will be found in the official Programme of the City and Guilds of London Institute for the promotion of Technical Education, which may be obtained at a small charge by writing to the Secretary at the offices in Exhibition Road, Kensington.

In commencing the study of Typography, we would recommend that a stated course of subjects be gone through *seriatim*. The following programme need not necessarily be followed in the order here given, as local circumstances

may necessitate a different course. The present syllabus should, therefore, be merely regarded as suggestive.

1. Tools and materials used by the compositor.
2. Distribution.
3. Composing, bookwork, and stereo.
4 & 5. ,, jobbing and tabular work.
6. Relative sizes of type.
7. Labour value of the same-sized pages in different type.
8 & 9. Imposition and making margin.
10. Spelling and punctuation.
11. Composing machines.
12. Machines—different classes.
13. Making ready at machine.
14. Inks, their manufacture and treatment.
15. Paper, its manufacture. Sizes of paper and cards.
16. Press work—making ready at press.
17. Rollers and their treatment.
18 & 19. Stereotyping and Electrotyping.
20. Zincography and other processes for producing blocks.

Text-books on these subjects are very useful, and if the candidate can avail himself of them he will be much benefited.

All subjects up to No. 9, as well as Nos. 14, 15, 16, and 18, will be found treated in this work. We have not given an elaborate or exhaustive treatment, but a complete delineation of the principles or theory governing the practical work of each department; except as regards the technological subjects, in connexion with which a concise description of each process has been given. Our object has been to give the information in such a manner as to make this book a guide in answering technological questions, as well as a manual of reference for practical every-day use in the printing office.

It has been our own practice to set the questions which follow to students in classes: some to be answered in the class-room at the close of the lecture, and others, which necessitate more thought and sometimes research, to be taken home, so as to have the answers worked out and brought to the next meeting of the class. The student then receives his answers back the following week marked with a figure denoting the quality of his answer. Thus 2 would count a bare answer not correct, 3 a little better, 4 good, and 5 very good. Some of these questions are

afterwards given in another form, and for this reason variations of the same question will be found interspersed in different places in the list. Preliminary examinations are also of great practical value. That is, one night in each session is taken up with writing answers to questions similar to those set at the Annual Technological Examinations.

Subject No. 10 is exhaustively and intelligently dealt with in "Spelling and Punctuation," by H. Beadnell (price 2s. 6d.). This will be found the best work on the subject, and cannot fail to give the student a very complete knowledge of this very important matter.

Subjects 12, 13 & 17 will be found fully treated in "Printing Machinery and Machine Printing," by Mr. J. Southward, editor of the "Printer's Register," and Mr. F. J. Wilson. This work gives a very complete and thoroughly practical treatise on this subject, and students, particularly compositors, should avail themselves of its help. Compositors, as a rule, know very little about machinery, and for this reason will do well to pay more than ordinary attention to it. We know that many compositors fail because of their need of information in this direction. Price 5s.

For subject No. 15, "A Treatise on Paper and its Manufacture," by R. Parkinson, 6, Market Place, Clitheroe, will be found helpful.

Stereotyping and Electrotyping (subjects Nos. 18 and 19) are now generally practised, and are undoubtedly very useful in saving type and reducing cost. A knowledge of the processes cannot fail to be of value. "Stereotyping and Electrotyping," by F. J. Wilson, published at the price of 5s., gives full and explicit instruction, and a careful study of the book will well repay.

Zincography is becoming more and more useful for making raised surfaces for type-printing, and it behoves all printers to have a knowledge of its operation. "Zincography," by Josef Bock (price 2s. 6d.), will be found an excellent manual.

All the books here mentioned, with the exception indicated, are published by Mr. E. Menken, at "Wyman's Technical Series" Office, 65 & 66, Chancery Lane, London.

GENERAL DIRECTIONS.

The following hints cannot be too strongly impressed upon the students :—

If attending a Technical Class, *attend regularly ;* if you miss now and again you lose the connection, and often some important information.

Take notes of all that is said ; even if you have a text-book, it helps to fix it on your memory.

In answering questions, give all the information you have on the particular subject, treating it as fully as possible. This is not easy to do, but constant practice will make a great improvement in this respect.

Before answering questions to be done at home, read up all the information you can before commencing. *Do not copy ;* write what you have learnt in your own words. If you are not sure whether you are right on some point, don't keep it to yourself—put it in your answer, and make a note of reference to the teacher, who then has the opportunity of putting you right if you are in the wrong.

Keep all your notes ; have a note-book, so that you can refer to them afterwards. Carefully preserve your question papers.

If you possibly can do so, get all the above text-books.

By students who have not the privilege of attending classes, the above advice should be equally taken to heart. Study well the works of reference, and then write answers to as many of the following questions as you possibly can, getting some competent authority to look them over for you.

In conclusion, do not enter upon the work with an idea that you have nothing to learn. There is no subject connected with Typography concerning which you may not learn something more than you know already. The task of preparing for the examination needs long and careful study ; but close attention, willingness to learn, and regular attendance, will go a long way to ensure success.

TECHNICAL QUESTIONS

SPECIALLY PREPARED FOR

TYPOGRAPHICAL CLASSES.

1. How many cases will a half-frame hold?
2. Which do you think the best mechanical quoin; and why?
3. Give a list of the tools and appliances used by the compositor, from "taking copy" to sending form to press.
4. How would you distinguish a cast from a wrought-iron chase?
5. Give the names of wood furniture, and their thickness in pica ems.
6. In the lay of the case what are the principal requirements to be borne in mind?
7. What is the difference between ordinary type metal used for large bill type, and that used for ordinary book or jobbing founts
8. What is the height to paper of type?
9. How many ems of the following are contained in seven inches:—Pica, pearl, long primer, bourgeois, brevier, minion, nonpareil, and small pica?
10. What weight of type should be ordered to set a book of 200 pages, without return of type, each page measuring 22 ems by 40 ems pica?
11. What weight of type should be ordered for a book of 200 pages, without return of type, each page measuring 5 in. by 4 in.
12. Describe what you consider the principal points to be studied in setting tabular work.
13. Describe the operation of distributing, and state what instructions you would give to an apprentice learning.
14. What are folding chases, and for what class of work are they best adapted?
15. Name several bad habits in connection with distributing which ought to be avoided.
16. What is the best plan for keeping reglets, so as to be handy, and convenient for use; make sketch of suitable construction?
17. What weight of type would you order for setting up a book of 200 pages, without return of type, each page 22 ems pica wide, and 46 ems pica deep?
18. Write out the number to the foot of types from pica to pearl, taking Figgins' standard.

19. When being taught to compose, there are several important points which should be impressed upon the mind of an apprentice, in order that he may become a quick, clean, and skilful compositor. Name the most important that occur to you.

20. What weight of type would you order for a book of 250 pages, each page 19 ems pica wide, and 35 ems pica deep.

21. What are the essential points to be observed in arranging the lay of a case in order to obtain the quickest result.

22. Name three essential points in setting which contribute to the speed of compositors.

23. What are the three worst habits which a compositor can acquire to spoil him as a workman?

24. Describe the operation of composing, stating what should be aimed at and what avoided in order to economise time and labour.

25. Describe what course you would pursue in composing to ensure clean proofs.

26. Suppose the text of a volume to be set in pica type, what size of type should be used for preface, foot-notes, and index?

27. What fault which would spoil the appearance of a book should be particularly avoided in spacing out matter. Answer in *two* words.

28. What is "preliminary" matter, and what is the order of arrangement?

29. State what you know of companionships, and what advantages or disadvantages are connected with them?

30. Give the rules to be observed in spacing and the rules for dividing words.

31. What rules should guide you in the choice of type in setting up a display circular?

32. Display the following as a title page:—A Complete History of Dudley Castle, from its foundation to recent years. By Hugh Johnson, F.R.S. 200 Illustrations. Second Edition. With imprint.

    [To be drawn out with pencil or pen on demy 8vo., or may be set in type.]

33. What disadvantages are connected with bad justification?

34. Describe an "ordinary" indentation and a hanging indentation.

35. What are the general principles of composition with regard to Title Pages?

36. 2,000 ens, composed, made up, imposed, corrected, and distributed, is the standard of two hour's work for a compositor. How long would it take you only to set up the 2,000 ens?

37. Why is it best that an apprentice should first learn to set type before he commences to distribute.

38. Describe in detail the principle of displaying an Auction Bill, stating what should be aimed at and what avoided in order to produce a good effect.

39. What principles would guide you in the display of a circular?
40. It is essential in good display work that harmony should prevail; state how this may be accomplished.
41. What qualities are absolutely essential to make a successful jobbing compositor?
42. How many ems are there of the following types in six lineal inches: Pica, Small Pica, Long Primer, and Brevier.
43. What class of type would you select for a Milliner's circular, and also for an Iron-founder's?
44. Describe what you consider the principal points to be observed in displaying a business circular.
45. Describe in detail the process of setting a curved line without the use of curvilinear quadrats.
46. In setting matter in a brass circle how would you proceed, and why?
47. What are the best principles on which to proceed with regard to display work generally
48. If you have a business card to display which is crowded with matter, what course would you pursue to get the best effect?
49. Describe the means of obtaining power in the Albion and Columbian hand presses. Say which you prefer, and why.
50. What are the operations of pulling the press?
51. What weight of type would there be in 150 pages, each page measuring 5 × 3½ inches?
52. How would you proceed to pull a good proof at press.
53. Describe any hand-press with which you may be acquainted, especially that portion by means of which power is obtained.
54. Give the sizes of the following cards: Small, Large, ½ Small, ½ Large, Thirds Large, and Extra Thirds Large,
55. Describe the operations of printing a Circular at press.
56. What are the disadvantages of a calico-covered tympan?
57. What is the best cover for a tympan?
58. How would you pack the cylinder for a common job, a bookwork form, and for an illustrated book of best quality?
59. How would you prepare a treadle platen machine for printing?
60. Enumerate in consecutive order the operations of printing a quarto circular at machine.
61. What is the object of damping paper before being printed? Describe the difference of the action of ink on damped and dry paper.
62. Describe the Wharfedale Single Cylinder Machine, stating how the bed and cylinder are actuated.
63. In making an overlay for a woodcut, what are the points that require especial care in order that the desired effect can be obtained?
64. Enumerate some of the difficulties of machine printing and their remedy.

65. What are the causes of slurring on cylinder machines?
66. What should be the characteristics of paper to be used, say, for Newspapers, Placards, and an Illustrated Book of first quality, and give the reason for your selection?
67. How would you distinguish the difference between a hand and machine-made paper?
68. What are the characteristics of Esparto Grass, and for what description of paper is it most suited for use in manufacture?
69. Name the characteristics of straw and wood pulp materials for making paper.
70. Name the different classes of raw material used in the munufacture of paper, and for what class of paper they are respectively best suited.
71. If a ream of double crown weighs 30-lbs., what would be the weight of a ream of double demy of same quality and thickness; and if a ream of double demy weighs 30-lbs., what would be the equivalent weight of a ream of double crown?
72. Name the different sizes of printing and writing papers, and give their dimensions in inches.
73. What are the principal adulterants used in the manufacture of paper?
74. If you were given a Manuscript of 200 folios to estimate what number of pages it would make, how would you proceed?
75. How many ens of Brevier would there be in 5-ft. 6-in.?
76. What weight of Leads would be required to lead 60,000 Minion ens?
77. Suppose a Manuscript to consist of 240 pages, each page containing 56 words, and each word averaging 5 letters, about how many pages would it make in Pica type, each page being 16 ems wide and 30 clear lines long?
78. If a sheet of Pica costs 50/- at 6½d. per 1,000 ens, what would the same size sheet cost if set in Brevier at 7d. per 1,000 ens?
79. A Book of 200 pages is set in Long Primer, each page being 21 ems pica wide, and 30 ems pica deep, what weight of Thick Leads would be required to lead the pages, and how many extra pages would it make?
80. If a ream of Double Demy weighs 40-lbs., what would be the weight of a ream of Double Crown of same quality?
81. Give the sizes of the following papers and their sub-divisions: Demy, Crown, Foolscap.
82. What would be the weight of 2,000 Brevier en quads?
83. What is the advantage of the *papier mâché* over the plaster process of Stereotyping?
84. Of what is Stereo paste composed?
85. Describe the operation of making flong.
86. How would you test the metal before pouring to ascertain whether it was at the proper temperature.

87. Zinc has a very deleterious action on stereo metal. How would you detect its presence?
88. Describe the operation of Stereotyping.
89. Of what is Stereo metal composed?
90. Give a short description of the plaster process.
91. What are the characteristics of good Stereo metal?
92. State what are causes of failure in stereotyping, and how to remedy them.
93. How many inches of thick lead are there in one ounce?
94. How many ens of Brevier are there in 9 inches?
95. How many pages would 20,000 words make in Long Primer type, each page being 22 ems Pica wide, and 40 ems Pica deep?
96. What would be the weight of 400 thick leads 22 ems long?
97. Suppose the labour cost of a sheet of Bourgeois to be £1 10s., what would be the approximate value of the same size sheet if set in Small Pica type?
98. What weight of thick leads would be required to lead out 20,000 Long Primer ens.
99. A manuscript of 500 folios being required to be cast off, each folio containing 20 lines, with an average of eight words in a line, about how much would it make in Pica type, the pages being 21 ems wide, and 34 lines long, exclusive of head and white lines.
100. What is the weight of four square inches of type?
101. What is the advantage of an electro over a stereo?
102. What is the cause of small holes sometimes appearing in an electro shell?
103. Of what does the composition consist for taking an electrotype mould?
104. State the principal cause of failures in electrotyping.
105. Of what chemicals is the solution for the depositing vat composed.
106. Describe fully the operation of producing an electro from a type forme.
107. What is the composition of backing metal for electros?
108. Give some account of a battery suitable for electrotyping; also describe the principle of the Dynamo Machine.
109. Enumerate the tools used by an electrotyper.
110. Write out and put the proper points in the following sentence: "The verdant lawn the shady grove the varied landscape the boundless ocean and the starry firmament are beautiful and magnificent objects."
111. Write out and correct the mistakes in the following paragraphs:
"Cyrus the younger king, of Persia, was remarkable for his greatness of soul and love of virtue."
"Every particuiar profession is in the opinion of the world uncapable of affording perfect content."

112. What weight of thick leads would be required to lead out 30,000 minion ens, and show how you arrive at the result?
113. Give an illustration showing the value of a comma.
114. Give the various symbols used in pointing, and describe their purpose.
115. Supposing a MSS. to consist of 25,000 words, each word to average (say) five letters, about how many pages would it make in minion type, the page being 23 ems pica wide, and 37 clear lines long?
116. Write a line containing an affirmation with a condition.
117. Of what is type metal composed?
118. Why is copper used as an alloy for type metal?
119. What are the characteristics of Antimony?
120. What is a strike?
121. Describe the operation of type-founding.
122. Describe the properties of each ingredient used as an alloy for type metal, and state the proportions of each to give the best results.
123. What are the characteristics of good type?
124. What is a bill of type?
125. What two pages, in regular schemes of imposition, are always imposed together at the left of the outer form?
126. Draw a scheme of imposition for a sheet of 8vo.—16 pages.
127. Give instructions for tying up a page of type.
128. What is imposing to quire?
129. If you had 12 8vo. pages to impose to quire, what pages would you lock up together?
130. Describe minutely and consecutively the various operations involved in imposing and locking up a form of 16 pages.
131. What should be the size in Pica ems of the type for a page of Demy 8vo. set in Long Primer type?
132. Draw out a scheme of imposition for a sheet of twelves.
133. Describe how to make margins.
134. Give the plurals of the following words:—Pony, Money, Fly, Beauty, Attorney, Loaf, Chief, Staff, Muff, Handkerchief, Wharf, Scarf, Leaf, Proof.
135. Add the affix 'ment' to the following words:—Abase, Judge, Lodge.
136. Enumerate the marks of reference in their proper order.
137. What weight of 8 to Pica leads would be required to lead out 45,000 Bourgeois ens, and show how you get it.
138. Change the following words into the past tense:—Combat, Register, Benefit, Manumit, Envelop.
139. How many Small Pica ens would there be in a page 36 ems Pica wide and 40 ems Pica deep?

140. Give the equivalent to 1,000 ems Pica in Brevier, Minion, and Ruby.

141. Supposing a Manuscript to consist of 35,000 words, each word to average (say) five letters, about how many pages would it make in Brevier type, the page being 23 ems Pica wide and 37 clear Pica lines long.

142. Give the rule for doubling the "t" in benefitting.

143. Give the rule for changing pony into ponies in the plural.

144. Describe minutely the various mistakes in the following :—

Madras to which Clive had been appointcd, was at this time, perųaps, the first in importance of theCompany's settlements.

In the preceding century Fort Saint George had arisen on a spot barren beaten by a raging surf and in the ueighbourhood a town, inhabited many thousands of natives, had sprung up, os they spring up in the *East*, with the rapidity of the Prophet's gourd. "There were already in the suburbs many whiie villas each surrounded by its garden, whither the agents of the company retired, after the labours of the desk, to enjoy the cool breeze which springs up et sunsetofrom the Bay of Bengal, The habits of these mercantile grandees appear to have been mote profuse, luxurious, and oustentatious than those of the high judicial and political functioanries who have succeeded them. *Lord Clive*, by LORD MACAULAY.

145. Name the most important points to be observed in composing bookwork.

146. Give the sizes in inches (inside measure) of chases required for Double Demy, Double Foolscap, Royal, and Crown Sheets.

147. Give the equivalent to 1,000 ems Pica, in Small Pica, Long Primer, and Bourgeois.

148. Give the marks which are used in correcting proofs.

149. What kinds of types are best to use for colour printing?

150. If red ink be printed on blue, what colour will be produced?

151. For a display circular in two colours, name in pairs all the colours you can remember which would correctly harmonize.

152. Draw a scheme of imposition for a sheet of sixteens from memory.

153. Give the rule for a correct choice of colours to harmonize.

154. Describe what you think the best method of obtaining tint blocks.

155. Describe the operations of Gold, Bronze, and Flock printing; also the process of Gelatining.

156. Give a list of mathematical, geometrical, and astronomical signs you are acquainted with.

157. How would you treat a roller before and after using Copyable Ink?

158. Describe what you know of difficulties incidental to colour-printing.

159. Name the primary colours.

160. Name the secondary colours.

161. What is a Zincograph?

162. What advantage has a Zinco over a Wood Engraving?

163. Name the ingredients of hard resisting ink.

164. What are the principal causes of failure in Zincography?
165. Describe the process of Zincography.
166. Name the ingredients of soft resisting ink and very soft ditto.
167. What is Photo-Zincography, and of what use is it to letterpress printers?
168. What are the causes of forms springing, and their remedy?
169. If a page "hangs," what is the cause?
170. Of what use is brass facing to letterpress printers?
171. Give the sizes in inches of the following writing papers :— Medium, Post, Large Post, and Royal.
172. For what classes of work should wove, laid, and printing papers be used? and give reasons why.
173. Taking Pica as the standard, and calling it 20, what are the relative depths of type from Pica to Pearl?
174. Give a list of measures suitable for Foolscap 8vo., Crown 8vo., Crown 4to., and Demy 8vo.
175. Describe the Hattersley, the Fraser, and the Mackie Composing Machines, giving the principles on which they work.
176. Mention any other process which you know of for facilitating composition and reducing its cost.
177. What reasons can you give why composing machines have not come into general use?
178. What colours would harmonize with blue? What ground tints would harmonize with chocolate?
179. How would you pack the cylinder for printing a bill?
180. How would you prepare a platen machine before making ready?
181. Enumerate, in consecutive order, the operations of printing 16 pp. of a book on a cylinder machine.
182. Describe the "Tumbler" Machine, stating how the bed and cylinder are actuated.
183. In making an overlay for a zincotype, what are the points which require especial care in order that the desired effect can be obtained?
184. What do you consider the best method of mounting stereos?
185. What weight of type should be ordered to set up a book of 200 pages, without return of type, each page being 16 ems wide and 24 ems deep?
186. If the text of a book be set in Long Primer, in what type should the preface, foot-notes, and index be set?
187. In a sheet of twelves (24 pages) set in Long Primer, each page 22 ems wide and 40 lines long, what weight of thick leads would be required to lead it, and how many extra pages would it make?
188. In teaching an apprentice the art of composing, how would you proceed, and what would you advise him to aim at and what to avoid?

189. Name the general rules to be observed in display work, and name in consecutive order the operations of setting a large card.

190. In displaying a newspaper advertisement, what general rules would you suggest to be carried out?

191. Suppose a Manuscript to consist of 40,000 words, each word to average five letters, about how many pages would it make in Long Primer type, each page being 25 ems Pica wide and 45 lines long?

192. Give, from memory, the sizes of Writing Papers.

193. What are the sizes, in inches, of a Large Card, a Small Card, and a Thirds Large?

194. What action has sunlight upon gelatine?

195. Describe the process of Photo-Zincography.

196. Name any other method of producing raised surfaces for letter-press printing with which you may be acquainted.

197. On engaging a man as foreman in a composing room, what questions would you put to him to test his capabilities?

198. On engaging a man as overseer in a machine room, what questions would you put to him to test his capabilities?

199. What are essential qualifications in an overseer?

200. Give rules for the management of a composing room, and also of a machine room.

201. Describe your idea of the arrangement of a composing room.

202. Describe what you think are failures in management generally.

203. What are the principal points to be noted in estimating?

204. Estimate the *cost* of producing a book of 200 pages, Crown 8vo. Printing only.

205. Draw out what you consider would be a good form of work ticket, so as to ensure every item of labour and material being charged.

206. What do you know of the management of gas and steam engines?

THE CITY AND GUILDS OF LONDON INSTITUTE TECHNOLOGICAL EXAMINATIONS.

QUESTIONS IN 1887.

Ordinary Grade.

1. When being taught to compose, there are several important points which should be impressed upon the mind of an apprentice, in order that he may become a quick, clean, and skilful compositor. Name the most important that occur to you.
2. One thousand ens (composed, made up, imposed, corrected, and distributed) is the standard of one hour's work for a compositor. To accomplish this, how long should it take you *to set up only* the 1,000 ens?
3. Suppose a manuscript to consist of 25,000 words, each word to average five letters, about how many pages would it make in Pica type (solid), the size of page being 21 ems wide and 35 clear lines long?
4. What would be the wages value of 16 pages of the above, calculated at 6½d. per 1,000 ens?
5. Draw a plan of imposition for a sheet of 16mo. (32 pp.); or a half-sheet of 18mo., without transposition of pages.
6. If a form will not lift (that is, if, after being locked up, the types in a form are not all equally tight, some falling out, and others being more or less loose), what steps would you take to ascertain the cause?
7. Supposing the body of a volume to be set up in Small Pica, what size of type should be used for preface, footnotes, and index?
8. Jobs, such as bills, prospectuses, circulars, &c., should be set up with a view to harmony of style. Explain how this may be done (supposing the required types are at command).
9. Describe any handpress with which you may be acquainted, especially that portion by means of which power is obtained.
10. Describe the manufacture of a composition roller from beginning to end.
11. If a "slur" were to occur on a single-cylinder machine, how would you proceed in order to discover the cause?
12. Describe the various methods of taking in the sheets on perfecting machines—web, dropbar, and gripper.
13. What is the size in inches of a Demy 12mo. handbill?
14. What is the size of a Double Small card?

15. Give the dimensions in inches of the following papers:—Printing: Double Foolscap, Super-royal, Double Demy, Double Crown, Medium. Writing: Foolscap, Small Post, Large Post, Demy.
16. Describe briefly the method of taking a stereotype plate from a type form.
17. Describe briefly the method of taking an electrotype from a woodcut.
18. How much Double Demy paper would be required for 100,000 Demy 16mo. handbills, allowing for necessary waste?

Honours Grade.

1. Suppose an author to submit for estimate a work consisting of 350 folios of MS., each folio containing 16 lines of 8 words each (the words averaging 5 letters). He desires it to be set up as a Crown 8vo., in Long Primer type; the page to be 20 ems (Pica) wide and 41 clear lines long. How many pages will the said MS. make?
2. The size of each of the above pages would be (say) $3\frac{1}{4}$ by 6 inches. About what amount of type (in weight) would be required in order that the whole might be set up without return of letter?
3. The labour cost of a page of Pica being 1s. 6d., what would be the labour value of the same size page in Bourgeois? And what in Minion?
4. Supposing you were about to start in business as a commercial and general printer; name 5 different printing machines that you would purchase, and state your reasons for selecting them.
5. Explain the process of making ready on the "hard packing" principle, and say for what kind of work it is best suited.
6. How would you ascertain the percentage of clay contained in a sheet of paper?
7. If a ream of paper of Royal size weighed 32 lb., what would be the weight of a ream of the same paper in Double Demy size?
8. There are several composing machines in the market (Kastenbein's, Mackay's, Hattersley's, Fraser's, &c.); why have they not been more generally used to economise production?
9. Taking 4 kinds of composition—jobbing, newspaper, ordinary bookwork, and technical bookwork (such as dictionaries, scientific works, &c.)—what percentage upon the cost of composition would you allow for proof-reading and revising in each case?
10. Explain briefly the method of taking a stereotype plate by the plaster process, and name the materials used.
11. Explain briefly the method of taking an electrotype plate, and name the materials used.
12. Write a letter to a supposed customer, containing an estimate for printing a trade catalogue—the chief object being to describe so accurately all details that mistake or dispute would be improbable.

QUESTIONS IN 1888.

Ordinary Grade.

1. Suppose a manuscript to consist of 26,000 words, each word to average five letters; about how many pages would it make in Pica type, the size of page being 20 ems wide and 33 clear lines long?
2. Give the cast up of the above per sheet of 16 pages, calculated at 6¾d. per 1,000 ens?
3. Draw a scheme of imposition for a sheet of 12mo. without cutting, and show the signatures.
4. Supposing the text of a volume to be set up in Pica type, what size of type should be used for preface, footnotes, and index?
5. If a page be 6 inches deep, how many lines of Pica will it contain, and how many of Long Primer?
6. Give the ingredients of composition rollers suitable for cold weather.
7. Give the size, in inches, of the following papers:—Printing: Double Crown, Double Demy, Royal, Imperial. Writing: Large Post, Foolscap, Demy.
8. What would be the size, in inches, of a Demy 16mo. handbill?
9. What is meant by making ready by the hard-packing system, and to what kind of work is it especially applicable?
10. Name four different kinds of printing machines, and state for what description of work each is adapted.
11. Describe the making of a "flong" for taking a paper mould for stereotyping.
12. How would you distinguish the right from the wrong side of a sheet of printing paper?
13. What is the size of a double large card, also of an ordinary third?

Honours Grade.

1. Supposing the labour cost of composing a sheet of Bourgeois to to be £1. 10s., what would be the approximate value of the same sized sheet if set in Small Pica type?
2. Supposing a volume of 320 pp. were required to be composed without return of type, each page to be 3 by 5 inches in size, about what weight of type would be used?
3. Supposing new type were required to be provided for the above, about what weight should be ordered to ensure having sufficient?
4. A manuscript of 500 folios being required to be cast off, each folio containing 20 lines, with an average of 8 words in a line, about how much would it make in Pica type, the pages being 21 ems wide and 34 lines long, exclusive of head and white lines?

5. The weight of a ream of Double Crown paper being 40 lb., what would be the weight of a ream of Double Demy of the same paper?
6. Name the kinds of printing machines which you think most suitable for a general printing office, and give reasons for your choice.
7. Describe the process of stereotyping with paper moulds, and name the materials used.
8. What is the composition of ordinary stereo metal?
9. Give rough but approximate estimate of the cost of labour and material in producing a Crown 8vo. pamphlet in Long Primer type, 32 pp., on 40-lb. Double Crown paper, 1,000 copies, stitched and cut, and show how you arrive at the answer.
10. Give some account of the various qualities of printing and writing papers.
11. Supposing you were about to engage a man to look after a steam engine and boiler, what questions would you put to him in order to ascertain his capabilities?—or:
12. Supposing you were about to engage a man to look after a gas engine, what questions would you put to him in order to ascertain his capabilities?

QUESTIONS IN 1889.

Ordinary Grade.

1. Arrange the following types in order according to size, the largest being placed first: Ruby, English, Double Pica, Nonpareil, Pica, Pearl, Bourgeois, Great Primer, Minion.
2. If a page be 4½ inches long, how many lines of Pica would it contain, and how many lines of Bourgeois?
3. Suppose a MS. to consist of 54,500 words, each word to average (say) 5 letters, about how many pages would it make in Pica type, the size of page being 19 ems wide and 32 lines long, exclusive of head and white lines?
4. Give the cast up of the above, per sheet of 32 pages, calculated at 6½d. per 1,000 ens.
5. Draw out a scheme of imposition for a sheet of 16mo. (inner and outer formes) and show the signatures.
6. What is the size of a Double Foolscap bookwork chase, inside measurement?
7. Describe the process of putting a new tympan on a handpress, and name the materials used.
8. Describe the appearance and qualities of a good roller in fit condition for working. If greasy, how would you treat it?
9. If a machine should "slur," how would you proceed in order to ascertain the cause?

10. Describe any letterpress printing machines with which you are familiar, and give their names.

11. Give the sizes of the following cards: Town size, Large, Double Small, Extra Thirds. Printing papers: Double Foolscap, Super Royal, Double Post.

12. Answer briefly the following questions: (1) What materials are used for making a flong for taking a mould? (2) What is the metal used in casting? (3) What is the proper thickness of a stereotype plate?

Honours Grades.

1. A MS. of 450 folios being required to be cast off, each folio containing 21 lines with an average of nine words in a line, about how much would it make in Pica type, the pages being 20 ems wide and 32 lines long, exclusive of head and white lines?

2. Supposing the labour cost of composing a sheet of Pica to be 20/-, what would be the approximate value of a sheet of the same size if set in Brevier type?

3. Supposing a volume were required to be composed without return of type, say 250 pages, each page $3\frac{3}{4}$ by 6 inches in size, about what weight of type would be used?

4. The weight of a ream of Demy paper being 26 lb., what would be the weight of a ream of Double Foolscap of the same paper?

5. If you, as foreman, were giving out a job of 100,000 one-page Crown 8vo. bills, to be printed in black and red, on good paper of fair weight, what definite written instructions would you give that would enable your subordinates to carry the work through economically without further questions?

6. In making up an estimate, allowance has to be made for wear and tear, rent, and other expenses in differing proportions. State what percentage you would put upon the following items of net cost to cover such expenses and leave a profit: (1) composition, wages charge; (2) machine (say Double Crown Wharfedale), cost of labour only; (3) ink; (4) paper; and give reasons for difference.

7. Name such machines as you are familiar with, and state the kind of work for which each is most suited.

8. Super calendered paper with a polished surface has now become popular. State the advantage of using it from a printer's point of view.

9. What is the proper treatment for an electrotype mould after it leaves the press and before it is placed in the bath?

10. Give a rough but approximate estimate of the cost of labour and material in producing a Crown 8vo. volume of plain matter, Small Pica type, 320 pages, printed on 36-lb. Double Crown paper, 5,000 copies, exclusive of binding, and show how you arrive at the answer.

THE Examination of the City and Guilds of London Institute consists of a paper of questions for all candidates, and of a Practical Examination for Compositors, to be held in a printing office.

The **Written Examination** will include questions founded on such subjects as the following :—

1. TYPOGRAPHY.—*Composing*: The various sizes of type in use, and their mutual relation ; tools and appliances used by the compositor ; casting off manuscript copy ; casting up the number of types in a sheet ; estimating the relative labour value of the same sized page in different types ; arrangement of pages of matter on an imposing surface ; method of determining margin, arranging the furniture, and locking up ; punctuation ; arrangement of title pages and other displayed matter ; peculiar accents and signs ; composing and distributing by machinery ; mechanical quoins and other means of fastening type in chase.

Press and Machine Work : The various kinds of handpresses in use ; the regulation of pressure ; the tympan, frisket, and blanket ; making register ; treadle machines ; various kinds of rollers, their composition, mode of manufacture, and treatment in hot or cold weather ; composition and properties of typographic inks, black and coloured ; effect of some metals on coloured ink ; various kinds of power-driven machines, platen, single-cylinder, and perfecting ; classes of work best suited for each ; making ready of woodcuts ; defects incidental to machine work, their cause and remedy ; schemes of imposition for laying down stereotype plates ; qualities of paper best suited for illustrated and other work ; sizes of paper ; mode of treatment before and after printing ; leaf metals, bronzes, and dusting colours.

Warehouse : Sizes of paper ; relative weight ; special qualities for different purposes ; sizes of cards ; hot and cold pressing ; hot and cold rolling.

2. STEREOTYPING AND ELECTROTYPING.—Reproduction of type forms by the paper, plaster, and other processes ; preparation of the flong and taking the mould ; composition of stereo metal ; casting the plate ; turning, planing, and finishing ; plaster moulds, and method of casting from them ; reproduction in copper by the electro process ; principle of the galvanic battery, and method of construction ; the dynamo machine, theory of its action ; composition of solution for depositing-trough ; moulding ; metal for backing up ; possible accidental defects, and their remedy ; method of producing perfectly level plates ; facing with steel, brass, and other metals ; various methods of making "process blocks" for surface printing.

The Candidates in the Ordinary Grade will be required to show a good technical knowledge of the subjects included in Section 1, and a general knowledge of the subjects included in Section 2.

The Candidates for Honours will be required to show a thorough knowledge of the subjects included in both of the preceding sections.

Practical Test.—In addition to the Written Examination, a Practical Examination for Compositors will be held, which will consist solely of composition from manuscript supplied to the candidate. It is intended to be a test, not so much of mere rapidity in "picking up," as of general intelligence and of ability in setting up any kind of matter that may fall in a Compositor's way ; for instance, a piece of bad manuscript, a simple displayed title-page or heading, a difficult piece of punctuation, a moderately complex table, a mathematical "building" line, or a foreign paragraph in fairly good hand-writing.

The Practical Examination in Compositors' work is not obligatory ; but those Candidates who pass the Written as well as the Practical Examination, will receive a Certificate on which it will be stated that they have passed in "Practical Compositors' Work."

Full Technological Certificate.—The Candidate, who is not otherwise qualified (see Regulations 32 and 33), will be required, for the full Certificate in the Ordinary Grade, to have passed the Science and Art Department's Examination in the Elementary Stage at least ; and for the full Certificate in the Honours Grade, in the Advanced Stage at least, in *two* of the following Science subjects :—

II. Machine Construction and Drawing.
VI. Theoretical Mechanics.
VII. Applied Mechanics.
IX. Magnetism and Electricity.
X. Inorganic Chemistry.
XIX. Metallurgy.

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