AVIATION WEEK

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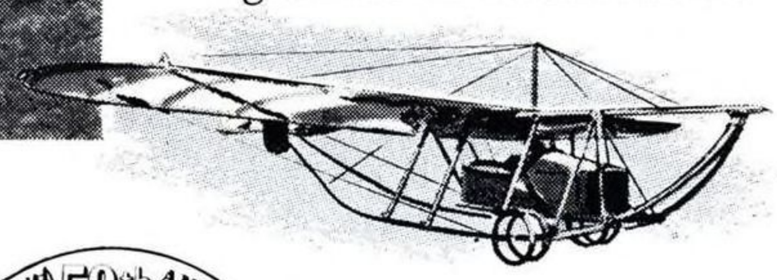
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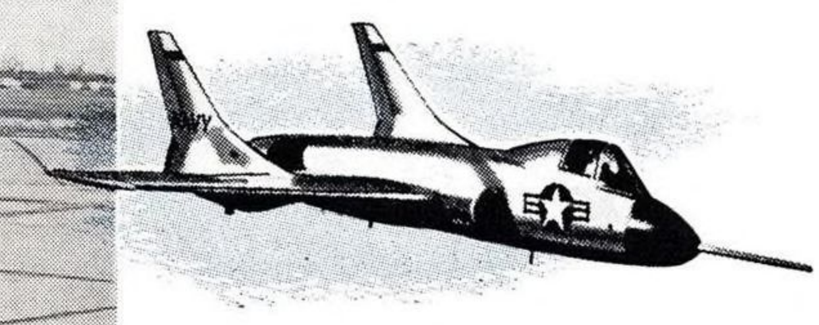


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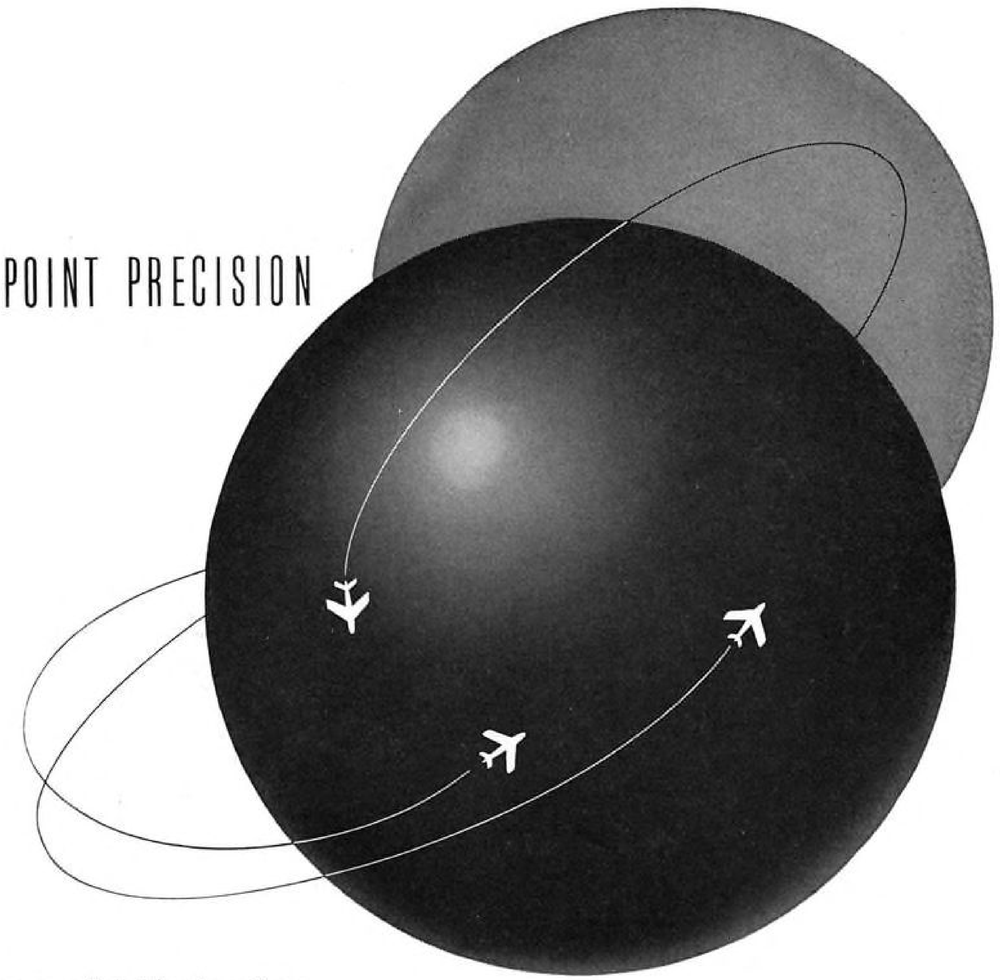
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Aviation Week

ABP Member

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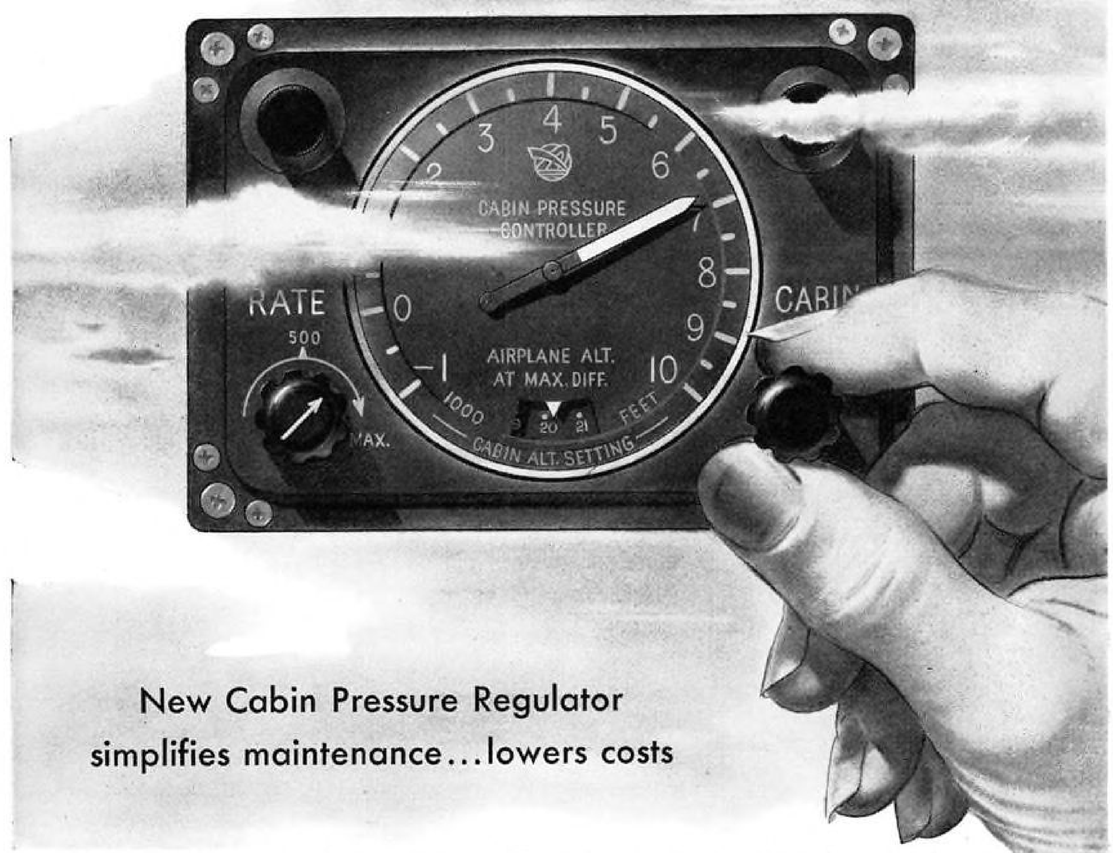
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NEWS DIGEST

Domestic

Fairchild Engine Division, Farmingdale, N. Y., has been awarded a Navy Bureau of Ships contract for design and development of a 25-ton miniature submarine. BuShips' choice of an aviation firm to build a submarine caused considerable speculation, but some industry observers see a connection with work done by the division in developing low-noise level powerplants. One phase has included use of hydrogen peroxide fuels.

New York Airways has ordered four more Sikorsky S-55 helicopters, bringing its fleet to a total of seven. The new copters cost $150,000 each, and the company paid an additional $100,000 for spares.

Vernon Johnson, Lockheed Washington representative, was elected president of the Aero Club of Washington last week. Other officers: Frank Boesche, Sentinel Aviation Corp., first vice president; Preble Staver, American Aviation, second vice president; Walter Bonney, NACA, third vice president; Wayne Weishaar, Aeronautical Training Society, secretary, and Bob Sander, Sanders Aviation, treasurer.

A Boeing B-47 Stratojet recently completed 47 simulated combat missions during an 81-day period, flying the equivalent of nearly nine times around the world in 500 hr.

Forty Fairchild C-119 Flying Boxcars dropped approximately 400 tons of construction equipment this month near Fort Bragg, N. C., in the first mass paradrop of heavy engineering equipment.

Vice Adm. Charles E. Rosendahl (Ret.), vice president of Flettner Aircraft Corp., New York, was appointed executive director of the National Air Transport Coordinating Committee last week.

Aircraft Industries Assn. reports 350 U. S. civil aircraft valued at $2,977,024 were exported during 1952.

Convair has granted a 6% wage increase totaling approximately $1.4 million to all salaried employes at the Fort Worth Division.

Mundy I. Peale, president of Republican Aviation Corp., forecasts an American aviation industry production of 14,500 military aircraft in 1953—more than the combined 1951-52 output.



SABRE WARMUP—USAF ground servicemen are shown winning ground in the constant battle against Korea's frigid temperatures as they pipe 300-deg. heat into an F-86 Sabre prior to starting the J47 jet engine. Another hose is used to melt external ice. Photo was made at an installation of the 4th Fighter-Interceptor Wing.

Gen. Nathan F. Twining, Air Force Vice Chief of Staff, says Russia is expected to begin building soon larger and faster long-range medium bombers than the four-engine copies of the U. S. B-29 that now make up the Soviet Union bomber force.

Los Angeles International Airport reports all-time high air commerce traffic records were set at the field last year. Record traffic totals for 1952: 2,213,887 passengers, 25.97% increase over 1951; 42,138,166 lb. of airfreight, up 19.90%; and 13,038,091 lb. of air express, a 13.87% increase.

Prewitt Aircraft Co.'s adhesively bonded steel helicopter rotor blades are being tested by the Navy at Weeksville, N. C., prior to fleet service on the HUP-2 scheduled for next May.

Trans World Airlines has ordered Curtiss-Wright electronic flight duplicators for installation in pilot training centers at New York's International Airport and La Guardia Field and at Kansas City, Detroit, Los Angeles and San Francisco.

Financial

Curtiss-Wright Corp. reports consolidated net sales last year are estimated at $325 million, nearly double the 1951 total of $176,625,380.

Northwest Airlines reached a record revenue of $60,532,079 in 1952 and finished the year with a net income of $1,631,827 after taxes, preliminary unaudited figures reveal.

Lockheed Aircraft Corp. was awarded prime military contracts totaling $1,157,300,000 from the start of the Korean war to June 30, 1952.

Flying Tiger Line says 41,458,387 ton-miles of domestic airfreight flown in 1952 produced revenues of approximately $7 million, compared with $4,570,000 in 1951.

Aeroquip Corp. reports net earnings after taxes of $260,885 during the first fiscal quarter that ended Dec. 31, 1952, compared with $246,084 earned during the same period in 1951. The corporation recently voted a regular quarterly dividend of 7½ cents on each of 937,500 common shares outstanding.

International

An LAI Italian Air Lines DC-3 crashed in flames last week in Sardinia's Sinnai Mountains 10 min. after it had taken off for Rome from Cagliari's Elmas Airport. All 15 passengers and four crew members were killed.

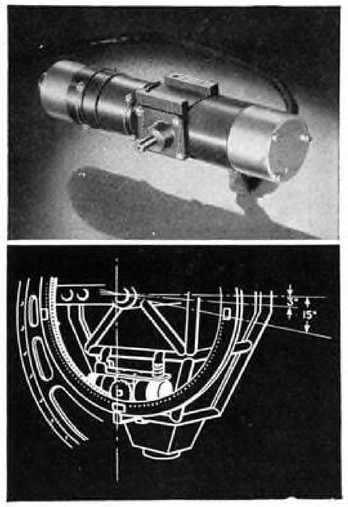
Hunting Group Co. of Great Britain has been awarded a U. S. Air Force contract of more than $2 million for overhaul of C-47 Dakota transports and Pratt & Whitney engines. Hunting says the contract is the largest of its kind to be placed in Europe.

Venezuelan airports at Maiquetia, Barcelona and Maracaibo will be enlarged to accommodate commercial jet airliners, according to government studies now in the final stages.

A twin-jet Canberra bomber flew from London to Darwin last week in 22 hr. and 1 min., setting a new official England-to-Australia speed record. Actual flying time for the 8,608-mi. flight was 19 hr., 1 min. The British bomber previously had set Atlantic speed records.

Aero-Vias, a newly formed Argentinian airline, is scheduled to begin flying 10 Lockheed Lodestar aircraft over six domestic routes at the start of the carrier's service next August.

Cameras on Reconnaissance Planes Airborne Actuated



The R-118M6 Rotorac® is used on the Grumman F9F-5P and the Chance Vought F7U-3P to position the photo reconnaissance cameras.

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The R-118M6 is a modification of the Rotorac shown in the I. A. S. Aeronautical Engineering Catalog. We suggest you refer to this publication for data on this and other Airborne actuators.

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AVIATION CALENDAR

Feb. 10—Second seminar on industrial lubrication engineering, American Society of Lubrication Engineers, Bellevue-Stratford Hotel, Philadelphia.

Feb. 12-13—National Aviation Education Council annual meeting, Atlantic City, N. J.

Feb. 18—New York Section of the Instrument Society of America, Hotel Statler, New York, N. Y.

Feb. 18-19—Eighth Annual Conference of the Society of Plastics Industry, Reinforced Plastics Division, Shoreham Hotel, Washington, D. C.

Feb. 22-24—Texas' Second Agricultural Aviation Conference, Texas A & M College, College Station, Tex.

Mar. 10-11—Eleventh Annual Conference, Society of the Plastics Industry Canada, Inc., General Brock Hotel, Niagara Falls, Canada.

Mar. 17-20—21st Annual Meeting American Society of Tool Engineers, Hotel Statler, Detroit.

Mar. 23-25—Third Midwestern Conference on Fluid Mechanics, University of Minnesota, Minneapolis.

Mar. 23-26—Institute of Radio Engineers National Convention, Waldorf-Astoria and Grand Central Palace, New York, N. Y.

Mar. 23-27—Eighth Western Metal Exposition and Congress, Pan-Pacific Auditorium, Los Angeles.

Mar. 23-28—Congress of Civil Aviation Conferences, a joint meeting of trade organizations; theme: 50 years of aviation progress. American Association of Airport Executives is holding annual meeting simultaneously, Kansas City, Mo. Contact convention manager, Ross C. Roach, P. O. Box 315, Kansas City 41, Mo.

Mar. 25-27—National Production Forum of the SAE, Hotel Statler, Cleveland, O.

Mar. 31-Apr. 2—First International Magnesium Exposition, National Guard Armory, Washington, D. C.

Apr. 4-12—Second Annual International Motor Sports Show, Grand Central Palace, New York, N. Y.

Apr. 20-23—Aeronautic Production Forum, National Aeronautic Meeting and Aircraft Engineering Display (SAE), Hotel Governor Clinton and Hotel Statler, New York, N. Y.

Apr. 29-May 1—1953 Electronics Components Symposium (AIEE-IRE), Shakespeare Club, Pasadena, Calif.

May 11-13—IRE National Conference on Airborne Electronics, Dayton Biltmore Hotel, Dayton, O.

Oct. 10—International Air Race, England to Christchurch, N. Z., entry deadline Jan. 31.

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Washington Roundup

Wilson and Politics

Seasoned Capitol Hill observers believe the new Secretary of Defense, Charles E. Wilson, is in this political situation:

• **Senate Majority Leader Robert Taft** is not one of his enthusiastic backers. Taft's wry comment when Wilson was up for Senate confirmation: "When they send up the nominations, it's my job to get them through."

General Motors Corp., from which Wilson resigned as $600,000-a-year president to take his new post, is credited with convention activities contributing to the Eisenhower nomination. Interested in expanding world markets, top executives of the firm looked with disfavor on Taft's foreign policies, also saw higher hope for a Republican victory with Eisenhower.

• **But there seems little chance of an open breach.** Sen. Homer Ferguson, from GM's home state of Michigan, an aggressive backer of Taft for the presidency, indicated this by taking the lead in supporting Wilson's confirmation. He heads the Senate Appropriations Subcommittee on Defense which has extensive power over the department through purse control.

• **Democrats will scrutinize Wilson's performance** microscopically. They need campaign ammunition for the 1954 election. It will determine control of the House and Senate, now slimly in Republican hands. Democrats look on Wilson particularly as a likely target for attacks on the Eisenhower Administration.

Wilson and Congress

The new Defense Secretary, like other officials newly appointed from private life, admitted he is inexperienced in what is to be one of his key jobs: testifying before Congress.

His predecessor, Robert Lovett, estimated that he testified on Capitol Hill an average of more than once a week.

The success of any Secretary's program depends in considerable degree on the success of his presentation of it and the support for it that he gets from Congress.

Following one round with Senate Armed Services Committee—after which some nettled senators released some of Wilson's comments to the press for wider circulation, Wilson pleaded: "I am an amateur at this business of testifying before a committee like this." He went on:

"Gentlemen, I got so interested in what we were talking about, I sort of forgot that I was talking on the record a couple of times. (He had been told his testimony would ultimately be made public.)

"I would have done much better if it had been a public hearing because I would have been conscious all the time of what I was doing."

Several senators, though, felt that Wilson followed the same course in his second presentation. Some of the things that annoyed committee members were:

• **Story-telling** instead of answering questions directly. Wilson had a penchant to reply with stories he recollected. This brought requests similar to chairman Leverett Saltonstall's, "If you could answer that . . . with just a 'yes' or 'no,' I think it would help us a lot."

• **Impatience with senatorial questioning.** For example, a query by Sen. Stuart Symington, Wilson suggested, "seems to me to be sort of an unnecessary burden on me."

Saltonstall replied: "The chair would hope that Mr. Wilson realizes that he will be asked many types of questions, whether he thinks they are pertinent or not, and the chair is sure the senator from Missouri would not ask it if he did not think it is pertinent, because he has been through it (as Secretary for Air), and the chair hopes that Mr. Wilson will be guided by that."

Then, Wilson wanted to know if there would be another hearing at which he would supply the information.

Saltonstall: "Mr. Wilson, the chair would say that you would be warming the seat which you are now sitting in many, many times in the next few months, and that if you are confirmed as Secretary, you will have ample opportunity to sit in that chair and to answer. . . ."

• **Advising senators.** An example of this was Wilson's recommendation that the committee call up Assistant Secretary W. J. McNeil to become informed on procurement policy and procedure. He suggested: "If you men would like to know more about that and have it on the record, Assistant Secretary McNeil, who has been in the department for a long time, understands all the details on how the business is done. If you get him up here and let him testify . . . how it is done, it might be helpful."

Sen. Harry Byrd and Sen. Richard Russell have been directing and following military policies from Capitol Hill for two decades. They, and several other members of the committee, participated in the writing of the 1947 Unification and Armed Services Procurement Acts, and several later statutes dealing with procurement.

• **An apparent lack of appreciation** that it is a senatorial responsibility to ascertain that all nominees comply with legal requirements. A typical Wilson protest: "I really feel you are giving me quite a pushing-around. If I had come here to cheat, by God, I wouldn't be here."

Sen. Russell's reply: "I am sorry you feel that way, Mr. Wilson. I am not trying to push you around, but I have my responsibilities, too."

Wilson and the Military

Another question on Capitol Hill is whether Wilson is headed for conflict in the Department of Defense, particularly with the military hierarchy.

Statements like these, by Wilson, give rise to Capitol Hill doubts:

• "My authority as Secretary of Defense is such that I could take over one of those departments and run it if I thought it were the right thing to do." (Actually, the Unification Act provides that each service department shall be "separately administered" by the Secretary.)

• The law, "by my interpretation gives me complete authority and proper authority to say to anyone in the whole setup, including the Army, Navy, and Air Force, that on that particular thing, 'Don't you handle it; we will handle it farther up.'" (Military personnel are under the command and authority of their chief of staff. Top civilians also have prerogatives under law.)

But Wilson takes over his job with great optimism. In his only public address since retiring as the nation's highest-paid industrial executive, he said:

• "I am encouraged that so far in the Defense Department I have identified no completely new or unfamiliar problems in . . . organization and human relations."

• His first act in taking over his new office will be to hang up this statement "which must be the guiding principle in all large organizations":

"Reasonable, intelligent men with a common objective in the presence of the facts do not have too much trouble coming into agreement."

—Katherine Johnsen

Remington Rand Methods News

A 20% increase in productivity with visual scheduling

An aluminum fabricating plant wanted to apply the Gantt principle of charting work done against work planned. After a study, they chose Sched-U-Graph boards as the most rational and simple device for charting daily progress of each item, part and sub-assembly on defense and civilian orders.

Their experience shows many definite advantages flowing out of this visible method for production scheduling. The big, bold charts make it easy for everybody to grasp all significant facts on machine loading, scheduled future loading, each variation from schedule, and the movement of each work order by operation.

Also, the Personnel Department can now *see clearly* how many employees will be needed – and when – in each productive department. The Sales Department can advise a customer well ahead of time if a schedule will not be met exactly. The Production Engineer can determine hours each machine has been used as well as scheduled future use – for efficient planning of his preventive maintenance work and replacement of equipment.

The most important advantage, of course, is that of insuring a continuous production flow through quick spotting of any bottlenecks which may cause serious delays. Production officials of the plant conservatively estimate that a 20 per cent increase in productivity is effected by this Sched-U-Graph visible method. For more details, see our scheduling manual **KD-341.**

CAN YOUR PURCHASING DEPARTMENT DO MORE TO HELP PRODUCTION?

There's a new way to increase the effectiveness of purchasing records. It's a simple checklist to help the buyer get complete information without burdensome detail. Checking it over just once with care may point the way to more efficient procurement of materials and equipment for your production needs.

This checklist is just one of the valuable features in a new 20-page manual of purchasing procedures to save time and money. It's full of practical ideas which will be easy to apply in your purchasing office.

You'll find here plenty of case histories showing how other firms help buyers make sound decisions faster, get orders placed and delivered sooner, slash purchasing paperwork, give clerks more responsibility, reduce the number of items to be purchased, etc.

Also, you'll see the actual forms and methods used in many firms – for every phase of paperwork from receipt of the requisition to closing of the order file. Ask for your copy of this new purchasing procedures manual **X-1202.**

A pressure problem for engineers, and how it was solved

The teletypes pounded urgently. Air Force officials wanted to know by 6:00 P.M. if a new alloy could be substituted in building the giant C-124 Globemaster transport.

The engineering chief of this division scanned the teletype, hurriedly made notes on its contents, dispatched the original to the typing pool. Minutes later, 20 neat copies of the message were placed on the desks of sub-chiefs concerned. This plant gets *fast action* from its Electri-conomy typing pool. Their all-electric typewriters, equipped with a special type face for legibility, can produce up to 20 neat copies from a single typing.

Electri-conomy helps relieve pressures on Engineering in many other ways, too. On big jobs such as bills of materials, parts catalogs and price lists, many typists can work simultaneously yet with uniform "touch" for uniform readability from page to page. This is especially important when material must be reproduced by stencil, offset or photographic means. And a later revision of any page will have the same uniform readability.

Regular work such as engineering changes, orders and reports is also turned out faster because this electric typing method requires less effort, reduces fatigue. Turnover in the typing pool has been reduced since they switched to Electri-conomy. For further details, see our engineering case history **RE-8548A** and folder **RE-8356.**

The case of the unpopular punch press

When a well-known manufacturer of engine parts switched to Remington Rand punched-card costing, the new detailed reports revealed surprising doings in the shop.

For instance, one report indicated a certain type of punch press was the most efficient on a particular operation. But another report showed the press was not often used on this operation. Investigation revealed that workers preferred a different type of press which was easier to operate. Management now had all the facts needed for effective action.

What's more, this new system put the finger on profit leaks much faster. Instead of waiting 30 days to get sketchy facts, management now gets complete cost reports 5 days after completion of a job.

Naturally, costing is just part of the punched-card accounting operation which helps the firm produce better products at lower cost with better service to customers.

Let us show you how it also simplifies control of parts inventory, scheduling production for warehouse stocks, and writing payrolls. Ask for case history folder **SN-752.**

If you'd be interested in punched-card services to give you the same informative records without the need of setting up your own punched-card department, ask for our folder **BSD-6.**

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P-10

WHO'S WHERE

In the Front Office

John N. Valianos has been elected executive vice president and general manager of Bardwell & McAlister, Inc., Burbank, Calif., manufacturers of Avionics.

William L. Greene has been appointed vice president of engineering and general manager, Engineering and Research Corp., Riverdale, Md. Greene directed the corporation's recent entry into production of electronic flight simulators.

Nathaniel K. Zelazo has been named vice president of Ketay Manufacturing Corp., New York, producers of instruments, servomechanisms and electronic systems.

E. B. Code has been promoted to vice president in charge of public relations for West Coast Airlines, which merged with Empire Air Lines last year. Elected to the West Coast board of directors were **T. E. Robinson** and **Denny Hoge**, both former Empire directors. Other appointments include: **George Cooke**, former Empire general manager, operations manager, **Tom Croson**, sales manager; and **T. Edward Stephens**, former Pan American World Airways personnel superintendent, personnel manager.

William H. Cann has been appointed assistant to the president of North American Aviation, Inc., Los Angeles.

Changes

T. W. Cummins has been named administrative assistant to Northwest Airlines' vice president of operations. He succeeds **Paul L. Thomas**, who resigned to become facilities planning engineer for the Port of New York Authority.

K. B. Haugen, former Northwest Airlines chief of flight standards, has been appointed director of the carrier's newly formed flight service division.

Lysle A. Wood has been promoted by Boeing Airplane Co. to director of pilotless aircraft, a recently created post. **Harold Abling**, former Boeing factory manager, was named assistant to the operations manager. **Charles Williams**, general superintendent of Boeing production, succeeded Abling.

John W. Mazur recently joined Doman Helicopters, Inc., Patuxent, Md., as chief design engineer.

L. F. Trew has been appointed production manager of Jacobs Aircraft Engine Co., Pottstown, Pa. Other appointments announced by the company are **B. D. Miller**, manager of production engineering, and **Earl J. Kachel**, manager of qualify control.

R. H. Bendio has been named director of maintenance and engineering for North Central Airlines, Inc.

Earl D. Foster has been appointed superintendent of gas turbine production in Solar Aircraft Co.'s Manufacturing Division at San Diego, Calif.

Robert Griffin has been promoted to general superintendent of Bingham-Herbrand Corp.'s Aviation Division, Fremont, Ohio.

Ed C. Jacoby has been appointed manager of the Contract Administration Department, Weber Aircraft Corp., Burbank, Calif.

INDUSTRY OBSERVER

► Fairchild Engine Division is working out an installation of its small, approximately 1,000-lb.-thrust J44 monocoque turbojet in a Fairchild C-119 to provide emergency thrust in event of powerplant failure during takeoff. Although such applications are not new, Fairchild's installation, say industry observers, will feature these twists: The J44 will be mounted atop the C-119 instead of in the usual underwing or underbelly position and it will be retractable to eliminate drag when not being used.

► **Watch for the Air Force to recall many of the C-54s and C-46s it now has on lease to commercial airlines to expand its own aircraft. USAF plans greatly increased application of airlift to help solve some of its acute logistics problems at lower cost to the taxpayer.**

► Trend toward lower-powered jet engines with more efficient weight-power ratio is well advanced in both USAF and the Navy. Jet engines producing 20,000 lb. thrust are already in prospect but the military is pretty well convinced that a more efficient propulsion job can be done by using multiple units of lower-powered turbojets.

► **Air Force has ordered four Convair 240 transports in addition to the MATS order for Convair 340 C-131 air evacuation transports. Two of the 240s, which will be known as VT-29s, will be used for plush executive transports and two will be fitted for standard high-density seating. All will be attached to the special mission squadron of MATS.**

► CAA has distributed a new airworthiness directive instructing operators of Boeing 377 Stratocruisers equipped with 2J17 Hamilton Standard propeller blades to avoid operation in flight below 1,750 rpm. except for use of 1,400 rpm. in level cruise. CAA order follows discovery of several cracks in this type blade. Directive also specifies ground operation placards forbidding continuous operations between 1,500 and 2,000 rpm. must be installed by Mar. 1.

► **New United Air Lines cross-country VHF ground-to-air communications network scheduled for initial operation this spring will be owned and maintained by AT&T and leased to UAL on a monthly fee basis. Several other airlines are reportedly interested in this type of operation which would relieve them of heavy equipment investment and maintenance problems.**

► Navy Bureau of Aeronautics is working out details of a program to break down its communication, navigation and identification equipment into separately packaged subassemblies. Small modular units should ease problem of finding space for large avionic equipment packages in the cramped confines of fighters and carrier-based attack planes by allowing airframe manufacturers to utilize scattered, odd-shaped areas and to tailor installations to airframe configurations.

► **New high-speed milling machine with a feed rate more than six times that currently available has been demonstrated at Convair's Ft. Worth plant. Surface finish after final cut is reported to be six microinches. The miller was built by Cincinnati Milling Machine Co. under an Air Force contract. Design was tailored to industry-written requirements.**

► Bell Aircraft Corp. has a twin-turbine-powered big helicopter transport design to follow after the XHSL-1 Navy anti-submarine copter being readied to fly at Ft. Worth. The larger, tandem rotorcraft will probably be powered with two Allison T38 turboprops and is expected to carry 50 passengers.

► **Navy is taking a dim view of the new one-man mobile GCA unit because of increased maintenance problems resulting from its additional complexity. Navy finds the new GCA requires twice as many maintenance personnel as the older three-man sets. Current Navy thinking is that finding and training GCA operators is easier than getting highly skilled radar technicians.**

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Eastern Clashes With United on Aircoach

- **Rickenbacker files formal complaint questioning Patterson's sincerity in challenging safety.**
- **CAB plans to start enforcement action against UAL for operating first-class service at coach rates.**

Civil Aeronautics Board members last week planned to start enforcement action against United Air Lines for unfair competition in operating first-class service at coach fare in violation of its tariff.

Meanwhile, Eastern Air Lines president E. V. Rickenbacker spurred the Board to act faster by filing a formal complaint questioning the sincerity of United president W. A. Patterson's denunciation of high-density aircoach seating as unsafe.

"Actually, United's proposal is solely and simply to increase the attractiveness of its coach service by allotting more room to each passenger," Eastern stated in a complaint and motion that CAB deny United's request to operate first-class (54-seat) DC-4s at coach fares.

▶**Quotes Cornell Report**—Eastern uses United's own source material to challenge Patterson's allegation that five-abreast seating is unsafe.

"United's contention . . . is not supported either by logic or by known tests," says Eastern. "Report No. JA-829-D-1 of Cornell Aeronautical Laboratory, Inc., on tests made to determine evacuation times in United's 66-seat DC-4 coaches pursuant to a contract with United, states . . . (page 22):

" 'It was observed that cabin clutter caused by brief cases, overnight bags, and blankets placed in the aisle did not noticeably affect the evacuation time. The aisle width appeared to be adequate for the orderly movement of passengers toward the exits. Evacuation time appeared to be limited only by the speed at which the passengers could get through the hatches or down the slide.' "

▶**Questions Patterson Sincerity**—Eastern adds: "The sincerity of United's concern as to aisle width also may be questioned because of its tariff proposal which would permit it to limit the number of seats for sale in its 66-seat DC-4s to 54 seats. Such action obviously would not increase the aisle width."

Eastern also points out that the aisle width in United's DC-4s "is less than two inches narrower than the aisle in the DC-6s used in first-class service." Eastern concludes that point, challenging, "If United is really sincere in its concern as to aisle width, it obviously should be concerned about the aisle width in its DC-6s."

Eastern then rips into the other "safety" contention of United: that its DC-4 seating capacity should be cut down because of the limited number of emergency exits available. "United's present 66-seat DC-4 aircraft have a total of six exits. Eastern's 68-seat DC-4 coaches have a total of 10 exits. It is apparent that United can do what Eastern has done, namely, increase the number of exits sufficiently to permit 66 passengers to evacuate in the same time that 58 passengers can evacuate from United's DC-4s."

▶**Aisle Width**—Eastern notes that if a DC-4 with five-abreast seating has too narrow an aisle, so have the DC-6 and Constellation coaches used by other airlines.

The DC-4 aisle is 14⅝ in. wide, compared with the same for the DC-6 and 14 to 15 in. wide for the Constellation series.

And the aisles of most modern planes in "first-class" four-abreast configuration are only 1½ to 2½ in. wider than the five-abreast DC-4, Eastern says, citing the Martin and Convair (17 in.), DC-6 (16¼ in.) and Constellation (17 in.).

The Eastern complaint argues that "United's contention [is that] . . . if the number of exits is kept the same, 66 passengers will take more time to evacuate than 58 passengers." Eastern's solution: "If United has a safety problem in connection with its 66-seat DC-4 coaches, it can be readily solved by increasing the number of exits, and there is no need to modify the Board's aircoach policy."

▶**Asks Policy Change**—However, Eastern's complaint does go on to ask the Board to modify its aircoach policy with regard to the minimum seating of the DC-6 coach, which is presently 68 passengers.

That should be raised to some figure comparable with the 79-seat minimum established for the Constellation, Eastern says.

The present differential enables United and National to operate DC-6 coaches with the more luxurious four-abreast seating in competition with TWA and Eastern Constellations with five-abreast seating. Eastern says this gives the DC-6 operators a competitive advantage.

But it will take a minimum of one year for Eastern and others to get this CAB rule changed, because most of the existing airline coach tariffs do not expire until Dec. 31.

Also, there are some arguments to be offered for the fairness of a 68-seat-minimum DC-6 coach compared with the 79-seat Constellation coach.

▶**CAB Policy**—The Board set these specific standards for coach-fare economy two years ago, for two basic reasons:

- When the Board considered making the policy, in the fall of 1951, American Airlines was running transcontinental 70-seat DC-6 coaches in competition with TWA 81-seat Constellations. The Board policy decision therefore set the minimum just two passengers less than any existing practice. But practicality was not the only yardstick they employed in the decision.
- CAB computed the direct flight cost of the DC-6 and the Constellation, based on coach airlines' reports for the 12 months ended June 30, 1951, for their whole fleets of DC-6s and Constellations—coach and first-class together. The DC-6 cost came out at $1.76 a mile, compared with $2.66 for the more powerful Constellation. Thus, the cost per available seat-mile of the two planes was about equal for a 68-seat DC-6 (2.59 cents) and a 79-seat Connie (2.66 cents).

A CAB official therefore concludes that it might be discriminatory for the Board to force DC-6 operators to increase their seating capacity to take advantage of their lower-cost plane, if some airlines prefer to use that space for providing more luxury at the same cost as competitors.

However, a Board official also says CAB probably would prefer the DC-6 operators compete by utilizing their full cabin space to lower the fare rather than using it to compete with first-class service.

As to the safety factor, CAB chairman Oswald Ryan told AVIATION WEEK the fare is the issue in United's dispute with the Board, not safety. United can cut its seating density to five persons, Ryan said, if the fare is increased enough to compensate for the lost payload. CAB's rate-making authority obligates it to render a decision on economy and fairness of fares for specific services, he said.

▶**United to Start DC-6 Coach**—On the day after Eastern filed its complaint, United announced it would start transcontinental 72-passenger DC-6 coach service Apr. 26.

Previously, American Airlines and nonskeds North American Airlines and Air America had asked CAB for special exemption to fly coach service on United's routes.

The action they took may have hastened United's decision to change earlier plans to put DC-6 coaches on the Honolulu run first and transcontinental later.

Future plans, United now says, "contemplate aircoach service to Boston, Cleveland, Detroit, and Washington as well as transcontinental service eastbound out of Los Angeles, which now receives United coach service to San Francisco and the Pacific Northwest."

United's Rebuttal to EAL

United Air Lines, in a rebuttal to Eastern Air Lines' complaint challenging UAL's sincerity in the aircoach controversy, has asked Civil Aeronautics Board to hold public hearings on the safety problems involved in high-density coach seating.

United also challenged the accuracy of Eastern's comparative data on aisle widths in coach and first-class DC-4s and DC-6s.

United further alleged that doubling the number of emergency exits, as Eastern had done with its DC-4 coaches, would not necessarily speed emergency evacuation. United bases this assertion on the possibility that some exits might be shut off by fire, and "with that contingency in mind and on the assumption that identically the same number of exits, therefore, might actually be available in both instances, the (Cornell) report demonstrates that evacuation times increase with increases in the number of passengers."

UAL adds that "with respect to Eastern's suggestion relative to increases in the number of exits, United's plans do include the installation of an additional exit on its DC-4 coaches," compares with Eastern's addition of four more exits.

Third-Quarter Statistics

(All figures in millions of dollars)

Product	Backlog June 30, 1952	Net new orders during quarter	Net sales during quarter	Backlog Sept. 30, 1952
Total	$14,308	$2,737	$1,588	$15,457
Complete aircraft parts*	9,043	2,029	968	10,104
For U. S. military customers	8,176	1,954	853	9,277
Other	867	75	115	827
Aircraft engine parts*	4,159	296	374	4,081
For U. S. military customers	3,980	260	333	3,907
Other	179	36	41	174
Aircraft propellers & parts	267	74	32	309
For U. S. military customers	235	68	26	277
Other	32	6	6	32
Other products & services	839	338	214	963

* *Source: Bureau of Census.*

Aircraft Backlog Tops $15 Billion

Backlogs of aircraft industry orders rose to more than $15 billion by the end of the third quarter of 1952, a survey of aircraft manufacturers revealed last week. The survey included aircraft, engines and propeller producers.

A report from the Bureau of the Census and Civil Aeronautics Administration, as of Sept. 30, shows that the $15,457 million in unfilled orders is 8% higher than reported June 30, end of the second quarter, when they were $14,308 million.

Since the end of third quarter 1951, the total backlog has jumped 41%, the report indicates.

▶**Breakdown of Backlog**—Of the total backlog, 65% was for complete aircraft, 26% for aircraft engines and parts and 2% represented unfilled orders for propellers and parts.

Major portion of the unfilled orders comprised defense contracts for the military. Ninety-two percent of the aircraft backlog, 96% of aircraft engine orders and 90% of propeller orders were military contracts.

During the third quarter of 1952 there were $2,737 million in new orders, which is 18% of the total backlog. Value of sales during the period was 10% of the outstanding backlog. Here is how new orders compared with sales during the quarter:

New orders for aircraft and parts 110% greater than sales; orders for propellers and parts more than doubled sales, and aircraft engine orders 21% less than sales.

Since subcontracts are reported to the Department of Commerce by both the prime contractor and the subcontractor involved in airframe contracts, there is some duplication in the figures on value of backlog, new orders and new sales of complete aircraft and parts.

As measured by major subcontracts let by airframe manufacturers to other airframe producers, duplication in the value of backlog of orders amounted to $375 million at the end of the third quarter. This compared with $400 million at the end of the previous quarter.

Value of the total periodic backlog, excluding duplication from such subcontracts, was $15,082 million at the end of the quarter. At the end of the second quarter, the value was $13,908 million.

Air Force and Navy contracts for engines and propellers are made directly with the manufacturers so that possibility of duplication arising from subcontracts let by military airframe producers to the engine and propeller firms does not exist. Military airframe contracts exclude the value of engines and propellers.

Comet Lands Short Of Runway in Africa

(McGraw-Hill World News)

London—British Overseas Airways' Comet G-Ally was caught in a downdraft and landed just short of the runway during a low approach to Entebbe, Uganda, airport in South Africa Jan. 21, the airliner captain reports.

An African workman was killed when struck by the Comet's undercarriage as the plane bounced short of the runway. Passengers and members of the crew were not injured, and the Comet captain quotes many persons aboard the aircraft as saying they did not know anything had happened.

A Ministry of Civil Aviation investigation of the accident is in progress. BOAC is said to support the captain's report.

G-Ally is at Entebbe while spares for the damaged undercarriage are flown from Great Britain, but BOAC expects G-Ally to return to full daily service in the near future.

Defense Team Holdings Revealed

Details of stock holdings and defense-business connections that have delayed Senate action on the five-man team picked by President Eisenhower to run the Department of Defense have been released by Senate Armed Services Committee.

New Defense Secretary Charles E. Wilson passed the hurdle of confirmation by a sweeping 77-to-6 vote after he agreed to divest himself of all stock interests in General Motors Corp., but consideration of the four other designees still was pending when Wilson was approved.

Wilson's action, which cost him substantially in capital-gains taxes, involves:

• Agreement to divest himself of 39,470 shares of GM stock valued at $2.6 million by Apr. 1. Wilson said he might sell a small part of it to members of his family.

• An alternative agreement regarding bonus payment of 1,736 shares of GM stock due Wilson in five annual payments from 1953 through 1957. The stock was earned by Wilson's services through 1952. But under the company's bonus plan, it is paid out five years later. Senators objected that, under the law, he would have a "pecuniary interest" in GM as long as the value of his bonus was tied to the price of GM stock. To meet this objection, Wilson agreed to take one of these courses:

(1) If possible, get cash payment from GM;

(2) Get stock bonuses translated into cash at the current price;

(3) Commit to charity any increase in the value of his stock bonuses.

In addition to stock-bonus payments due Wilson for past service, Wilson is to get these cash bonus payments from GM: 1954, $280,534; 1955, $203,585; 1956, $130,793; 1957, $64,764. No Senate objection was raised to the payments, because they are fixed amounts for past performance. Nothing Wilson might do as Secretary could be construed as affecting them.

Wilson's wife owns 10,472 shares of GM stock, but this was not questioned.

▶ **Other Wilson Interests**—Promptly on being designated Defense Secretary, Wilson retired as $600,000-a-year president and director of GM and also resigned several other directorships. These included La Gloria Corp., an oil company; Anderson Banking Co., National Bank of Detroit, and Automobile Manufacturers Assn. He said he planned to continue as director of the Carnegie Institute of Technology and the Kettering Foundation, because the two posts would involve little time.

No objection was raised to Wilson's holdings in other corporations, which do not transact business with Defense Department. These are La Gloria Corp., 37,650 shares; Texas Illinois Natural Gas Pipe Line Co., 9,272 shares; Anderson Banking Co., 303 shares; and National Bank of Detroit, 15,000 shares.

▶ **Defense Undersecretary**—Roger Kyes, Defense Undersecretary-designate, resigned as $253,548-a-year vice president of GM to take the new post. He also resigned as director of Yellow Manufacturing Credit Corp. and Yellow Manufacturing Acceptance Corp.

He indicated he would follow Wilson's lead and divest himself of GM stock amounting to 2,458 shares, valued at $165,000. He also owns 387 GM shares in an agency account.

Kyes faced the same bonus problem as Wilson. He has earned these bonus payments: 1954, 389 shares and $108,224; 1955, 390 shares and $88,179; 1956, 235 shares and $63,165; 1957, 136 shares and $34,163.

Kyes launched his successful business career with the Glenn L. Martin Co. A Harvard economics graduate, he is a distant relative of Glenn Martin.

▶ **Air Force Secretary**—The Charles Evans Hughes report severely criticizing World War I aircraft production of Dayton-Wright Co. figured in committee consideration of Harold E. Talbott as Secretary of Air Force. Talbott was president of Dayton-Wright during the first World War.

The Hughes report also recommended the court martial of Col. E. A. Deeds, then an Army procurement officer, for alleged favoritism in the award of contracts to Dayton-Wright. Deeds, Charles Kettering and Talbott's father, Harry Talbott, had been business associates. Deeds is now chairman of National Cash Register Co.

The report was filed a few months before the end of the war in 1918 by Hughes, defeated Republican candidate for President, later Chief Justice.

Talbott said the firm had been financed by his father as a small operation, with Orville Wright designing the planes. When it was expanded for war production, Harold Talbott was kept on as president. He said he had little executive authority, and important matters were handled by his father as chairman of the board and Kettering as vice chairman.

Sen. Richard Russell quoted a House investigating report: "This company was launched about the time of our entry into the war, manifestly with the expectation of obtaining government contracts."

▶ **Produced "Flying Coffins"**—Planes produced by the company, the de Havilland 4s, were "unsatisfactory," Talbott said. He confirmed that they had become known as "flying coffins." This, however, was the fault of the Army Signal Corps that submitted designs and required the company to build according to its specifications, the new AF Secretary said.

Russell said he understood that Deeds' court martial "was approved by the Judge Advocate General of the Army, but that after some further hearing in the office of the Secretary of War . . . the court martial never took place."

Talbott reported Col. Deeds "was completely exonerated by a board of review appointed by the Judge Advocate General."

He said a claim filed by the government in 1922 for recapture of $2.5 million in overpayment was decided in Dayton-Wright's favor by the U. S. Circuit Court of Appeals. Dayton-Wright won a "counter suit" for collection of overpayment of taxes, Talbott said, and was awarded $600,000, which was only enough to cover legal fees involved.

Talbott reported his resignation from these directorships: Chrysler Corp., Electric Auto-Lite Co., Standard Packaging Co., Meade Corp., Baldwin-Lima-Hamilton Co., Mary Chess, Talbott Corp. He said Talbott Corp. is a family holding company largely engaged in real estate.

He reported these stockholdings: Chrysler, 2,000 shares; Standard Packaging, 15,000; Electric Auto-Lite, 8,000. Talbott volunteered to divest himself of the Standard Packaging stock, because he thought its product should be procured by the military.

▶ **Navy Secretary**—Robert Anderson, Secretary of Navy-designate, was the only designee who had no connections or holdings that might conflict with his duties, committeemen indicated.

He was introduced with high praise by Sen. Lyndon Johnson, although Anderson bolted the Democratic Party and supported Eisenhower while Johnson backed the Democratic ticket in the recent election.

Anderson has been a member of the Texas legislature, Assistant Attorney General and State Tax Commissioner. Since 1937, he has been manager of the W. T. Waggoner estate, a farm-ranch-oil operation.

▶ **Army Secretary**—Robert Stevens, Secretary of Army-designate, had three stockholdings that some senators felt might conflict with his duties as Army chief: 1,000 shares of Pan American World Airways, 500 shares of General Electric Co., and 12,000 shares of Owens-Corning Fibre Glass Corp. He resigned recently as director of the three companies.

Undersecretaries

President Eisenhower already has selected the undersecretaries of Air and Navy, it is reliably understood. They are:

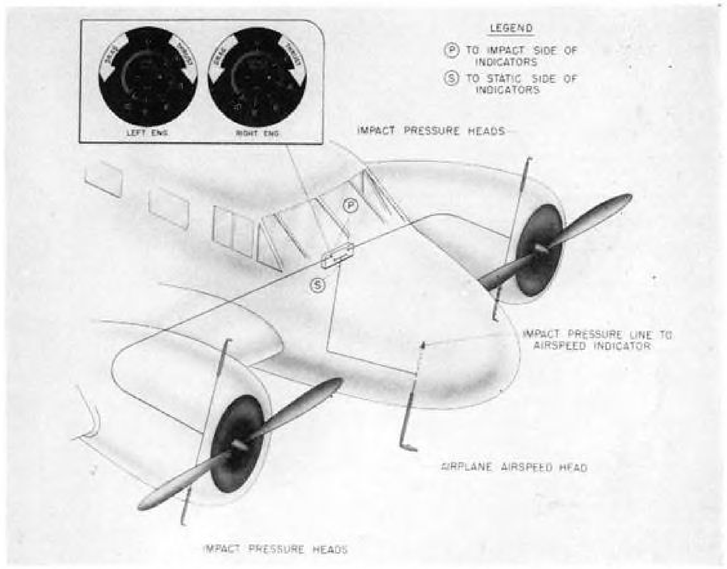
• **Robert Chapman Sprague** of Massachusetts to be Undersecretary for Air, the post now filled by Roswell Gilpatric. A graduate of the Naval Academy (Class of '21), he subsequently attended Massachusetts Institute of Technology and then worked as a Naval architect, designing the carrier USS Lexington. In 1926 he founded Sprague Electric Co., a large electronics component firm which he has headed since. He has served as president and chairman of the board of Radio-Television Manufacturers Assn.

• **Charles Sparks Thomas,** Los Angeles, to be Undersecretary of Navy. He is president of Foreman & Clark, Inc., retail clothing chain. During the war, he served as special assistant to the Secretary of Navy, then the late James Forrestal. He worked out an incentive-type contract for the Navy and received the Distinguished Civilian Service Award and Presidential Medal of Merit. He is a director of Lockheed Aircraft Corp.



CONVAIR YB-60 LANDS AT EDWARDS AFB

The eight-jet sweptwing Convair YB-60, just about to touch down at Edwards AFB, Calif., following its first cross-country hop from Ft. Worth, Tex. The big plane stayed at the Desert Test Center briefly for engine-thrust trials. Second of the P&WA J57-powered bombers has been completed and is awaiting installation of engines. USAF does not plan to put the B-60 into production, but has given Convair a development contract for a new-type high-speed bomber to be handled by the Ft. Worth Division.



PROP THRUST INDICATORS layout is clearly depicted in this schematic arrangement of the devices installed in a Beech C-45. Note the two diametrically opposed pressure heads mounted in the engine nacelles behind each propeller. Dual units are required to average out pressures before applying them to pilot's indicator in order to avoid erroneous readings due to pitch or yaw of the plane.



THRUST INDICATOR INSTRUMENTS used in tests are mounted separately from the normal instrument panel as shown in upper right-hand section of photo. These two instruments are modified conventional airspeed indicators fitted with new scales.

Aviation Safety

New Approach to Prop Reversal

A new approach to solving the inadvertent propeller reversal problem, which has been causing much anxiety among engineers the past year, proposes installation of pressure tubes behind the props to give instant indication in the cockpit of any change in thrust.

Mel Gough, veteran NACA test pilot and director of flight test operations at NACA's Langley Laboratory, described the simply arranged device last week in a talk with movies at the Wings Club, New York City.

Adapted from the impact pressure

heads long used by NACA in various flight research programs, the tubes are installed in diametrically opposed pairs, behind each propeller. The pressures sensed by each pair are averaged before being combined as a single reading on an indicator in the cockpit, showing the thrust being provided by that engine.

► **Avoids Error**—With an indicator for each engine, the pilot has a positive cockpit indication as to how each powerplant is performing. In the event of an inadvertent reversal he could tell immediately which propeller was reversed by a glance at his dials.

The dual installation for each propeller is required to avoid erroneous single readings in flight conditions of pitch or yaw.

Gough pointed out that while the loss of one engine on takeoff would mean the loss of 25% power for a four-engine airplane, an inadvertent reversal on takeoff would mean about a 50% power loss, since the negative thrust of the reversed propeller would partially counteract the positive thrust of the other propellers. Considering this along with resulting dissymmetry of thrust and the control problem it presents, the importance of providing an instantaneous indicator of reversal and which propeller is affected becomes apparent, Gough pointed out.

Movies of flight tests of indicators mounted in a twin Beech C-45 cockpit, showed indications from pressure tubes mounted at top and bottom of nacelles behind the propellers.

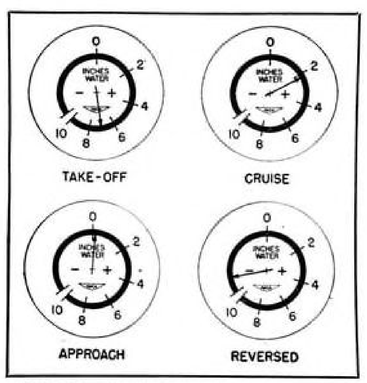
► **Indicators**—The measurement, Gough explained, is of the pressure differential between the front and the rear of the propeller disk. Front pressure reading is supplied from the airspeed tube ahead of the propellers.

The cockpit indicators were made of conventional airspeed indicators, modified by changing their scales to show plus and minus thrust measured in inches of pressure.

The motion picture demonstrated how the thrust indications shown on the dials in the C-45 followed the power input indications.

While other devices for safeguarding against inadvertent reversals are now being tested by Hamilton Standard (AVIATION WEEK Apr. 14, p. 84; Nov. 17, p. 76 and Dec. 29, 1952, p. 7), some safety experts suggest that the simple thrust meter indicators could be installed without the major operation involved in modifying a propeller's governors and controls and getting CAA approval of the modification.

Gough pointed out that the reverse thrust measurements on the C-45 were calculated but not flight tested, since the airplane was available for the flight test of the tubes and indicators but was not equipped with reversible propellers.



TYPICAL READINGS from thrust indicators mounted in C-45. The "reversed" reading is estimated since the C-45 used had no reverse-propeller installation.

Advisory Board Verdict

The industry and educational advisory board appointed by USAF to monitor AEDC operations passed the following resolution as part of its second annual report in December 1952:

- That the board reiterates its previously expressed opinion that it is in accord with the Air Force policy of operating the AEDC through the medium of a private contractor.
- That the board is completely satisfied with the progress made to date under the organization established to accomplish the Air Force objective at AEDC.

J. R. Markham of the Massachusetts Institute of Technology is chairman of the board.

Other members of the organization: C. E. Brehm, president of the University of Tennessee; E. M. Powers, vice president, Curtiss-Wright Corp.; Wright A. Parkins, engineering manager, Pratt & Whitney Aircraft; A. T. Colwell, vice president, Thompson Products, Inc.; R. G. Bowman, Republic Aviation Corp.; Kendall Perkins, McDonnell Aircraft Co., and Simon Ramo of Hughes Aircraft Co.

AF Supports Aro in Congress

Top Air Force chiefs recommend that the company be continued as operator of AEDC project.

The Air Force will seek congressional repeal of a ban against further payments to Aro, Inc., for operation of the Arnold Engineering Development Center. The ban will become effective Mar. 31.

USAF stated its position on Aro in response to a request from Sen. Albert Gore, leading critic of Aro's participation in AEDC; he asked USAF to confirm in writing the present status of its plans for operating AEDC after Mar. 31. USAF replied to Gore in a letter signed by Roswell L. Gilpatric, Acting Secretary of the Air Force. Copies were sent to Sen. H. Styles Bridges, chairman of the Senate Appropriations Committee; Sen. W. Stuart Symington, member of the Armed Forces Committee and USAF Secretary when the Aro contract was let; and Rep. John Taber, chairman of the House Appropriations Committee.

Gilpatric's letter revealed that USAF had decided to support a course of action proposed by L. J. Sverdrup, president of the St. Louis engineering firm of Sverdrup & Parcel of which Aro is now a wholly owned subsidiary, as follows:

- Seek congressional repeal of the appropriation act restriction on Aro.
- Pending a reasonable opportunity for congressional action (from 4 to 6 months) Sverdrup & Parcel will, if requested by the Air Force, operate AEDC on a non-profit basis.
- If final congressional action is favorable, USAF will contract with Aro for continued operation of AEDC at a fee mutually acceptable and lower than any comparable fee now being paid by government.
- If congressional action is unfavorable, both Aro and Sverdrup & Parcel will withdraw from any further connection with the operation of AEDC.

Support of Sverdrup's proposed course of action by USAF was recommended by Lieut. Gens. James H. Doolittle and Laurence C. Craigie "in the interest of securing the best possible operation of AEDC." Doolittle is a reserve general now serving as a special adviser to USAF Chief of Staff Gen. Hoyt S. Vandenberg. Craigie is Deputy Chief of USAF Staff for Research and Development.

► **Unanimous Support**—"General Vandenberg and General Twining (Vice Chief of Staff) believe that this recommendation should be followed," Gilpatric wrote to Senator Gore. "The matter was also discussed by me with Mr. Finletter (then Secretary of the Air Force) who felt that the views of the new Secretary, Mr. Talbott, should be consulted. That I did . . . in the presence of Mr. Sprague, who is to be the new Undersecretary, and it was their reaction that the air staff position should stand."

Gilpatric also detailed USAF exploration of possible alternatives to continued Aro operation of AEDC that were suggestedy last fall by Senator Gore:

- A non-profit corporation under sponsorship of a leading university. USAF concluded, as it had in previous studies of this alternative, that this type of operation was not practicable from the standpoint of management and AEDC did not fit into the kind of research ordinarily carried on by universities.
- A government-owned or controlled corporation. USAF concluded that special legislation would be required before either a government-owned corporation such as TVA or a government-controlled corporation such as the Federal Deposit Insurance Corp. could be used. Also, the object of this type corporation could not meet the requirements that have been consistently applied under the Government Corporation Control Act in deciding whether to carry out a government function through a governmental corporate form.
- A non-profit contract with either a reorganized Aro or a new corporation to be set up by Sverdrup & Parcel. Messrs. Gilpatric, Doolittle and Brig. Gen. Marshal Roth, Assistant to the Deputy Chief of Staff, Development, for development programs, met with Sverdrup & Parcel officially last November, at which time L. J. Sverdrup indicated his willingness, although with great reluctance, to consider a concrete proposal for a non-profit contract along the lines of the Atomic Energy Commission arrangement with Management Services, Inc.

Gilpatric noted that "the board of directors of Aro would be reconstituted along the lines" of a talk he and Doolittle had with Senator Gore. This understanding involved the proposed addition of several nationally recognized technical experts in aviation to the Aro board of directors.

► **Reject Profitless Offer**—USAF submitted the specific non-profit contract proposal to Aro last Dec. 23. Replying to this proposal in a meeting with General Craigie Jan. 6, L. J. Sverdrup flatly rejected the idea of a non-profit contract with the statement that he and his business associates were firm believers in the profit system, with its resultant taxes, and they regarded non-profit proposals as fundamentally socialistic in principle. At this meeting Sverdrup made the counter-proposals which USAF has now agreed to support.

Aro reported that the three additional directors added to the board when USAF requested broadening of its base have since left the firm (AVIATION WEEK Jan. 12, p. 12). They were Stephen Bechtel, David R. Calhoun, Jr., and J. Wesley McAfee. These directors were selected by Sverdrup & Parcel and not recommended by USAF Undersecretary John McCone as AVIATION WEEK erroneously reported.

Aro also reported that out of its $95,000 fee on the second AEDC contract, more than $45,000 was paid in taxes and $20,000 was required to meet expenses which the government ruled as non-reimbursable. Aro reports it has never paid a dividend to its stockholders and that after three years' work on the AEDC project it has a net position of $31,000.

Dan Kimball's decision on Navy engineering objections to Aro plans was made as a member of a three-man Research and Development Board committee and occurred before, not after, Aerojet was approached as a participant in Aro. Aerojet withdrew from Aro about three months after it agreed to participate because of USAF objections to an equipment manufacturer operating test facilities that would be used to test rival manufacturers' equipment.

W. Stuart Symington did not make the decision to award the AEDC contract "unilaterally" as reported by AVIATION WEEK. As USAF Secretary, Symington approved a recommendation submitted by Assistant USAF Secretary Harold Stuart that Aro be given the contract.



IKE'S PILOT

Maj. William Draper will pilot the Lockheed Constellation which will be used as the official White House plane by President Dwight D. Eisenhower. Draper succeeds Lieut. Col. Francis W. Williams who was pilot for former President Truman.

Engine Failures Hit BOAC Stratocruisers

Teardown of 15 Pratt & Whitney Wasp Major engines taken from British Overseas Airways' Boeing four-engine Stratocruisers was progressing in the carrier's London shops last week after the airline grounded its entire 10-plane Stratocruiser fleet to find the cause of recent repeated engine difficulties.

A BOAC spokesman in New York said the planes are to begin going back into service Jan. 29 as engine teardowns and fixes progress.

► **Engines "Seize Up"**—The airline reported that 15 of the engines "seized up" in ground and air operations within a five-day period, indicating pistons were sticking because of insufficient lubrication.

Civil Aeronautics Administration technical engineers last week reported that four of the engines had been torn down with the following results: Two engines showed defective master rods, one apparently due to oil starvation. A third engine showed an intake valve failure, and a fourth had a piston pin plug failure that was believed the cause for flakes of metal found in the oil sump.

Inspection of 11 engines not yet torn down disclosed similar metal flakes in all oil sumps.

So far, the teardown has not established any one definite trend. CAA said, but master rod difficulty in two engines out of four inspected is subject to further check on the basis of findings of other teardowns.

Whitney Straight, head of BOAC, announced the decision to ground the entire Stratocruiser fleet Jan. 22 as a result of the engine difficulties. The grounding order was said to be costing BOAC $70,000 a day.

► **Faulty Lubrication**—A New York BOAC press statement said the fault had been traced to faulty lubrication of engine bearings due to excessive evaporation. Lubrication of master rod bearings was diluted by fuel under certain temperature and rpm. conditions, the statement reported.

CAA engineers said early indications were that there has been no need for drastic action in respect to American-operated planes powered by similar engines, including Pan American, United and Northwest Airlines Stratocruisers.

Scotland Yard was watching the teardowns for evidence of possible sabotage, but BOAC officials discounted the possibility. They pointed out that no single workman had serviced more than one of the affected planes.

Some BOAC officials expressed belief the grounding might disappoint hopes of the airline for a small profit this fiscal year and result instead in a deficit.



How Tornado Crippled B-36 Fleet

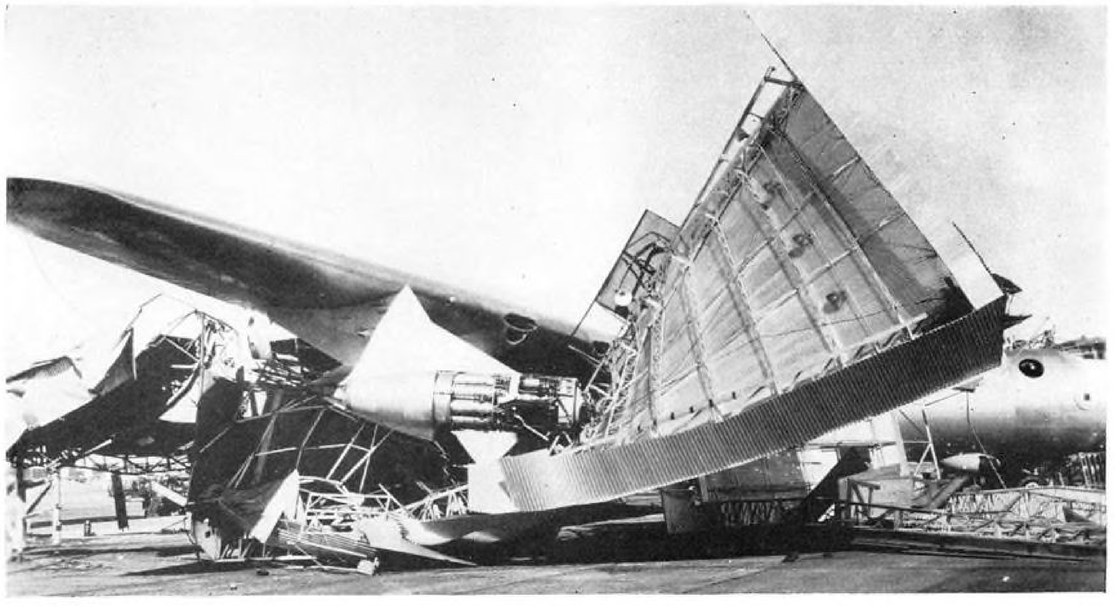
Some of the enormous damage suffered by a large portion of Strategic Air Command's Convair B-36 intercontinental bomber fleet caught by a tornado which struck Carswell AFB, Tex., Sept. 1, is shown vividly in these pictures just released. Wrecked portable-maintenance stands tangled with the B-36s.

Department of Defense explained that these photos had been classified as non-publishable until the damage had been repaired.

More than 70 of the big bombers were knocked out. The pictures show some of the damage inflicted when uprooted structures were hurled into the parked planes. Note top photo at right shows collision of two B-36 tails.

Air Force and Convair pushed repair work at top speed and by Oct. 5 had 51 of the planes back in service. In addition, Convair stepped up B-36 deliveries so that by that date Air Force had more of the big bombers available than it did prior to the storm. Repair cost: $23,431,946.

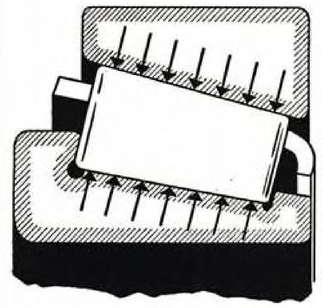
Lack of suitable dispersal facilities was given as the reason for concentration of the planes at one spot.



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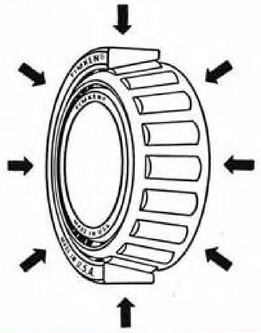
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Loads carried on the rollers and races of Timken® bearings are spread evenly over a line of contact. This greater load area assures extra load-carrying capacity.



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Due to their tapered design, Timken bearings carry radial and thrust loads in any combination. No auxiliary thrust bearings or plates are needed.



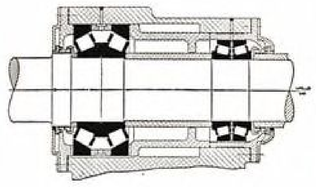
PRECISION

Timken bearings hold shafts in positive alignment, prevent end-movement, minimize deflection. Gears mesh precisely, assuring a smooth flow of power.



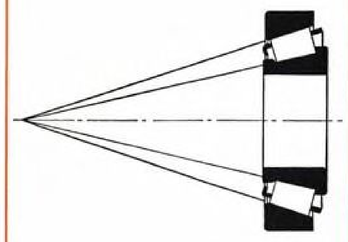
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Closures are more effective because Timken bearings keep housing and shaft concentric. Dirt and grit are kept out. Lubricants are kept in.



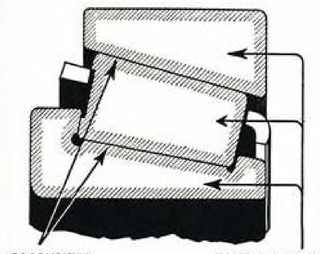
FRICTION

Timken bearings roll freely due to true rolling motion. Lines coincident with tapered surfaces of rollers and races meet at a common point on the bearing's axis.



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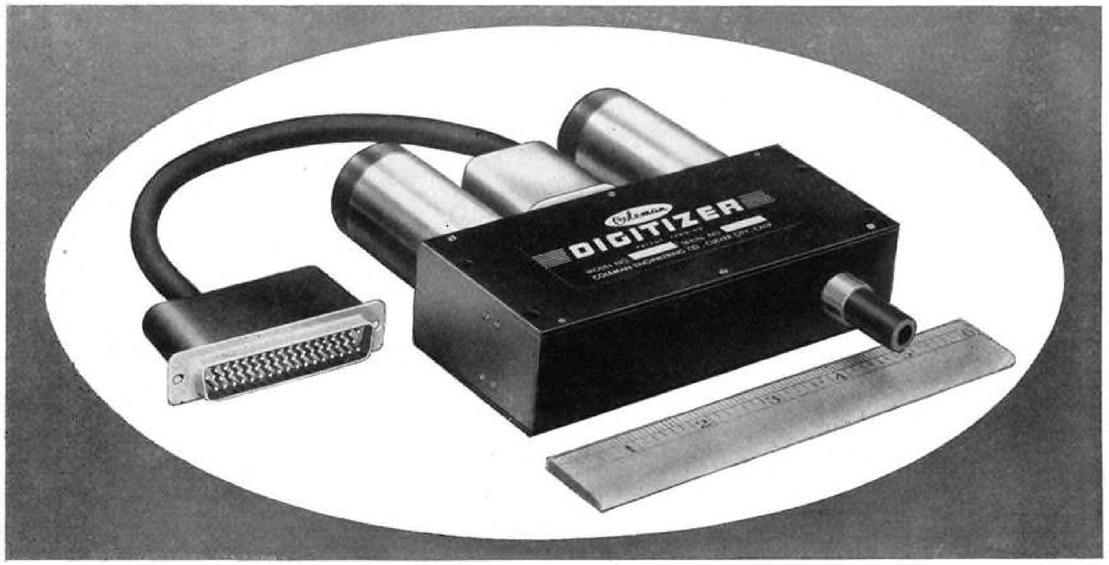
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LIGHTWEIGHT TITANIUM ALLOY replaces stainless steel in North American Sabre's aft-body section—the plane's "hot zone."

NAA Reveals Titanium Experience

Work to date indicates that stretching processes are better for this metal than impact methods.

Although titanium and its alloys are still undergoing a multitude of specialized studies for aviation applications of high promise, these materials already have seen considerable use in the airframe and engine fields.

One of the toughest production problems with titanium—forming of sheet for airframes—has been given close attention by North American Aviation, Inc. All the answers haven't been obtained, but currently available materials have been put to use where they will do the most good.

NAA's largest application of titanium is 600 lb. of the material in one model of the F-86—an appreciable part of this fighter's total airframe weight.

Data on production and related problems were outlined recently by NAA's F. Robert Kostoch, before the annual meeting of the Society of Automotive Engineers, in Detroit.

▶ **Characteristics Compared**—NAA's use of titanium stems from the material's temperature-resistance and favorable strength-weight ratio. Kostoch compares titanium alloy with high-strength aluminum alloy (75S-T6) and half-hard 18-8 stainless steel, using the relationship of ultimate tensile strength-weight vs. temperature (Fig. 1).

However, the graph shows that there is an area between 250 and 800F where aluminum loses its position, and where stainless steel, although strong enough, does not compete when measured on a strength-weight ratio. The dotted line for titanium alloy shows a favorable ratio, but at the temperature indicated, creep becomes the limiting property. It is in this temperature range of 250-800F that NAA finds its requirements for titanium.

However, this comparison doesn't tell the entire story because, as Kostoch points out, there are other mechanical properties such as compressive yield strength and modulus of elasticity which frequently are limiting properties. Kostoch points out that there are

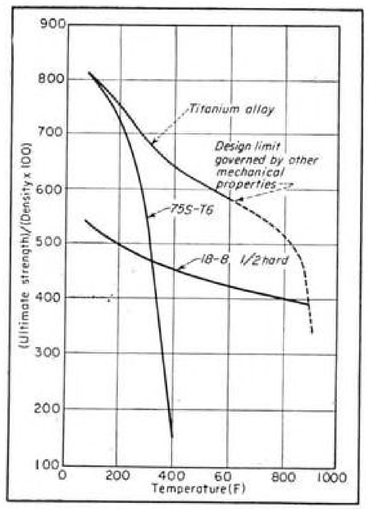


FIG. 1. Ultimate tensile strength/density vs. metal temperature.

two sources for the high temperatures that are pushing titanium into the foreground. One of these is in the picture now—the jet engine, particularly where it is submerged in the fuselage. The other source—airplane speed—is rapidly becoming significant.

▶ **Hot Section**—In the F-86 Sabre, with the engine buried in the fuselage, the aft-body section is the "hot" zone. In the past, 18-8 stainless was used when the temperature was too high for aluminum. As more powerful engines were developed, Kostoch reports, more and more stainless was required, with weight becoming a serious problem. In the face of this situation, titanium's debut was opportune.

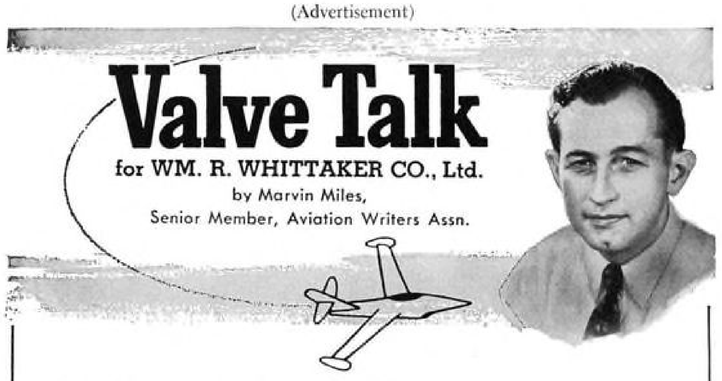
In addition to structural applications, there are firewalls and other heat shields required to protect accessory equipment and mechanisms. Here strength is not as important as corrosion- and heat-resistance. Commercially pure titanium does an excellent job in these applications, Kostoch says.

▶ **General Approach**—Early in NAA's concentration on titanium sheet, it became apparent that fabrication of the material into parts was not an easy job. Only recently did NAA get sufficient material quantities to begin real production fabrication.

Kostoch relates a few examples of what has been accomplished. He points out that these are not necessarily optimum practice—merely the way NAA has been able to make the parts. He is cognizant that better methods could be developed and expects that NAA will bring in improvements.

One of the big problems of going into large-scale production of titanium

(Advertisement)



Valve Talk

for WM. R. WHITTAKER CO., Ltd.

by Marvin Miles,
Senior Member, Aviation Writers Assn.

Ever hear of a hot air snowball?

There is one—and it's still rolling!

I refer to Whittaker's line of hot air valves that snowballed from a query into 160 different models and 20,000 units in two years.

Joe Globig, engineering vice-president, tells me it started early in 1950. Jet engines were jamming out air in enormous volume, with soaring pressures, temperatures and control problems. Control was the big issue—if available air was to be utilized.

Into the Whittaker plant came first a trickle of inquiries, then a steady stream, finally almost a flood. And the "big gamble" was launched.

It had been obvious for some time that hot air valves would be demanded for anti-icing, for cabin pressure and temperature control, for compressors, etc. The field was wide open. The problem was how to meet it.

Plenty of puzzlers

Whittaker experts went to work. They analyzed, they studied, and they came up with plenty of puzzlers.

What temperature range? What stresses? Would suitable materials be available? How much leakage would be allowed? How much air would be available a year, two years from now? What power should be utilized to operate hot air valves?

Whittaker men found themselves skewered on a two-horn dilemma—not only must they design and produce hot air valves, they must also evolve a new actuator to operate them.

The complete job took exactly one year, from the beginning of January to the end of December, 1950, and in those twelve months the company gambled deeply on experience, ingenuity and foresight.

Prototypes of the first new hot air units went to Boeing for anti-icing control and to North American for cockpit heating, with deliveries in January and February, 1951. Then came trouble.

On flight trials, their performance fell below expectations. Why? Backtracking disclosed that Whittaker's test facilities were inadequate to simulate closely enough the required temperature and pressure values of jet engine air.

Digging out of a hole

The answer came in two fast phases: Design and installation of efficient test gear; and the modification of every single hot air valve that had been delivered.

The snowball had slowed a bit. But from that point on it picked up speed and girth amazingly. A half million dollars in Whittaker development costs paid its first dividends in enthusiastic industry response.

Today the 160 different "active" models range from one-inch to six-inch valves, weighing from a half-pound to eight and a half pounds, handling jet air from a warm 250 degrees to a hot 750 degrees, and pressures from five to 166 p.s.i.

Yet "the squeeze" is still on—higher pressures, hotter temperatures, more and more cycles, even to five times the cyclic life actually needed.

To meet these demands, Whittaker has gone into metallurgy to develop its own alloys, into processing and finishing and other phases of material research.

Requirements exceeded

"The hot air valves we produce today are able to meet higher temperatures and pressure requirements than are actually needed," Globig explained matter-of-factly. "Nevertheless we shudder now and then at the startling specs we receive for new units.

"It's a healthy situation, though. Requirements should always be just beyond our reach. That incentive keeps the snowball rolling!"

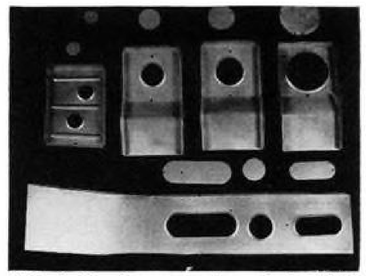


FIG. 2. Punch press parts made by NAA of commercially pure titanium.

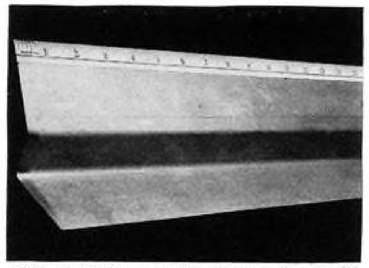


FIG. 3. Brake operation forms alloy in 90-degree Z section.

parts is the high cost of the material. NAA engineers decided to hold experimental work to a minimum and do forming test work on parts as they went along. This meant that tools and dies were made without a lot of the know-how that production men would like to have in detail rather than in generalities.

Kostoch reports that instead of definite values, "we frequently have had to say 'it will be pretty close to ½-hard stainless.'"

► **Cold-Forming**—Some typical punch press parts in commercially pure titanium are show in Fig. 2. The problem here was to maintain flatness. Although fractures exist, die rework eliminated the failures.

A simple brake operation to form titanium alloy to a 90-deg. Z-section is illustrated in Fig. 3. The lower bend was successful but the reverse bend failed at about 35 deg. This illustrates one of the worst problems NAA has found. Sheet stock often bends well from one surface, but fails when bent from the other.

Presumably one side of the sheet has absorbed more oxygen or nitrogen than the other during pack rolling, and though there is probably more to the phenomenon than this, there is no explanation for it now. Pickling the sheet with a nitric-hydrofluoric dip has reduced the failures.

A section of a titanium alloy frame formed cold by Hydropress is shown in Fig. 4. This illustrates that titanium will stretch well, but does not shrink readily. The upper flange, with a greater radius after forming, has stretched uni-



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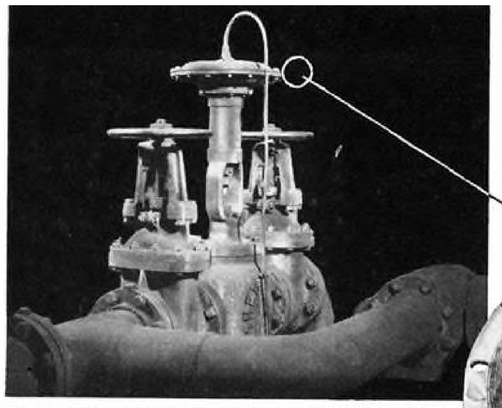
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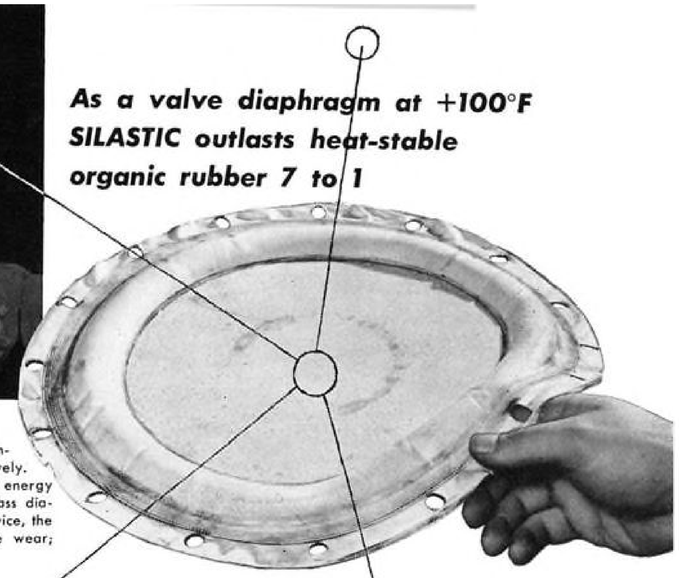
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AIR ASSOCIATES



The diaphragm in this valve that regulates the intake to a boiler feedwater storage tank, is in almost constant motion 24 hours a day at temperatures well above 100°F. Successive synthetic rubber diaphragms lasted 7, 11 and 13 months respectively. That's unsatisfactory performance in a power house supplying energy to a large chemical plant. So they tried a Silastic coated glass diaphragm. Recently inspected after more than 78 months of service, the Silastic diaphragm was still soft and flexible; showed little wear; appeared serviceable for many more months.

As a valve diaphragm at +100°F SILASTIC outlasts heat-stable organic rubber 7 to 1



For maximum life and reliability

specify SILASTIC

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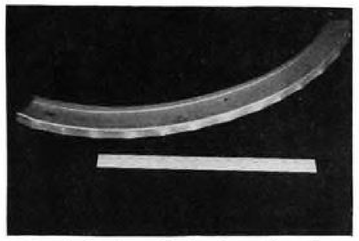


FIG. 4. Section of titanium alloy frame formed cold by Hydropress.

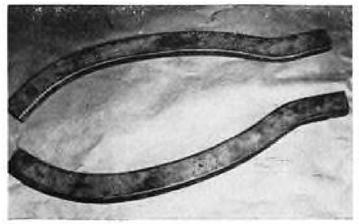


FIG. 5. Flange blanks were heated before forming operation on Hydropress.

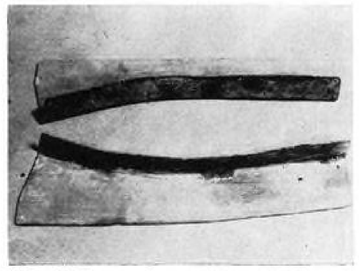


FIG. 6. Part made on 500-ton Hydropress at high temperature.

made cold but are better if made hot (less buckling and springback), while some can only be made hot. Temperatures are being explored, but are not fixed yet. Thus, the part shown in Fig. 6 has been made on a 500-ton Hydropress at 600, 750, 800 and 900F. All pieces exhibited the same amount of springback, Kostoch says.

► **Stretching**—One of the most successful forming methods is by stretching. Many of the NAA parts have very large radiuses of curvature, making it difficult to get shallow draws without springback. Stretching solves this, Kostoch reports, by doing plastic deformation over the entire length of the curve, and if the die is properly made springback can be practically eliminated.

The good contour that can be achieved is shown in Fig. 7, where the large flat blank is the contour template.

A stretch press (60-ton Hufford) operation is shown in Fig. 8. Here, the part which was to be formed (shown broken) is a Z-section first made in straight section on a brake. This part was given a stretching load of approximately 108,000 psi. and then wrapped around the die. The failure was caused by laminations in the material, but parts have been made cold successfully.

Kostoch claims that the stretch press can be used most successfully when sufficient stretch can be given to the formly to the prescribed contour. But the lower flange, with smaller radius than previously, has not shrunk well—it has buckled. There are two courses open to solve the buckling problem—the part can be formed with greater unit pressure or it can be hot-formed, Kostoch says.

► **Hot-Forming**—A part made with the hot-forming procedure is shown in Fig. 5. This channel has both shrink and stretch flanges similar to the cold-formed part, but could not be made cold on the Hydropress.

The forming blocks were heated to 900F. The cold blank was put on the block, then heated with a torch until it expanded enough for the tool holes to pick up the tool points in the block. The hot blank and die were covered with loose asbestos fiber for insulation and a hard-rubber (65-75 Shore) pad placed over the asbestos-covered pieces. The part was then formed in the Hydropress, with no buckling of the shrink flange.

NAA has not examined all the limits of the forming methods or temperatures. Kostoch reports that many parts have been made cold, many can be

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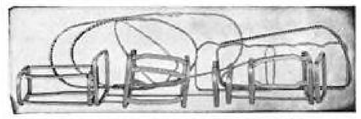
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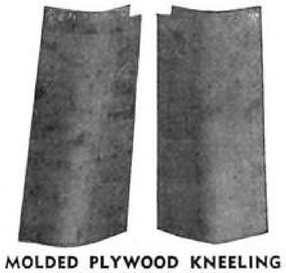
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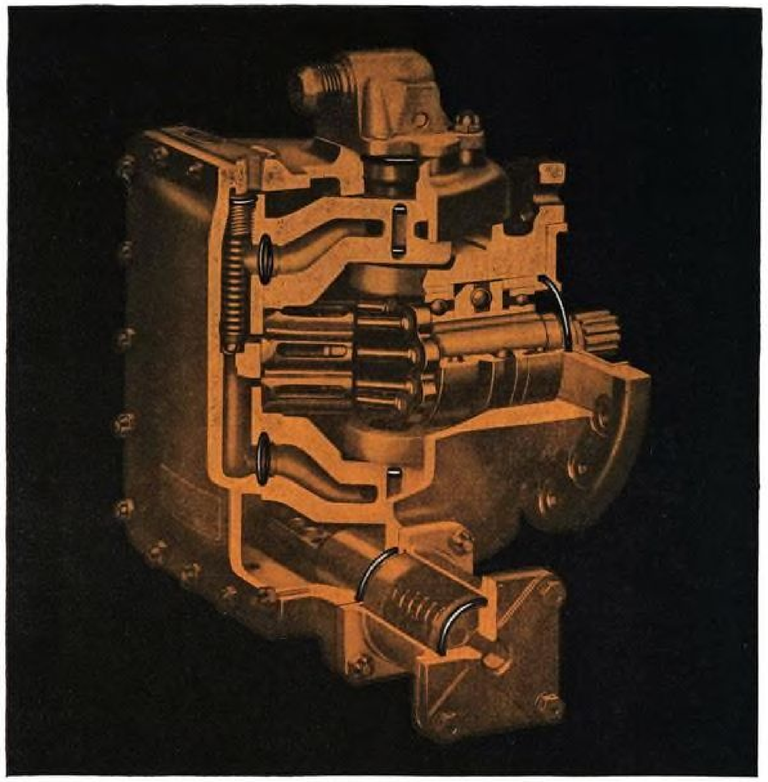


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FIG. 7. Stretching gives part with large curvature a good contour.

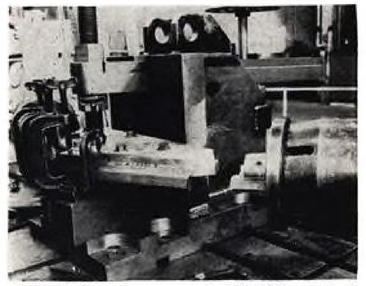


FIG. 8. Stretch press put 108,000 psi. load on part wrapped on die.

outside flange to move the neutral axis as close as possible to the inside flange so as to make the compression shrink small.

In some instances, he says, it is possible to move the neutral axis back of the inside flange and thus make both flanges by stretching. Chief limitation here is the width of the web between flanges—if it is too wide the outside flange would require stretching beyond its ability to deform without breaking.

► **Tools**—NAA has successfully made parts by conventional methods such as punch and draw press, brake, drop hammer, stretch press, Hydropress and Hydroform.

Kostoch reports that some methods are far superior to others, but at this time it is difficult to give them a numerical rating. He claims that NAA experience indicates that titanium "does not like to be pushed around rapidly," hence stretching, Hydropress or Hydroform, and draw pressing seem superior to punch press and drop hammer.

► **Welding Aspects**—NAA has limited assembly of alloy parts to bolted and riveted connections. He reveals that there has been no success in developing a reliable production method for resistance or fusion welding of the alloy. While weld joints can be readily made by either process, the as-welded condition is very brittle.

There appear to be methods for gaining back some of the ductility by post-heating, but these are not accomplished simply in production and they do not bring the ductility back far enough to "sell the whole job," Kostoch claims.

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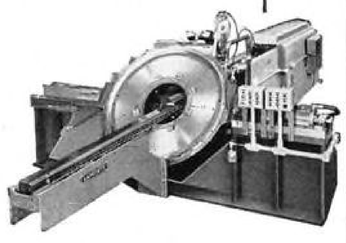
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contrast to the alloy—can be spotwelded without much difficulty, resembling stainless steel in this respect. With adequate shielding, fusion welding appears feasible and probably will be limited to the inert gas shielded arc method, because of the very high chemical activity of the molten titanium puddle.

▶ **Speed Affects Picture**—Commenting on the relationship of skin temperatures to speed, Kostoch observes that at Mach 2 at 35,000 ft., the calculated skin temperature approaches 300F. At Mach 3 for the same altitude, it is in the 600F region. The first is about the absolute limit for current high-strength aluminum alloys. As planes go faster the area of titanium use will expand to the forward fuselage and wings.

Eventually, Kostoch says, the parts that are now titanium will require even a better heat-resistant material and those that are now aluminum will require titanium.

▶ **Future Look**—On current designs—especially in the commercial field—there are many places where titanium could be used if it could be justified economically. Lower cost per pound would mean more utilization, Kostoch claims.

There are two good futures, he says—one, where nothing else will fit the picture, and two, when costs come down and weight can be saved economically. New alloys and better production techniques can expand these futures.

It is reasonable, he thinks, that one or more of the new alloys will be completely weldable. At this time extruding processes are feasible and this will increase titanium use in aircraft.

Better rolling techniques will overcome one of the greatest headaches—non-uniformity of sheet metal. —IS



LONG LINE OF 340s is scene from film Convair made to study production efficiency.

Movies Help Convair Boost Output

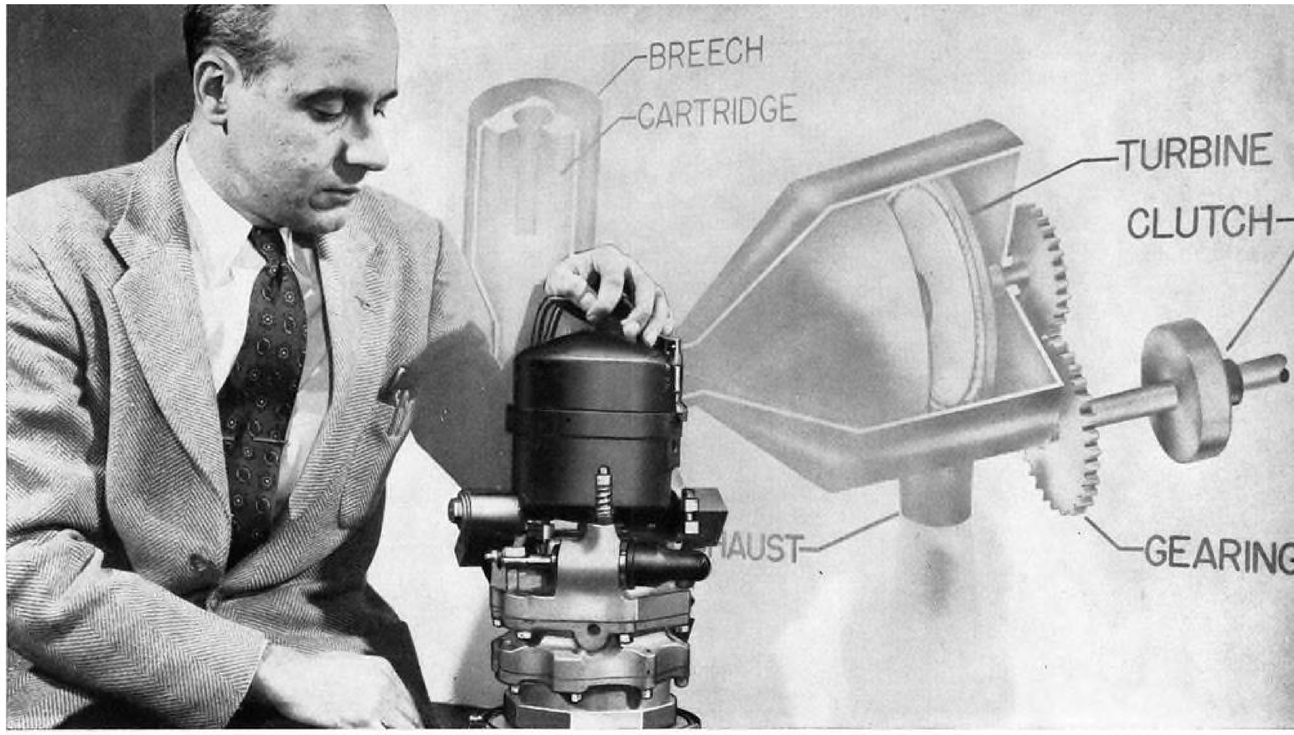
Production specialists at Consolidated Vultee Aircraft Corp.'s San Diego division are getting a detailed, live look at manufacturing activities—via the movie camera. Convair is using this method to analyze production procedures, then institute corrective measures to boost efficiencies. The company has shot and shown sequences of its fabrication and assembly lines, offices and exterior plant.

With the films, it is possible to demonstrate to production supervisors the over-all details of a particular process without causing the delay involved in conducting a group through the work area.

Movies of work methods have disclosed where workers hold parts when they should be held in fixtures. Crowding or understaffing of work stations and congestion of transportation routes inside and outside the plant can be recorded, then improved.

Safety, too, has been boosted with use of the movies. Unsafe practices have shown up which previously had escaped individual observers.

The films have proved especially useful in studying progress of plant layout programs. Convair says that they are more effective than a drawing or statistical report.



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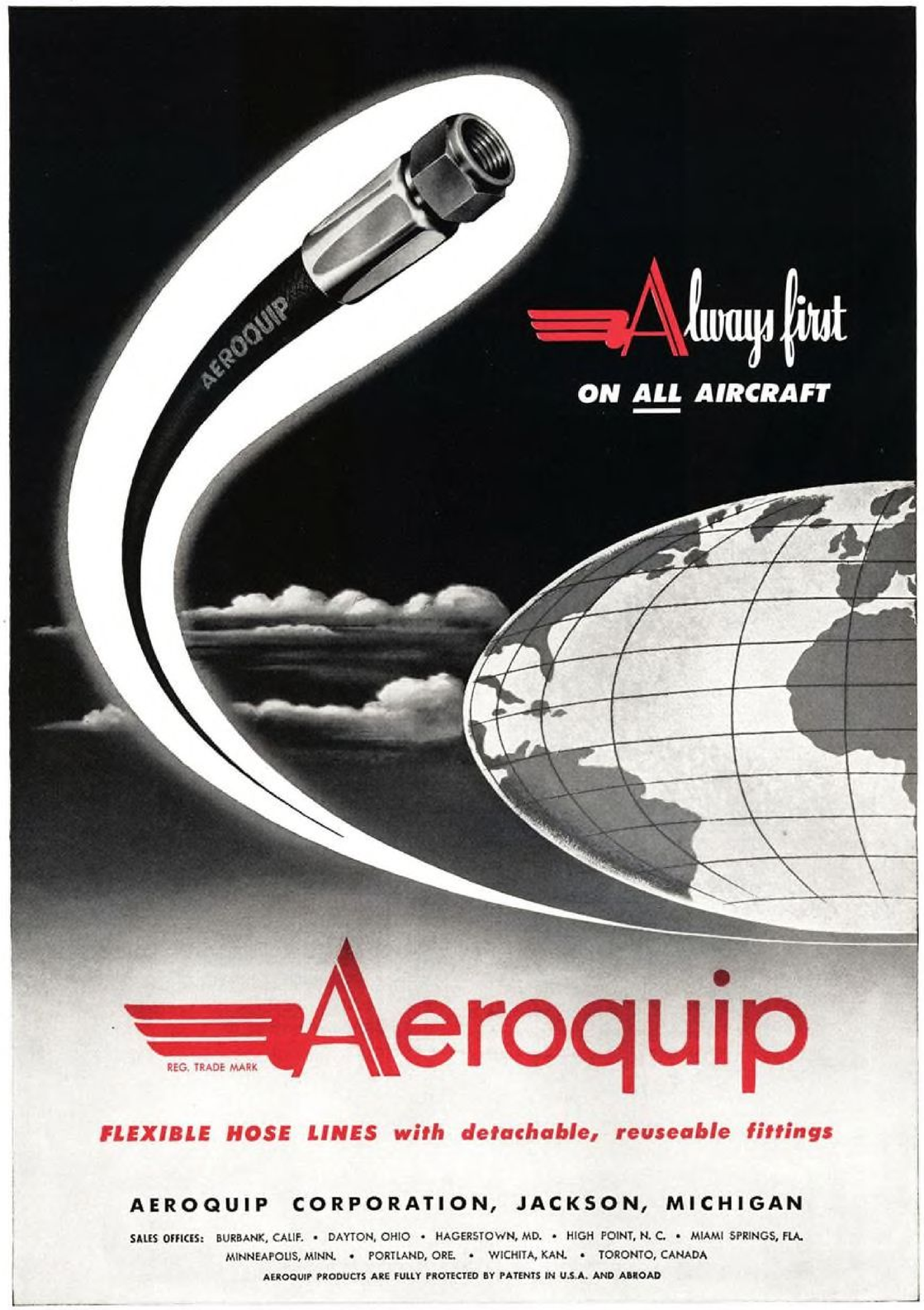
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Lewis Engineering Co., 339 Church St., Naugatuck, Conn., indicator, 504 ea., $28,713.

Barrett div., Allied Chemical & Dye Corp., 40 Rector St., New York, cummar resin, 288,000 lb., $43,776.

Mead Aviation Equipment Co., 457 Mulberry St., Trenton 8, pilot's belt, $136,888.

Aeroproducts, Allison div., General Motors Corp., Municipal Airport, Dayton 1, maintenance parts for F2H-1, 2 aircraft, $37,613.

Stein Brothers Mfg. Co., 1401 W. Jackson Blvd., Chicago 7, pilots' belt, 6,000 ea., $33,900.

Hydro-Aire, Inc., Subsidiary of Crane Co., 3000 Winona Ave., Burbank, swivel joint, filter assembly, $69,067.

Champion Spark Plug Co., 900 Upton Ave., Toledo 1, spark plugs, 34,560 ea., $67,750.

United Aircraft Corp., Pratt & Whitney Aircraft div., East Hartford, 8, Conn., P&W tools for engines, $111,336; maintenance & spare parts for P&W engines, $1,512,318.

Washington Steel Corp., Woodland & Griffith Ave., Washington, Pa., steel, corrosion- & heat-resistant, 51,735 lb., $27,745.

Breeze Corp., Inc., 41 South 6th St., Newark, N. J., screwjack, 63 ea., $35,423.

Scintilla Magneto div., Bendix Aviation Corp., Sherman Ave., Sidney, N. Y., tools, used on aircraft engine magnetoes, $39,127.

Koehler Aircraft Pro., 814 Vermont Ave., Dayton 4, fuel valves, $50,104.

Goodyear Tire & Rubber Co., Inc., 1144 E. Market St., Akron 16, wheel & brake assemblies, $298,261.

G. Felsenthal & Sons, 4160 W. Grand Ave., Chicago 51, board, chart plotting, 1,163 ea., $31,849.

Electric Auto-Lite Co., 1201 Champlain St., Toledo 1, hydraulic pressure gage, 4,915 ea., $44,658.

Technical Tape Corp., 177th St. & Harlem, New York, tape, marking, $46,994; tape, masking, $79,089.

Minnesota Mining & Mfg., 900 Fauquier Ave., St. Paul, tape, marking, $33,170.

Pastushin Ind., 5471 W. 98th St., Los Angeles 45, rivets (15 items), $57,733.

Greer Hydraulics, 454 Eighteenth St., Brooklyn 15, unit, propeller governor test, 9 ea., $61,677.

N. Y. Air Brake Co., 420 Lexington Ave., New York 17, hydraulic pump assemblies, $17,610.

Lear, Inc., 110 Ionia Ave., N. W., Grand Rapids 2, actuators for R4Q-1 aircraft, $224,264.

Hollingshead Co., 840 Cooper St., Camden 2, coating, solution, 12,000 gal., $26,595.

Glenn L. Martin Co., Baltimore 3, maintenance parts for PBM aircraft, $221,553.

General Electric Co., 1405 Locust St., Philadelphia, handbook of operation & service instructions, $27,732.

Kaiser Alum. & Chem. Sales, Inc., 919 N. Michigan Blvd., Chicago 11, aluminum alloy, $42,062.

Purolator Pro. Inc., 970 New Brunswick, Rahway, N. J., filter, 18,385 ea., $47,046.

Barber-Colman Co., Rockford, Ill., thermostat, 1,620 ea., $54,198.

Bassons Indus. Corp., 1432 West Farms Rd., New York 60, helmet, 3,500 ea., $56,350.

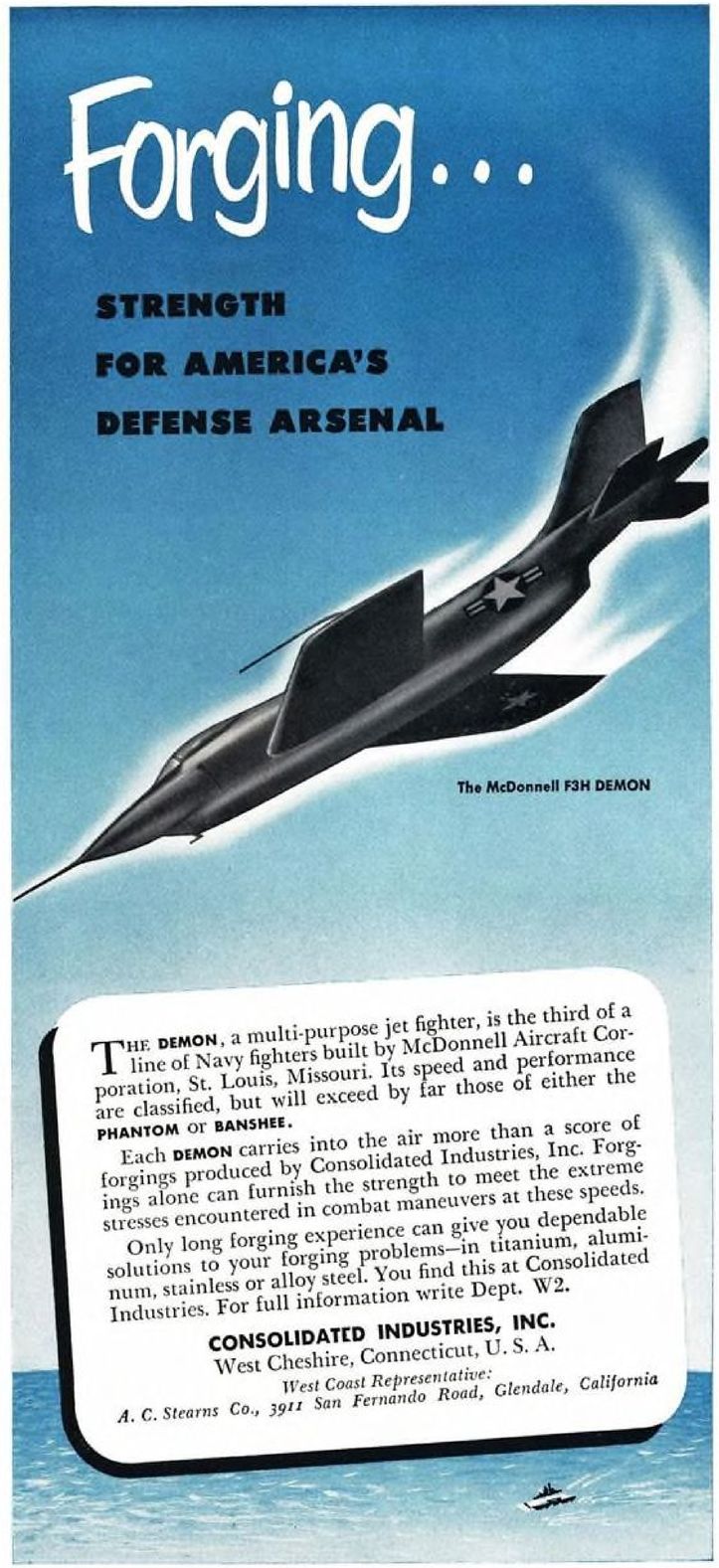
Aluminum Co. of America, 1200 Ring Bldg., Washington, D. C., aluminum alloy, $57,886.

Gould-National Batteries, Inc., 5519 Charlcote Rd., Washington, D. C., battery, 1,743 ea., $67,881.

Reynolds Metals Co., 2500 S. Third St., Louisville, Ky., aluminum alloy, $74,924.

AiResearch Mfg. Co., Garrett Corp., 9851-9951 Sepulveda Blvd., valve assemblies, $111,862.

Electric Storage Battery Co., 17th St. & Indiana Ave., Philadelphia 32, battery, 2,874 ea., $129,980.





1. Boeing GAPA missile at instant of firing at Alamogordo . . .



2. Starts to gain momentum as it leaves launching rack with . . .

First Details of Boeing GAPA Project

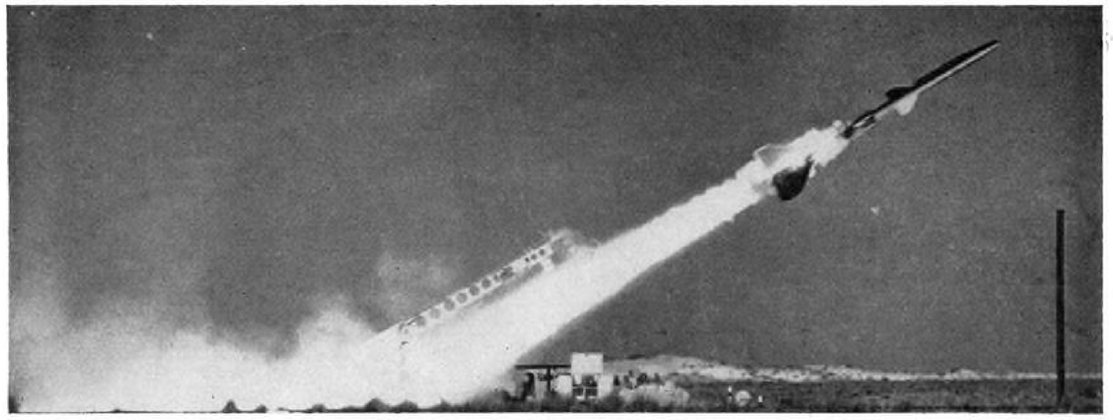
Defense Dept. has released photos and details of Boeing's GAPA (ground-to-air pilotless aircraft) supersonic missile program. More than 100 of these test vehicles were built and fired, first at Wendover, Utah, then at Alamogordo, N. M. Speeds of more than 1,500 mph. were reached by GAPA missiles in this series.

The program was begun at Boeing in 1945, under a USAF contract, and firings were carried out from 1946 to 1949, when the project was completed. The missile never went into production. Boeing also developed and built fixed and portable launching platforms for these defense weapons.

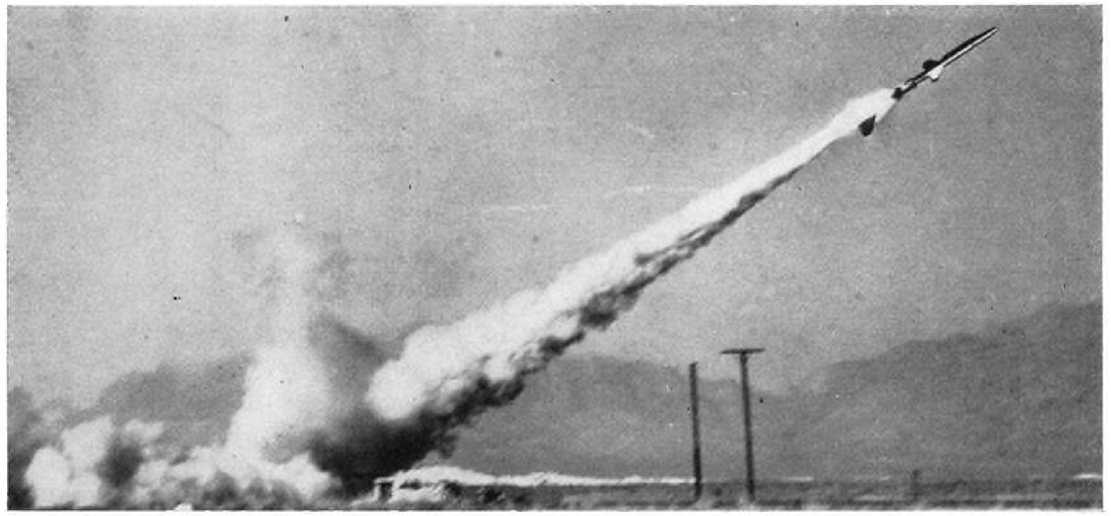
Examination of the photos on these two facing pages shows a blunt nose on the GAPA missile, indicating ramjet propulsion. Additional power came from a solid-propellant rocket booster. The missile, less booster, is about 26 ft. long, a foot in diameter.

Use of movable single-wing structure (mid-body on the missile) would make it appear that the GAPA projectiles had to bank in order to turn. Missiles such as the Fairchild Lark, with cruciform wings, are designed to maintain their control surfaces in horizontal and vertical position when turning, requiring less complexly defined reference axes for their guidance and sensing systems.

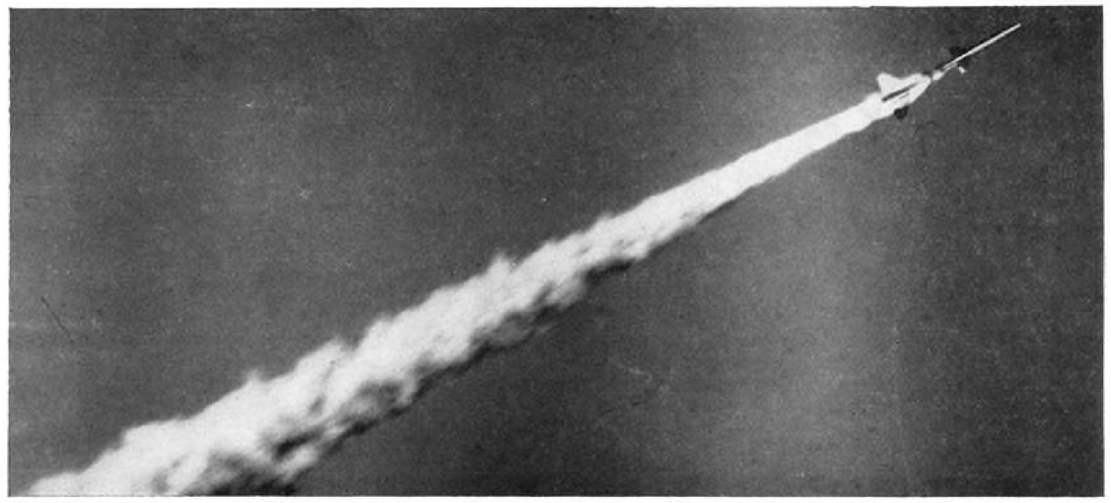
In the firing illustrated on these pages, the presence of flames at the point of separation between the missile and booster bodies (photos 2 and 3) indicates that both ramjet and rocket were



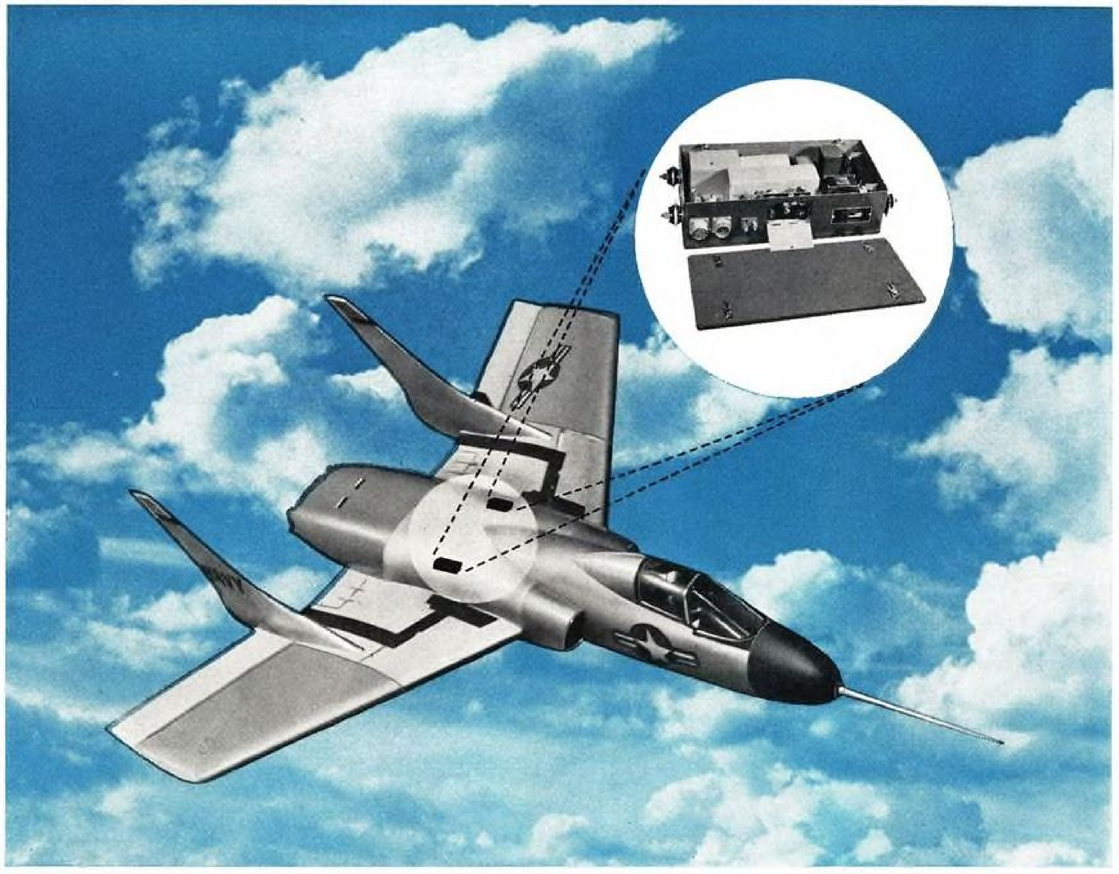
3. Smoke and flame trailing behind, indicating that both . . .



4. Ramjet and rocket powerplant are operating, taking GAPA . . .



5. Up to stratosphere, with radar, etc., tracking its course.



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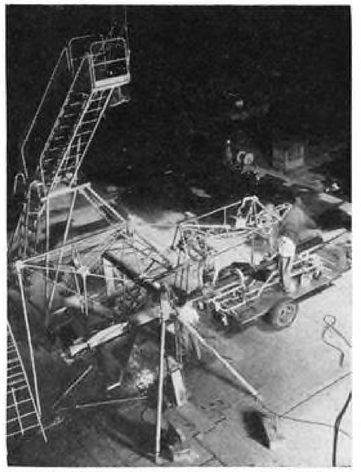
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GAPA MISSILE is prepared for firing at Alamogordo. Small surfaces somewhat below nose are probably for steering.



PORTABLE PLATFORM for launching is one of those designed by Boeing for GAPA.

set off simultaneously in this test.

William Allen, Boeing's president, pointed out in a recent report that the company is still deep in missile work although the GAPA project is over. Boeing's present guided missile is in the developmental stage, Allen said, but it is one of the largest projects in the company's engineering department and is expected to grow in importance. He was apparently referring to the XF-99 Bowmark, ground-to-air experimental vehicle.

The company has previously announced the existence of a Boeing guided missile test group at USAF Missile Test Center, Cocoa, Fla.



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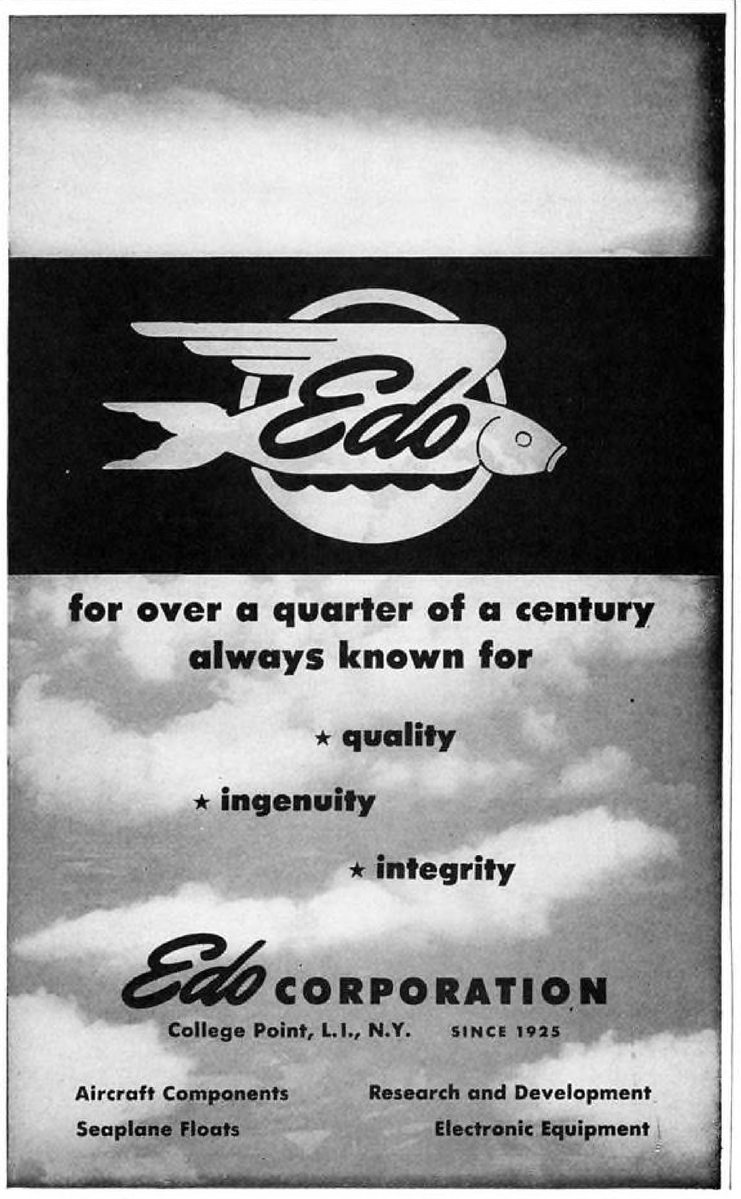
IAS Papers Reflect Complexity

Specialized complexity of the aircraft industry was reflected in the program listings and papers presented at the twenty-first annual meeting of the Institute of the Aeronautical Sciences in New York last week.

Greatest emphasis was shared by aerodynamics and avionics, with three sessions in a day-long program for each subject.

The meeting ran the gamut of aviation from sailplanes to space travel and from skin friction to solar activity. Individual meetings of the IAS were devoted to flight propulsion, aircraft design and structures. Other sessions on rocket propulsion, meteorology, aviation medicine, motorless flight, safety and rotating-wing aircraft were held in cooperation with the professional groups representing those phases of aeronautical science.

Aviation Week presents on these pages the available summaries of the technical papers given during the four-day session. Because of the length of this material, it will be run in parts, of which this is the first.



Flight Propulsion

► **Stall-Flutter in Cascades.** Fernando Sisto, Wright Aeronautical Div., Curtiss-Wright Corp.

Assuming the complex of aerodynamic reactions to be small compared to blade inertia and elastic forces, some results from nonlinear mechanics are utilized to develop a convenient method of studying stall-flutter oscillations in a new method of attacking the problem.

Data are presented from an exploratory experimental investigation in a "two-dimensional" cascade in which one blade and later three blades are flexibly mounted. The variation of flutter amplitude with stream velocity and mean incidence is obtained for angles of attack near the static stall. Experimental determinations are given for three different gap/chord ratios. The motion is predominantly torsional.

Results confirm certain deductions from the nonlinear theory concerning transient behavior and equilibrium flutter amplitudes, or "limit-cycles." The effect of cascading is consistent with the assumed stall-flutter mechanism. Other qualitative results confirm the essentiality of adopting this general approach in order to explain the gross features of stall-flutter phenomena.

► **Stall and Surge in Axial-Flow Compressors for Jet Engines.** M. C. Huppert and W. A. Benser, Lewis Flight Propulsion Lab., NACA.

Blade failures attributable to resonant vibrations excited by rotating stall have been experienced in single- and multi-stage compressors.

A stage stacking analysis has shown that rotating stall will exist over a large portion of the compressor map at low speeds but will be instigated almost simultaneously with compressor surge at high speeds.

In the stage stacking analysis no deterioration of stage performance due to unsteady flow resulting from stall of adjacent stages was considered. In general, the pressure drop at the stall point is believed to be much larger than indicated by an analytical formulation of compressor performance.

Compressor surge is attributed to a limit cycle operation about the compressor stall point, and, as indicated in a few compressor tests and in jet-engine tests, a small compressor discharge receiver volume may result simply in stall of the compressor without the cyclic characteristics of compressor surge. In this event, engine operation will be limited because of the large drop in performance accompanying compressor stall.

► **Aerodynamic Interference Between Moving Blade Rows.** Nelson H. Kemp, Graduate Student and Research Asst., and W. R. Sears, Director, Graduate School of Aeronautical Engineering, Cornell University.

This is a brief report on an investigation of unsteady aerodynamic effects in a typical stage of an axial turbomachine, caused by the relative motion of the stator- and rotor-blade rows. The problem is attacked from the standpoint of the theory of thin airfoils in nonsteady, incompressible, inviscid flow.

The method of analysis is an approximate one, based on the assumption that the nonsteady part of the circulation about any blade is small compared to the steady part.

Results include expressions for the nonsteady components of lift and moment on stator and rotor blades, expressed as ratios to the steady values. The rate of transfer of energy to the downstream wake pattern is also obtained.

Numerical results are presented for some typical configurations representing compressor stages. From these examples it appears that the nonsteady forces may be of appreciable magniture (e.g., 18 per cent of the steady values), especially when the entry of the rotor blades is not "shock-free." The magnitudes of unsteady effects depend strongly on the distance between the blade rows.

Structures

► **An Exact Solution for the Buckling Load of Flat Sandwich Panels with Loaded Edges Clamped.** S. V. Nardo, Asst. Prof. of Aeronautical Engineering, Polytechnic Institute of Brooklyn.

This paper presents an exact solution for the buckling load of flat rectangular sandwich plates whose loaded edges are clamped and unloaded edges simply supported. Method of solution is applicable for the case in which unloaded edges are clamped and loaded edges simply supported.

The solution is based on small deflection theory, and it is assumed that stresses are always below the proportional limit. The material for faces and core is considered isotropic. Three equations of equilibrium, derived by means of the principle of virtual displacements, from the starting point of the theory. The equilibrium equations are partial linear differential equations with constant coefficients; two are of the second order, and the third is of the fourth order. The equations of equilibrium and sixteen boundary conditions are satisfied identically.

Numerical calculations have been made for the case of loaded edges clamped. Design charts are presented which give the buckling load as a function of plate aspect ratio and the ratio of core to plate thickness. Each chart is valid for a particular value of a parameter representing the ratio of shear rigidity to bending rigidity. Values of this latter parameter are chosen to span the range encountered in most practical applications.

► **A Stress Analysis of Sheet Stringer Panels with Cutouts.** Harvey G. McComb, Langley Aeronautical Lab., NACA.

A method is presented for determining the stresses in axially loaded sheet stringer panels having cutouts. The method is based on the use of unit perturbation solutions that are appropriately superposed to give the effects of the cutout on the stress distribution that would exist with no cutout. The analysis of stringer reinforcements and doubler plates is carried out in a similar fashion.

► **The Creep Deflections of Beams and Columns.** Yoh-Han Pao, Asst. Prof., Dept. of Engineering Mechanics, and Joseph Marin, Prof. of Engineering Mechanics and Research Prof. of Engineering Materials, The Pennsylvania State College.

This paper reports on the development of a theory for determining the creep de-



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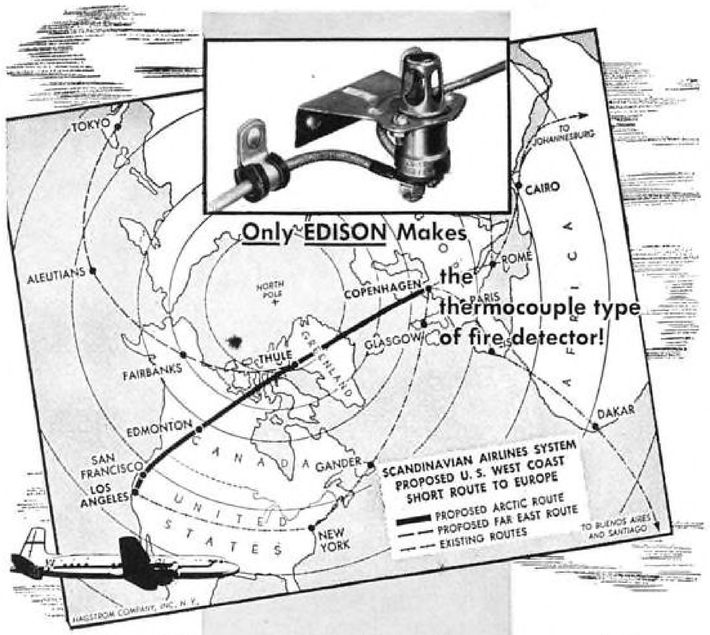
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flection of beams, based on assumptions that are in better agreement with the actual behavior of materials. The theory is applied to the case of the creep deflection of columns, and the differential equations and solutions obtained are discussed in the light of previously published solutions of this problem.

► **Compressive Buckling of Plates Due to Forced Crippling of Stiffeners.** P. P. Bijlaard, Consultant and Prof. of Struct. Engrg., Cornell Univ.; and G. S. Johnston, Structures Engr., Methods and Allowables Group, Bell Aircraft Corp.

A method of analysis is presented for determining critical and ultimate compressive stresses of multiweb beams and skin-stringer panels which are subject to a forced crippling type of buckling. This type is characterized by skin buckling across the stiffeners, forcing them to distort locally.

The method considers the flexibility of the stiffener flange and shows an appreciable reduction in allowable stresses from those determined by conventional analyses, when a combination of low ratio of unsupported skin width to thickness and small gage stiffeners is used.

It is believed that this is the first theoretical analysis for this mode of buckling. The use of the analysis is explained, and design charts are included to simplify the calculations of the allowable stresses for numerous cases. The validity of the theory is confirmed by test results.

Aircraft Design

► **Some Basic Concepts for Analyzing Dynamic Flight-Test Data.** Harold Klein, Aerodynamics Engr., and Raymond Sedney, Aerodynamicist, Douglas Aircraft Co., Inc.

The problem is finding, through the use of observed data, the coefficients of the differential equations that describe a dynamic system. This problem occurs in the determination of the aerodynamic stability derivatives of an airplane or missile from flight-test data. There is a maximum number of coefficients which may be determined. A method is given for finding this number, and conditions are given under which the maximum number is obtained. These results are summarized in a working rule and applied to two examples.

► **The Structural Tail-Load Problem—Theory, Tests, and Criteria.** Richard K. Koegler, Head Engineering Br., Flight Research Department, Cornell Aeronautical Lab.

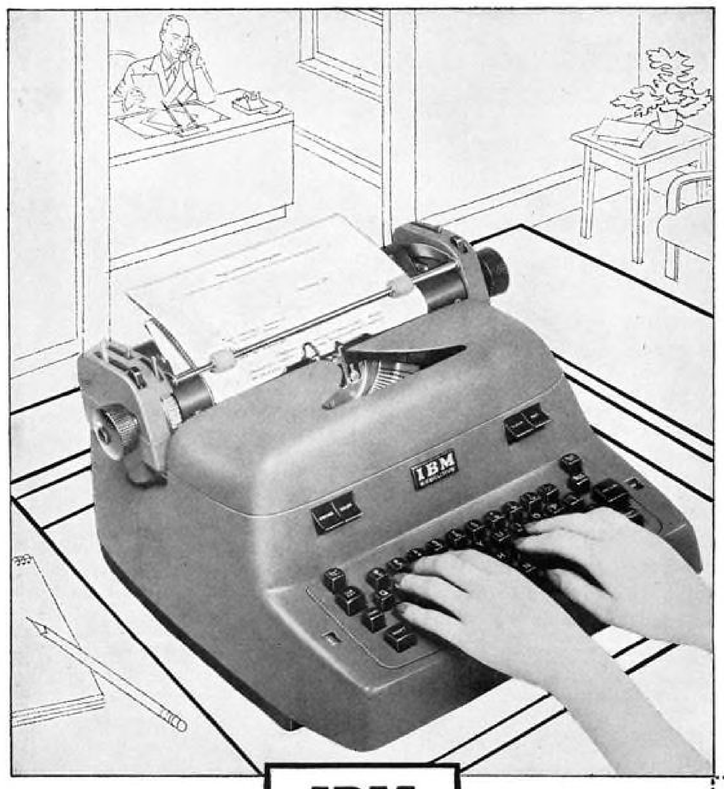
Tail loads can be satisfactorily determined from present linear stability and control equations and calculation methods for all cases except those involving extreme angular excursions. Accuracy is dependent largely on accuracy of stability derivative determination.

Current horizontal tail-load criteria fall into three general categories, and statistical data on time histories of load factors or motions are needed in all three cases. Such data, if correlated with stability characteristics, could lead to simple rational criteria.

Vertical tail-load criteria require statistical data on loads and maneuvers for further improvement, and a possible simple recorder

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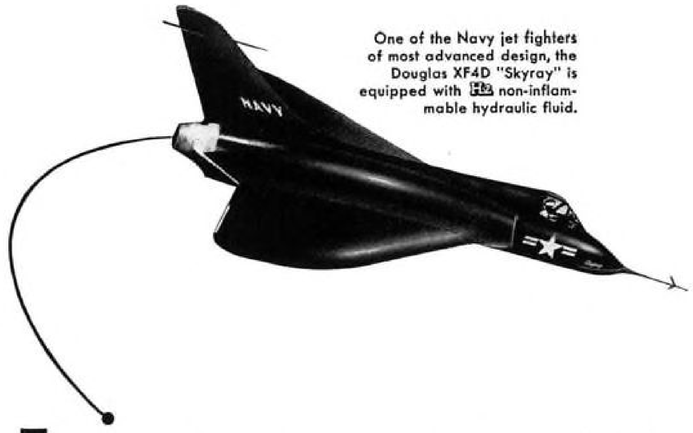
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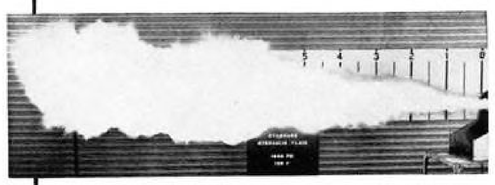
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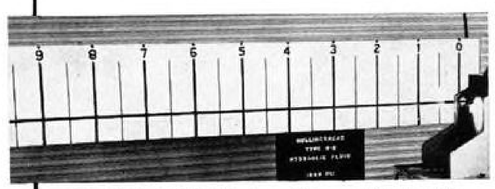
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for this purpose is discussed. A study of complete equations of motions for rolling pull-out calculations is discussed.

Literature on spanwise distributions of horizontal tail loads shows that a reduction in loading near the fuselage should be assumed. Asymmetrical loadings are briefly mentioned.

Literature on buffeting shows its prevalence and significance. Recent studies of rational methods of treating this problem are discussed briefly relative to needed data and possible applications.

Aeroelasticity and nonstationary aerodynamic effects are briefly discussed.

►**Notes on the Analysis and Design of Multipost Stiffened Wings.** D. M. Badger, Group Leader, Structures Research and Development Group, Northrop Aircraft.

This paper discusses an unconventional type of wing construction which utilizes spanwise rows of vertical posts to stabilize the compression skin against buckling by tying it to the inherently stable tension skin. This construction offers two manufacturing advantages: (1) additional working space gained through the openings between the posts and (2) fewer internal fasteners necessary to attach posts as compared to shear webs.

Stringers installed along the lines of posts are needed to achieve high buckling strengths and to prevent an undesirable type of buckling involving both tension and compression skins. However, these stringers need be only one-tenth as stiff as stringers acting alone.

Theory recently developed by the NACA is interpreted, and the results of large-scale static tests conducted at Northrop Aircraft, Inc., to substantiate the design of a complete poststiffened wing are discussed.

RPI to Study Airflow By Electric Analogy

An electric tank filled with current-conducting fluid will be used to simulate air-flow around an object by measuring the electrical potential in the solution at Rensselaer Polytechnic Institute, Troy, N. Y.

Major study problem for the new tank will be flow conditions around fluttering airfoils.

The project is under the sponsorship of the USAF Research and Development Command, Office of Scientific Research.

Original research in France developed the electrical analogy technique. The French studies showed that electrical potentials measured in conducting fluids are mathematically equivalent to pressures in actual airflow. A technique for two-dimensional analysis has been perfected by the French, presumably at ONERA, the equivalent of our NACA.

The RPI tank will be constructed to study three-dimensional flows as well as the two-dimensional problems. Dr. Paul Lieber, of the RPI staff, is the principal investigator on the project.

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Aircraft Common Stocks
1952 Market Action

	Range High	Range Low	1952 Year-End Close	Increase or Decrease From 1951 Close	% Change
Beech	$16.00	$12.00	$14.50	$1.75	13.7
Bell	23.00	14.75	21.25	8.50	66.5
Boeing	41.25	31.37	40.25	15.62	65.0
Cessna	8.62	5.50	7.75	1.0	14.8
Convair	20.87	16.50	20.37	3.12	18.2
Curtiss-Wright Common	10.00	7.75	8.37	(0.87)*	(9.5)*
Douglas	65.50	52.00	62.50	4.87	8.5
Fairchild Engine	7.75	5.75	7.37	0.25	3.5
Grumman	31.37	23.25	25.75	2.25	9.5
General Dynamics	45.62	24.50	42.75	16.12	60.6
Lockheed	24.62	18.37	22.62	0.50	2.2
Martin	16.00	8.87	15.12	2.87	23.4
McDonnell	21.37	18.00	19.62	——	——
Northrop	15.50	11.62	13.25	(1.50)*	(10.0)*
North American	17.87	15.00	16.25	0.50	3.2
Republic	22.12	13.62	19.87	6.00	43.5
Ryan	12.00	9.00	12.00	2.00	20.0
Sperry	45.35	31.50	42.62	9.37	28.0
United Aircraft/Common	38.50	28.00	38.00	6.37	20.1

* *Decreased.*

Value of Aircraft Stocks Goes Up

Capital appreciation was general last year, some aviation common shares rising more than 60%.

Aircraft equities, as a group, treated their stockholders well during 1952 from the standpoint of capital appreciation. An AVIATION WEEK compilation of the market action of all major aircraft stocks for the year reveals higher quotations in virtually every instance. Substantial gains are widely sprinkled throughout the list.

The year-end is a convenient point for financial statements and measuring results in almost every form of business enterprise. It lends itself to evaluating investment performance of equities representing the individual companies involved.

But, logical as this may appear, actual events and operations depicting completed transactions or contracts for the aircraft industry do not always conform or fit into neat fiscal patterns as measured by the calendar year, and it is often necessary to qualify investment appraisals made in terms of a calendar year. Nevertheless, standard practice has established these calendar year measurements.

▶ **Nineteen Studied**—The accompanying table reveals the market range, 1952-year-end close, and net change from the 1951 year-end of equities of 19 leading aircraft enterprises. Price appreciations range from a low of 2.2% to a high of 66.5%.

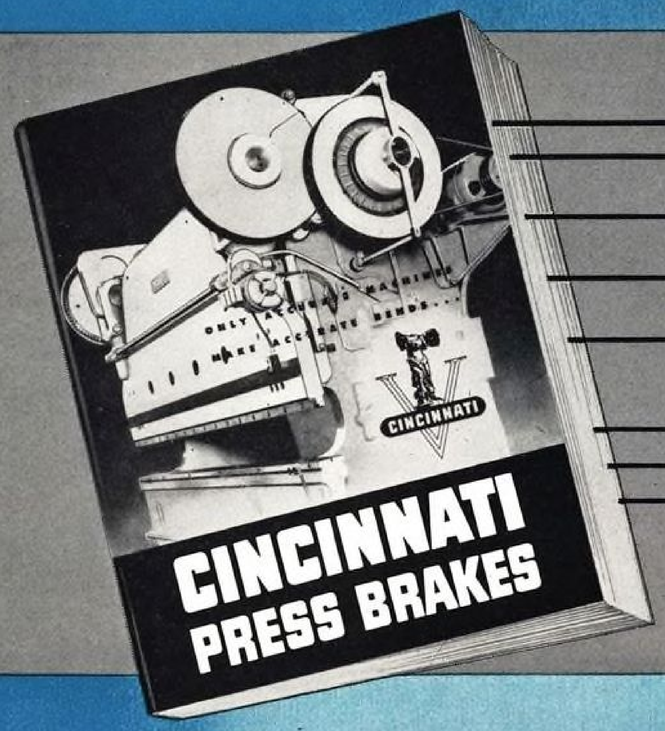
Only two companies, Northrop and Curtiss-Wright, show a decline in the market price of their junior equities for the year.

McDonnell, which was listed on the New York Curb (now American Stock Exchange) early in 1952, remained unchanged in price from that prevailing at the 1951 year-end. By contrast, the market as a whole, as reflected by the New York Times average of 50 stocks, increased by 10% during 1952.

▶ **Selectivity Continues**—In a broad measure, the market actions of the individual aircraft equities reflect the position, earnings and potential of the separate companies represented. It is significant that there is a complete lack of uniformity in the price variations of the individual aircraft equities. Selectivity is very pronounced and is an industry characteristic that has been prevalent in the past.

The greatest price appreciation of any aircraft equity belongs to Bell Aircraft. This gain of 66.5% is after

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adjustment for the two-for-one stock split effected early last year. Close behind is Boeing with a gain of 65%, adjusted for a one-for-two stock split last year. In third place is General Dynamics (included because of the major contribution made by Canadair) with a price increase of 60.6%.

From that point, there is a wide gap until Republic's 43.5% increase is reached. Again, there is a wide spread before the 28% gain registered by Sperry is noted. The rest of the list tapers down from that point.

It is noteworthy that most of list finished 1952 pretty much at the top of their range of last year. Grumman is a notable exception. A study of the table also indicates that during 1952 almost all of the equities shown did not sell much below the closing quotations recorded at the 1951 year-end.

▶ **Investment Prospects**—As revealed here recently (Jan. 5, p. 18), considerable stability of operations for the aircraft industry has led to sustained earnings and hence the maintenance of continuing and liberal dividend disbursements.

There is no doubt that the earnings and dividends have improved the investment standing of aircraft equities. No longer are they regarded as poor risks because of the past uncertainties and the sharp fluctuations of military appropriations. More investment firms have begun to realize the continuing basis of high-volume production now inherent in the aircraft industry. All this has simply been reflected in the market price of aircraft equities.

The wide disparities in past market fluctuations of the individual companies is a vivid reminder that not all units in the industry will participate evenly in the business and earnings to be developed in the future. Technological progress in the aeronautical arts, shifts in the military procurement policies of the services, and the engineering and managerial abilities of the companies themselves remain as the major elements influencing the trend of leadership within the industry.

As future patterns evolve, the market place will continue to serve as a sensitive barometer of the relative progress, or lack of it, among the separate aircraft companies. —Selig Altschul

McDonnell 6-Mo. Report

McDonnell Aircraft Corp. reports a record backlog—$460,055,266—as of Dec. 31, end of first half of its fiscal year.

The company earned $1,831,620 on sales of $58,332,531 for this six-month period, compared with $1,407,775 on $34,325,859 for similar period last year.

This year's figures are after deducting $526,770 amortization for emergency facilities.

20th Annual "Inventory of Air Power" COMING MARCH 2nd

No. 1 Aviation Advertising Opportunity of 1953

This is the established Yearbook of Aeronautical Business. More aviation men will read this issue . . . more aviation suppliers will advertise in this issue . . . than in any aviation magazine of the year. As a manufacturer, it offers you a prime medium for informing the entire industry, civil and military, of your products and services. Note below the editorial scope of this report by the editors of AVIATION WEEK.

MILITARY AVIATION — On-the-spot reports from Korea by AVIATION WEEK's correspondent will provide a picture of Military Aviation in action. This section includes design requirement data, information on the current program and production progress.

GUIDED MISSILES — The great progress that has been made in this rapidly developing Aviation Field by the Industry and Air Force will be reported in detail. Approved information will also be incorporated in special first hand reports by AVIATION WEEK Editors.

PRODUCTION FOR AIR POWER — World requirements and commitments plus the growing program of the U. S. Air Force indicate the huge production task now being fulfilled by our Manufacturing Industry. The Inventory Number will analyze our production picture.

AVIONICS FOR AIR POWER — With Avionics furnishing the brains, the eyes and ears of today's Military Air Force, this constantly developing 100 percent Aeronautical Market will come in for special attention in the "Inventory of Air Power" issue.

NORTH ATLANTIC AIR POWER — The NATO build-up in terms of Air Power imposes additional and heavy loads upon our productive capacity. McGraw-Hill correspondents in the key cities of these nations will report and interpret each nation's requirements.

RESEARCH — What is the Research budget? What are the chief areas of Research? What is the trend of expenditures? What new facilities are needed? The 1953 "Inventory of Air Power" issue will examine Aeronautical Research and report on these questions.

COMMERCIAL TRANSPORTATION — The vast, ever-growing Transport Industry which is fast changing the traveling habits of the world's people will be given a special section for detailed analysis. The latest information and statistics will be a part of this section.

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Indicating Pyrometers

for temperature testing in the laboratory or in the plane...

Constructed with the same care as our aircraft temperature indicators, these pyrometers bring "aircraft quality" to the test engineer.



MODEL 58PY, above, has been used extensively by leading motor car manufacturers for road testing on the "Proving Grounds" — where performance counts. Housed in rectangular bakelite case, has 6" hand drawn scale and is fully compensated for ambient temperature. Made in ranges listed below, with suitable thermocouple materials.



MODEL 23B, left above, has same type movement as our aircraft pyrometers. Housed in flanged, 4" round, bakelite case for panel mounting.

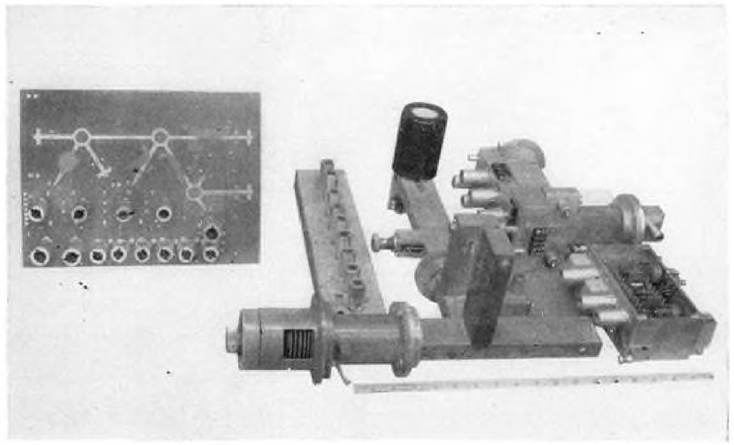
MODEL 20B, right above, has same 3" steel case and same movement as our aircraft panel indicators. Both are fully cold-end compensated and available in standard ranges listed, with suitable thermocouple materials.

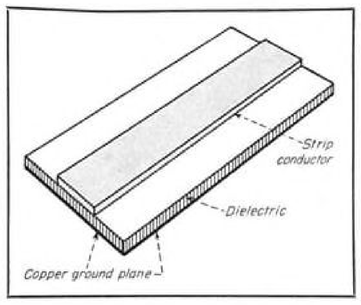
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Zero to 400, 600, 800, 1000, 1200, 1600, 1800, 2000 and 2500.
CENTIGRADE
Zero to 200, 300, 400,. 500, 600, 800, 1000, 1100 and 1400.

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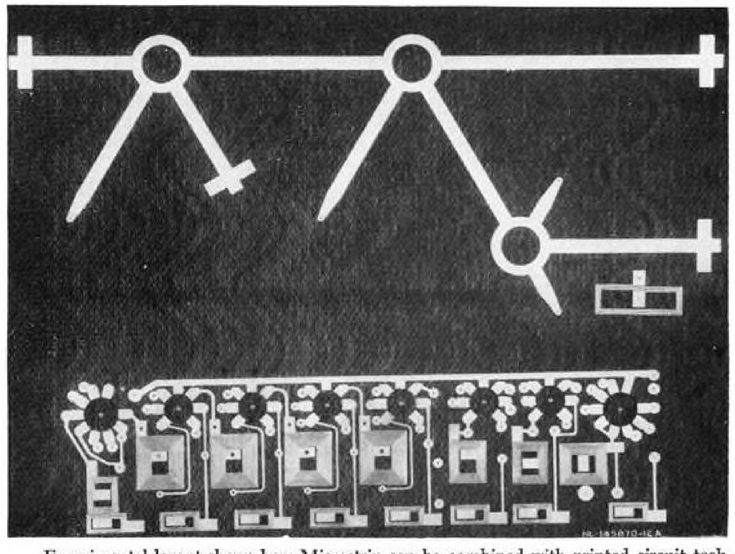
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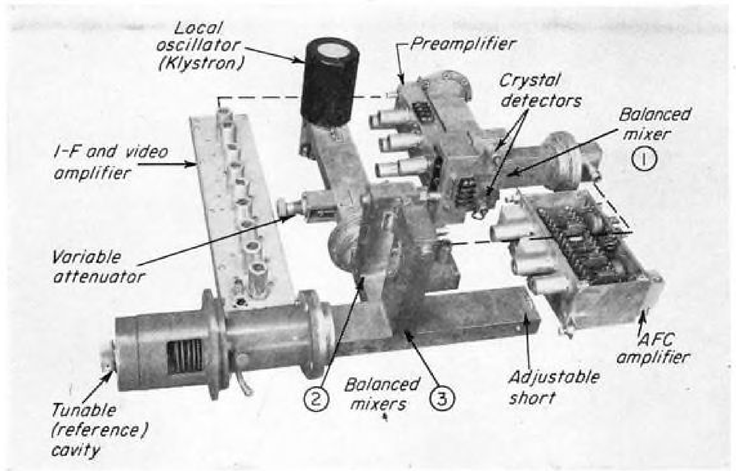


1 The weight- and space-saving capabilities of the recently announced Microstrip technique of fabricating radar wave guides and components are illustrated here. Federal Telecommunications Laboratories (an IT&T affiliate) has constructed an experimental Microstrip version (above left) of the R-F and I-F portions of the 5,000-mc. receiver (above right). By replacing conventional components with Microstrip parts, FTL brought weight down to 4 lb. from 30 lb. Technique uses conductor separated from ground plane by dielectric (sketch, left).

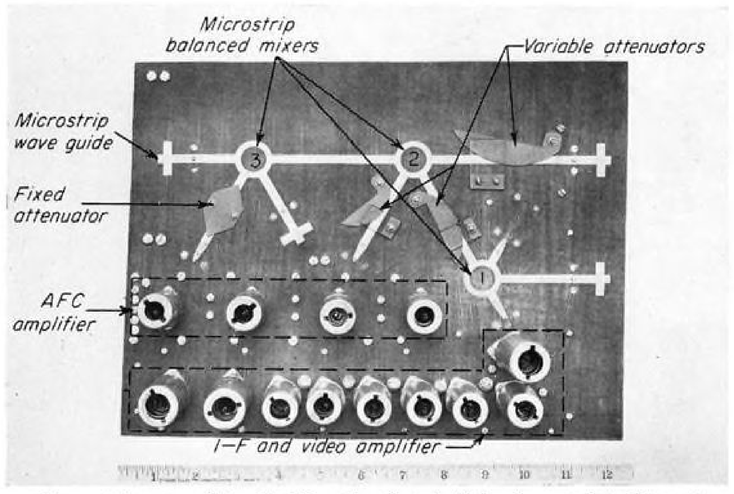
Microstrip Brings the Size Down



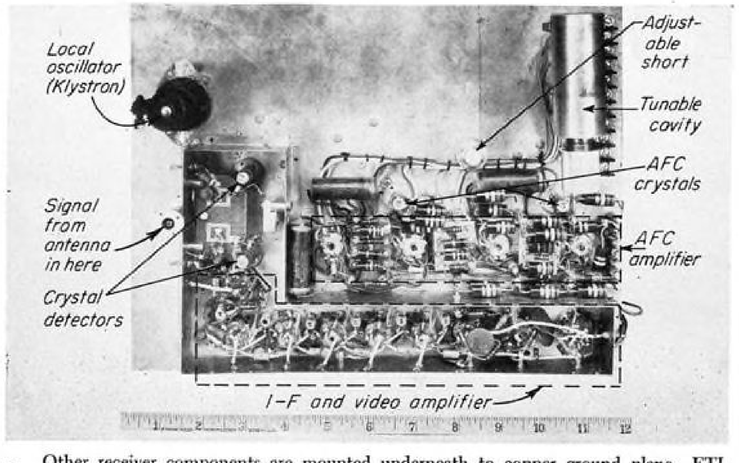
2 Experimental layout shows how Microstrip can be combined with printed circuit technique that forms I-F transformers and interconnects resistors, etc.



3 Comparison of conventional receiver (above) and Microstrip version (below) shows functional similarity. Weight and space economy appeal to industry.



4 Compact layout possible with Microstrip offsets its higher losses and, in this receiver, eliminates need for preamplifier between crystal mixers and I-F amplifier.



5 Other receiver components are mounted underneath to copper ground plane. FTL says Microstrip components cost only one-hundredth the cost of conventional devices.

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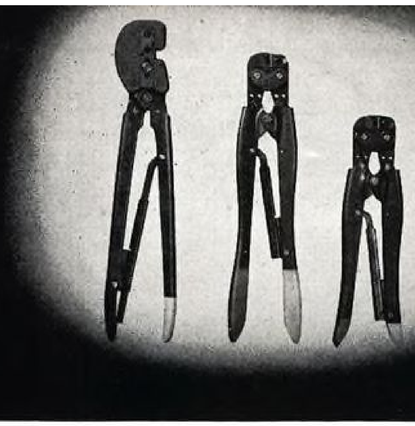
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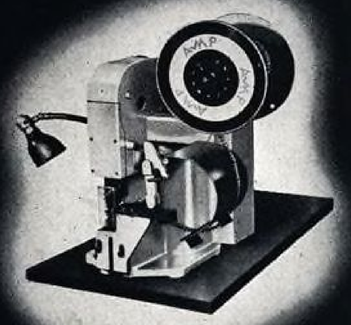
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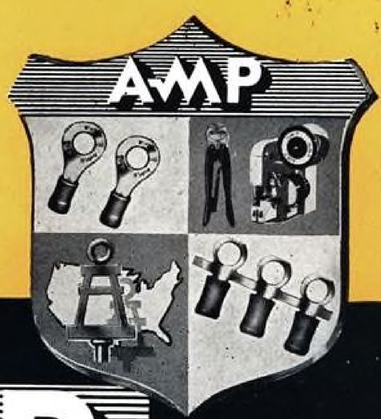
All the gadgets or combination tools in the world will not insure the correct installation of your wire terminations day in, day out, on the line. It's the extra factor of assurance that counts! AMP tools and terminals are made to use together. They're made so that you can be *sure* that you have a correctly installed termination. AMP application tools and dies and automatic machines are so designed that at the point of application you can control accuracy and uniformity within ±.003''. Remember: In wire termination there is no short cut to precision and foolproof production!

Shown below: AMP CERTI-CRIMP* hand tools—will not release until proper crimping pressure has been reached. (Below right) the AMP INSPECTO-MASTER* gives continuous inspection at point of terminal application. Write to AMP for information about these and other recent developments in wire termination.

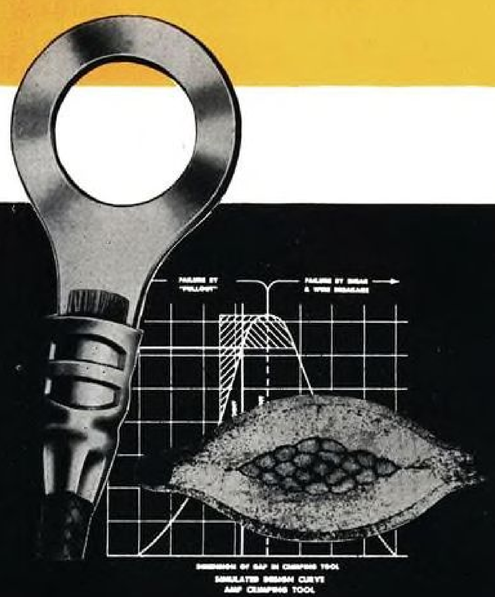
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► **F-84F Gets New E-9 Autopilot**—Republic Aviation's sweptwing F-84F will use the new Westinghouse E-9 autopilot, a stripped-down, lighter-weight version of the W-3A autopilot used on the Lockheed F-94C (AVIATION WEEK Oct. 13, p. 46). Because of the F-84F's ground-support mission, the E-9, unlike the W-3A, won't incorporate an ILS approach coupler or be designed to tie in with a radar fire control system. E-9 designation is USAF nomenclature and reflects the fact that E-9 is purchased by USAF, whereas the W-3A is sold to Lockheed directly.

► **Westinghouse Buys Computers**—Westinghouse Electric Corp. has purchased several Boeing Aircraft analog computers for system stability studies of new aircraft voltage regulator designs at its Lima, Ohio, plant. Computers will also be used to study regulator performance in multiple-generator power systems as well as for mechanical problems such as designing vibration dampers and springs.

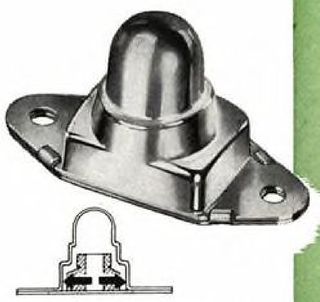
► **Douglas Seeks Heat Relief**—Douglas Aircraft Co. is investigating a mounting rack, which has cooling air ducts connected to each piece of equipment. A. W. Rebard, Douglas engineer, says the company hopes to raise cooling efficiency from present 3% to at least 10%. Avionics-generated heat from DC-7 equipment rack is 3,500 watts, double that of early DC-6's. De luxe over-water aircraft may find that they will have to dissipate 7,000 watts when they go into operation in near future.

► **Arinc Issues Spec on Crystals**—Aeronautical Radio, Inc. (Arinc), has released Specification No. 401, its first spec covering crystal units used in airline radio equipment. New spec generally follows military specs on crystals but calls for tighter frequency variation tolerances (±0.0025%) when operated in a more limited range of ambient temperatures (—200 to 70C). Arinc spec follows MIL spec in calling for ±0.005% variation for wider temperature range of —40C to 90C.

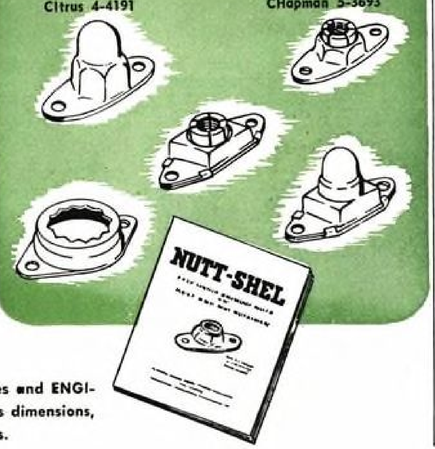
► **Aerovox Buys Acme**—Aerovox Corp., large manufacturer of capacitors and precision resistors, has purchased Acme Electronics, Inc., of Pasadena, Calif. Acme, which makes wave filters, bandpass filters, power supplies, toroidal inductors and magnetic amplifiers, will be operated as a subsidiary.

► **Sperry Tries Mag-Amplifiers**—Sperry Gyro has substituted magnetic amplifiers for vacuum tubes in one axis of its A-12 autopilot on an experimental basis. Company says that mag-amplifiers are "being incorporated in several different aircraft control systems."

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FLOATING DOME NUT
cut installation time
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This nut floats 1/32" in all directions and is interchangeable with fixed type. Time is saved because it does not require accurate placement of plate nut over hole.

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Meets applicable requirements of AN-N-10 specification.

WRITE FOR SAMPLES
Write on your letterhead for samples and ENGINEERING MANUAL. Manual contains dimensions, tolerances and material specifications.



RB-66 AUTOPILOT GYRO

Newly developed gyro, which can be remotely caged and uncaged, will provide the vertical reference for Minneapolis-Honeywell's new E-11 automatic pilot, slated for use on the Douglas RB-66 twin-jet bomber (Aviation Week June 9, 1952, p. 28).

ENGINEERED FOR RUGGED ASSIGNMENTS!

3 PHASE
DIRECTIONAL POWER RELAY
FOR AIRCRAFT POWER SYSTEMS UTILIZING PARALLEL CONNECTED 3 PHASE, 4 WIRE ALTERNATORS



Provides absolute protection for generators and connected loads—

This relay is designed for use on power systems of two or more 208/120 volt, 4 wire, three phase, alternators operating in parallel. Its function is to protect the system by removing an alternator in the event of a drive failure, a shutdown of the drive without prior disconnection of the alternator, a balanced three phase fault within the alternator or a high resistance three phase fault between the relay and alternator. The relay operates if reverse power in any phase exceeds 1500 watts. It has an inverse time characteristic. At 2000 watts the relay operates in 0.4 seconds.

Completely environment-proofed to meet critical requirements—

Designed for critical aviation applications, all components except the current transformers are mounted on a single shock-mounted chassis with all items including wiring 100% potted for complete immunity to environmental conditions or changes. Rugged cable connectors permit quick, easy replacement of the entire unit or current transformers. This equipment is readily adaptable to power systems of other voltages and frequencies.

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AVIATION SAFETY

ALPA Enunciates Safety Policy

Sayen details pilots' views and the organizations they have set up to deal with safety problems.

The most comprehensive policy statement on aviation safety that has been enunciated by the present administration of the Air Line Pilots Assn. has been released by the president, Clarence N. Sayen.

Sayen issued the statement originally in an off-the-record address at the annual meeting of the Flight Safety Foundation in Bermuda.

Sayen disclosed that ALPA membership is now about 8,000 active pilots and approximately 2,000 inactive pilots and co-pilots employed or formerly employed by 41 domestic and international U.S. flag airlines.

His following statement describes the union's organizational structure for processing of safety problems.



Clarence N. Sayen

Why ALPA Needs A Safety Organization

The airline pilot is the primary consumer or user of the products, gadgets, procedures, or innovations that are designed to improve air safety in commercial air transportation. This explains one reason why he is concerned with safety and maintains an independent organization dedicated to the improvement of air safety. There are several other basic reasons.

• **The airline pilot has a primary responsibility for safety to his passengers, and the general public which cannot be delegated to anyone . . . neither his employer, the federal aviation agencies, nor any other person or agency.** The airline pilot cannot, in good conscience, and in face of this responsibility, accept a product, gadget, procedure or innovation of which he has any doubt as to its safety.

• **The airline pilot has a natural interest in the development and growth of air transportation.** Air transportation is his business. His own welfare depends on its prosperity. Since, for initial employment, an airline pilot is old at 30, his professional career is determined with his initial employer when he reaches 30.

Unlike even the president of the company, he cannot readily transfer his knowledge and skill to another company; therefore, his "record" as a professional airline pilot is his stock in trade. He is not likely to look lightly at gadgets, innovations, or revised procedures that might fail him at a critical moment. He cannot in his primary responsibility to the public or to his professional career afford "experimentation" on the job.

• **The professional airline pilot is interested in his own self preservation and economic gain.** One of the greatest safety assets of commercial air transportation is the fact that most airline pilots are conservative family men.

ALPA's Safety Functions And Projects

1. Continuous Monitoring of all Commercial Aviation Facilities.

Some airline pilot utilizes practically every commercial aviation facility in the world (outside of Russia) every day. In addition, practically every type of commercial aircraft, aircraft component, radio, commercial airport, etc., is utilized daily by a professional pilot. There is available, therefore, through this means a continuous monitoring of all aviation facilities. By the means of routine pilot reporting and special incident reports, the aviation industry has available its greatest source of information to determine that safety problems exist.

I conceive one of the primary safety functions of the airline pilot to be the discovery and reporting of air safety problems. Anything that interrupts or

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THE NEW GUARDIAN LINE OF

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MEETING OR EXCEEDING THESE SPECIFICATIONS:

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. . . FOR THE first TIME

sealed Solenoid Contactors are designed and produced (exclusively by Guardian) to be completely assembled, adjusted and tested before the sealing operation. The envelope is not a part of the structure, thereby enabling these Guardian Solenoid Contactor units to surpass all tests specified. Resonance tests meet MIL, AN and JAN requirements for all jet aircraft. Test charts available upon request.

Designed for Production

INTERCHANGEABILITY

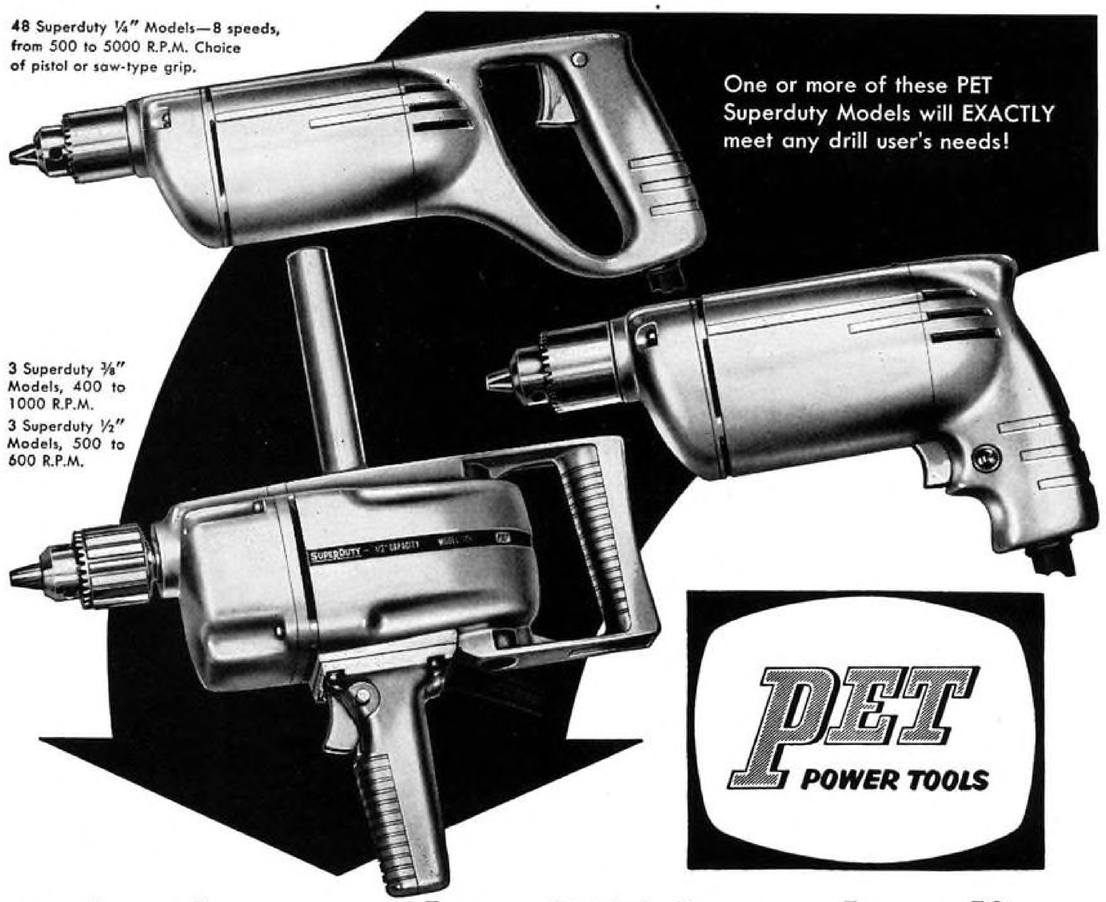
The ever-growing need for increased power in aircraft circuits now demands 50 Amp. circuits where heretofore 25 amps. or even 10 amps. were sufficient. *Interchangeability* of these Guardian units permits designers to replace all 10 ampere and 25 ampere (power or time delay) contactors with 50 ampere Guardian sealed contactor units without mechanical drafting changes excepting those circuit connections which, in lower current use, are normally flexible leads. The 100—200—250 Amp. units are *interchangeable* with AN 3360 and AN 3370 contactors both mounting wise and dimension wise. The only required drafting change permits wire connections at top for easy test methods. *Interchangeability* facilitates conversion of older aircraft to modern sealed circuits.

Increasing numbers of aircraft designers specifying extremely high temperatures for controls are able to gain all of these distinct advantages: (1.) Guardian's New Sealed Solenoid Contactors meet or exceed MIL-R-6106, MIL-R-5757, JAN, AN, specifications and will meet or exceed all contemplated MIL-R specifications. (2.) Units pass tests up to 120° C. (3.) They equal or exceed tests for 50 G shock. (4.) Units are furnished wired from the top to eliminate difficulties of inaccessibility during assembly, making it possible to retrieve lost nuts and bolts that formerly dropped into otherwise inaccessible areas. These 100 — 150 — 200 and 250 ampere (28 V., D.C.) units permit torque testing of all connections. Wrongly set torque wrenches highly in excess of specifications will not damage the solenoid or seal. Special units are available with a new Guardian developed insulation that resists cracks, damage or flaws during installation. Insulation does not change test requirements. Units, normally grounded, can be furnished insulated from ground at slightly extra cost.

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And, a wide selection isn't the only thing you'll like about the PET Superduty line. Just plug in one of these drills: feel the vibration-free power as it flows from a dynamically-balanced armature through precision-cut gears. Then you will know you've found a drill that will stand up in rugged service day in and day out—and still come back for more!

For complete details on the best in electric drills—sold at prices that will come as a pleasant surprise—find out the name of your nearest PET Distributor. Write today, to Portable Electric Tools, Inc., Dept. AW-23, 320 West 83rd St., Chicago 20, Ill.

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interferes with the free flow of this information in itself constitutes a hazard.

The ALPA then must perform several important functions to most efficiently render this service:

- **Stimulus must be provided** for continual alertness in the apprehension and reporting of hazards or incidents. The role of the critic must be maintained and must be attractive.
- **Channels must be kept open** and an independent spokesman provided through which reports may be properly channeled and effectively made known.
- **A medium must be provided** for following up on reports to see that action is taken. The conscientious individual who never sees results from his work becomes frustrated and the work stops. He may cease to bother people with his complaints and the level of safety will drop accordingly. Complacency has never sponsored progress.

2. Incident Reporting.

It is not easy to keep the channels open for incident reporting. Both officials of government agencies and airline officials have taken actions at times which almost completely shut off incident reporting on some airlines, and drastically reduced it throughout the industry. They, therefore, created a hazard of greater magnitude than that which they were at the moment trying to eliminate. . . . (A detailed report of President Sayen's views on incident reporting was carried in AVIATION WEEK Jan. 12, p. 85.)

3. Special Projects.

Although we conceive the primary responsibility of the pilot to be the discovery and reporting of air safety problems, ALPA recognizes the necessity for the pilot or operational viewpoint being applied in the solution of problems.

Therefore, in addition to the organizational processing of problems at the local, national, and international level which will be described later, ALPA attacks specific problems on a special project basis. This is accomplished by designating individual pilots with specialized training or experience along a particular line as spokesmen and specialists for the Association on a specific subject. Committees are set up to work with the spokesman. The committee and spokesmen have available to them the channels and facilities of ALPA from which to gather information or determine pilot opinion.

By this means, pilot specialists sitting with industry committees trying to find solutions to air safety problems are in a position to represent responsibly the operational or pilot viewpoint. They are also in a position to determine the "consumer acceptance" of the results.

ALPA currently has 18 special projects in progress embracing such subjects as airport lighting, fire prevention, cockpit standardization and others too detailed to describe here.

4. Contract Writing for Safety.

Safety considerations must permeate one other aspect of ALPA's activity—that of establishing the rates of compensation, rules and working conditions for pilots. Since ALPA is by law the collective bargaining agent for practically all of the airline pilots in the United States, ALPA, with the air carriers, largely determines the rules and working conditions of pilots. Extreme care and caution must be exercised that safety is a primary consideration in this activity.

For this reason, among others, active line pilots participate and make the final decisions in all ALPA collective bargaining sessions.

5. Accident Investigation for Safety.

ALPA participates in the investigation of all major air carrier accidents. Standard investigation and reporting procedures have been worked out and are furnished to pilot representatives. Reporting of each investigation made to the president of the Association. Such reports are analyzed by ALPA staff members and pilot representatives for clues that may prevent future accidents.

Recently the practice of reporting the probable cause of the accident has been instituted. In this regard, it should be noted that ALPA readily admits that there are "pilot error" accidents.

However, it holds that no pilot ever erred deliberately or in the interest of self-destruction. ALPA is interested in the reason behind the error and feels that any accident written off as "pilot error" has not been adequately investigated.

For example, did the error originate in design error, fatigue limits, cockpit booby traps, inadequate training program, etc. ALPA feels that this viewpoint must be strongly represented at all accident investigations if the operational aspect is to be thoroughly explored and the maximum learned from each accident.

ALPA's Safety Structure

1. Primary Unit—the Local Council.

The basic unit of the ALPA organization is the local council. At each domicile where a minimum number of the pilots of a particular airline are based, a local council is organized. Each council has a Local Council Air Safety Committee which is charged with the processing of local air safety problems. This may include contacts with the local airline, government, civic, or airport officials. Surveys conducted by ALPA are processed through this Committee.

There are currently 115 Air Safety

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2. Airline Central Air Safety Committees.

The pilots of one airline may have 10, 12 or more Councils. Representatives from each council comprise the Airline Central Air Safety Committee. Problems common to more than one Council or concerning the entire airline are processed through this Committee. There are currently 41 Airline Central Air Safety Committees.

3. Regional Air Safety Committees.

Representatives from the Council Air Safety Committees in a particular region comprise the Regional Air Safety Committee. For example, representatives from 15 Air Safety Committees make up the New York Area Regional Air Safety Committee.

This Committee processes problems which are peculiar to a particular geographical area. Example: the noise problem in the New York area.

4. National Air Safety Organization.

The National Organization of ALPA maintains an Engineering and Air Safety Department through which problems from the 115 Council Air Safety Committees, 41 airlines, or regional committees may be processed. The national organization usually serves as the spokesman on national problems or designates a pilot specialist or pilot committee to speak for ALPA on these matters.

A "draft release" procedure is employed to secure a representative opinion on a subject. Special committees are required to submit their findings for comment to all Council Committees.

The industry representative who feels that he has gauged pilot opinion by the process of speaking to several pilots at random is naive. . . . However, we still occasionally hear the statement, "but I spoke with several pilots and they told me this is what the pilots want."

If you want representative pilot opinion, go through channels to the pilot representatives.

The 12th Convention of ALPA provided for an Annual Air Safety Forum. This will be an annual convention of safety representatives from each airline who will devote their meetings entirely to air safety problems.

International Federation of Air Line Pilots Assns. is a federation of pilot organizations from 20 different countries, with inter-offices in London.

The processing of safety problems of an international nature and representation at ICAO is effected for the member organizations through IFALPA. An annual meeting is held of representatives of the 20 member organizations.

Special study groups are established to deal with individual problems. Study groups are maintained in each geographical area of the world to monitor facilities and represent pilot viewpoint on problems peculiar to the area and concerning which pilots flying continuously in the area will be best informed.

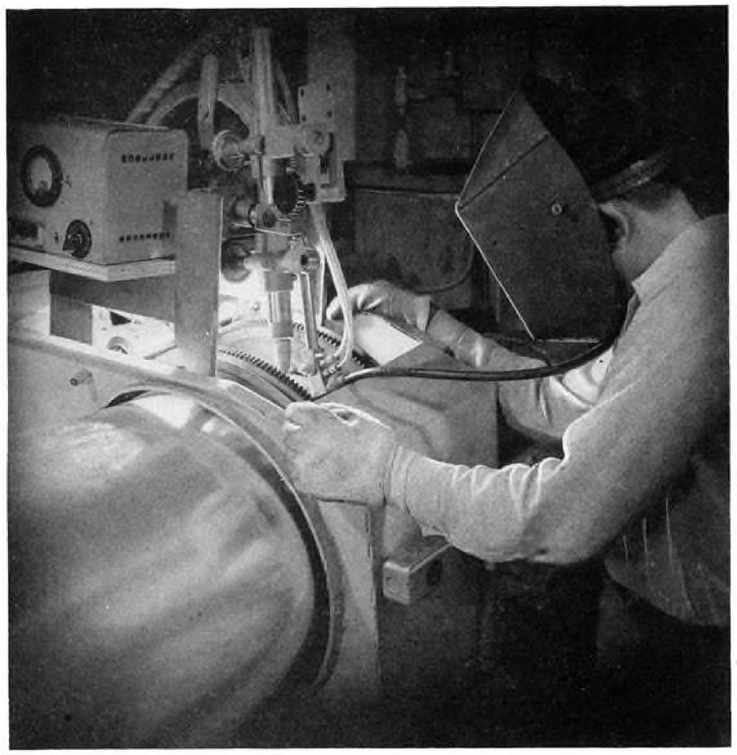
Safety vs. Economics

ALPA represents pilots in their economic problems as well as their safety problems.

We are familiar with the constant complaint of the safety specialist that the airline operator and government agencies too often get their economic and air safety thinking mixed and that safety suffers as a result. It is proper to inquire, therefore, whether ALPA opinions on safety matters are not sometimes dictated by economic considerations.

This question may be answered in two ways.

- ALPA is a strong enough organization to process its economic problems without recourse to the utilization of safety as an argument. Safety decisions may be made without the consideration of utilizing such decisions toward achieving an economic goal.
- But we must be realistic enough to



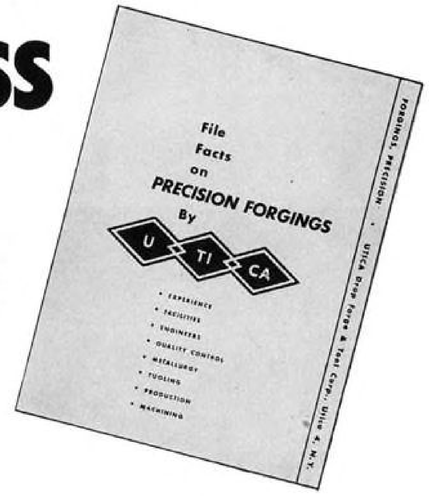
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Here's a project, in Marietta, Georgia, where Lockheed's Georgia Division has a long-range production schedule for B-47 Jet Bombers and a more recent contract for the C-130A Turbo-prop Air Force Cargo Plane. Incidentally, the C-130A is a Lockheed design so you see this is a forward looking concern which provides opportunities for creative talents as well as production "know-how."

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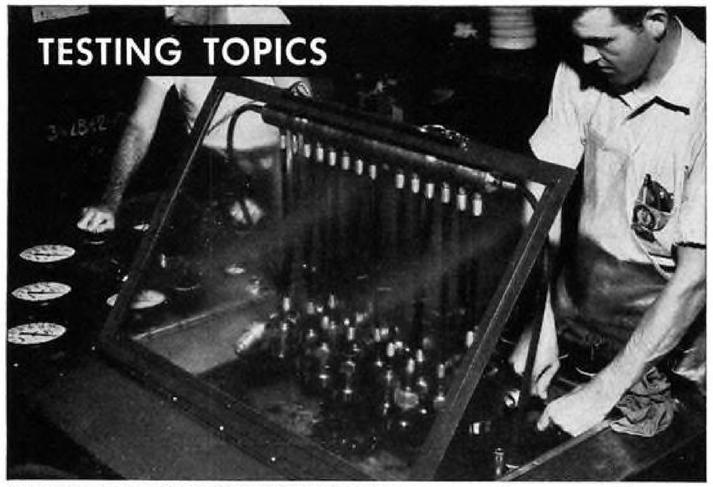
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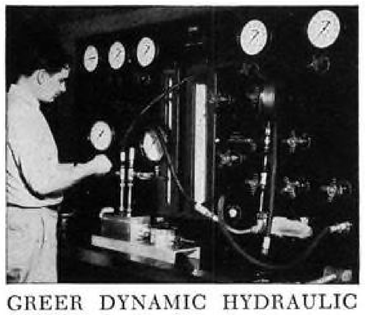


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No one knows the urgency of accurate testing better than the men who build the famous Cutlass and Corsair. It is a fine tribute to the Greer reputation that Chance Vought chooses Greer equipment for vital testing operations.

Again and again, leaders in the aviation field turn to Greer for maintenance and test equipment. Pioneers in this field, Greer has standardized its machines until you can order them for most purposes right out of a catalog (write for your free copy on company letterhead).

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remain cognizant that unresolved economic problems influence safety and must, therefore, be considered. Unresolved problems influence morale. The airline industry is susceptible to "wars of nerves." Low morale adversely affects safety.

We are cognizant of (1) the importance of exercising extreme caution in flight operations during periods of economic crisis or low morale, and (2) the advisability of seeking, as expeditiously as possible, solutions to problems which arise.

If there must be a dispute over an issue, it is better to have it quickly and reach a decision.

The Bilateral Approach

Even a designer of clothespins would not put his commodity on the market without attempting to measure the "consumer acceptance" . . . and then when the commodity comes on the market, the consumer has the prerogative of accepting or rejecting it. Yet, on occasion in the aviation business, we still have new gadgets, standards, and procedures placed into operation without pilot representatives ever having been consulted or informed.

In a recent instance, the gross weight of an aircraft was altered without consultation with or information to the pilot representatives. This despite the fact that gross weight increases alter the performance pattern of the aircraft.

It is my belief that the user viewpoint should be represented throughout the conception, design, testing and adaptation of aircraft, their components, or operational procedures if the maximum of safety value and acceptance is to be achieved. The existence of an effective and responsible association of pilots, having facilities for the dissemination of information and an organizational structure capable of making available responsible spokesmen through whom government agencies and industry representatives may work, is of positive value to accomplish this goal. Through one agency, government and industry may sample the "user viewpoint." Opinions, viewpoints and decisions which are reliable may be secured.

One further point should be made clear on the ALPA viewpoint and organization for safety.

We do not believe that a bilateral approach by the government and pilots, or management and pilots, to safety problems deprives the government official of his authority or the management official of his managerial prerogative. It is simply a more effective way of improving air safety—a responsibility the pilot cannot avoid or delegate nor the government or industry avoid or delegate.

Press manufacturer saves money on tools and gets better finished machining with pre-hardened, free-cutting Carilloy FC Steel

VERSON Allsteel Press Co., of Chicago, now makes the dies for big press brakes from U·S·S CARILLOY FC steel instead of an ordinary die steel. Pre-hardened, free-cutting FC steel enables this important manufacturer to make harder, smoother dies that are easier to produce.

Here's what Verson says about the performance of FC steel: "This steel cuts much cleaner and more easily than the steel we had been using. As a result, our cutting tools last much longer and the dies are not damaged during machining—even though we are using a much harder steel (300 BHN instead of 250 BHN). In addition, we put a smoother finish on the dies.

"Smooth finish is especially important in press brake dies, because metal is literally dragged over the die during forming. With these smoother dies, less pressure is needed to make a bend and the dies do not scratch the metal.

"Since the dies are harder, they work better on high tensile steels . . . often eliminate the need for retreating the dies after use. We're well satisfied with FC steel."



Press brake dies being planed from free-cutting CARILLOY FC steel at Verson Allsteel Press Company. CARILLOY FC is much easier to machine than the steel previously used, so tools last much longer. In addition, it enables Verson to get a smoother finish and to use a harder steel for the dies. As a result the dies give better service.

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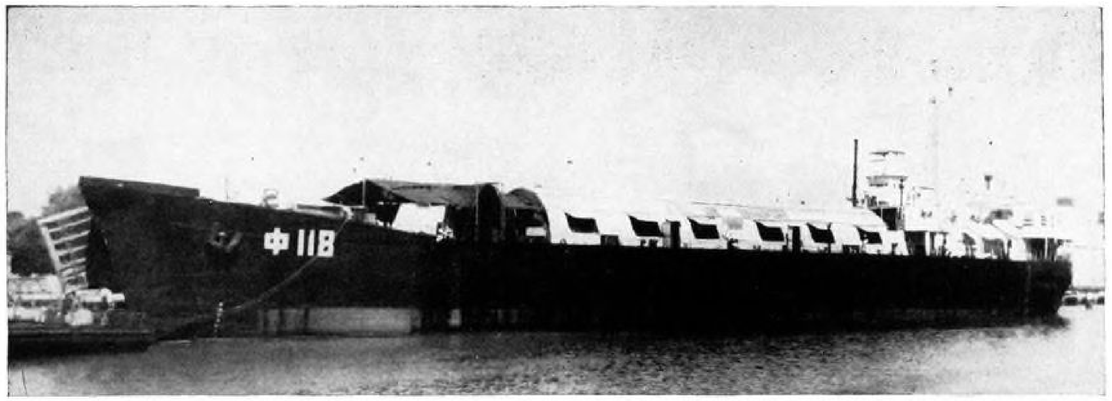
Our experienced metallurgists will be glad to discuss the possible applications of pre-hardened, free-cutting FC steel in your products. Just write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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LST Base Keeps Chennault Line Flying

Ship and 2,000-ton supply barge form floating base that moved airline intact during flight from Reds.

By George L. Christian

Kaohsiung, Formosa—Maj. Gen. Claire L. Chennault's Civil Air Transport line is being kept flying by a maintenance base built on a World War II LST that is tied up at this port on Nationalist China's island stronghold of Formosa. A 2,000-ton barge is the carrier's supply base.

Of CAT's 104-plane fleet, 71 now are in the United States or en route for overhaul after being impounded more than two years while Chennault fought Communist China in British courts for the aircraft that were seized when the mainland fell to Red troops.

Chennault, wartime leader of the Flying Tigers and now CAT chairman of the board, began shipping the aircraft to America after he was awarded ownership of the planes by a decision of the British Privy Council in Hong Kong. The last 17 of the disputed aircraft left Hong Kong for America last month on the U. S. aircraft carrier Windham Bay.

The fleet impounded by the Reds consisted of five DC-4s, five Convair 240s, 30 each of C-46s and C-47s and a PBY Catalina. Whiting Willauer, airline president, estimates their value at $11 million.

Chennault's carrier currently is operating with 23 C-46s, eight C-47s, a PBY and a DC-4.

▶ **Mobile Base**—Willauer told AVIATION WEEK the Nationalist China airline probably is the only carrier in operation that can move itself intact in 48 hours and be ready to operate as soon as a new location is reached.

He says mobility allowed by the LST (landing ship, tank) and barge saved CAT from annihilation by Communist troops at Shanghai, Canton, Hainan and Hong Kong, where the craft almost was lost because the Reds sabotaged the LST steering mechanism.

The LST-barge combination will allow the airline to move back into China as quickly as it retreated from the Communists, Willauer says.

The two ships now are tied up at Kaohsiung, a small port 26 miles from CAT's main aircraft overhaul base at Tainan on the southwest shore of Formosa. An FM radio telephone system links Kaohsiung, Tainan and the rest of CAT's system.

The LST cost an estimated $50,000 when it was purchased but currently is valued at nearly $1 million because of a vast amount of machinery and equipment crammed into its hull, CAT chief engineer Hugh Grundy says.

There is no waste space aboard the the LST, which has well-equipped shops in its hold for overhaul of electrical, hydraulic and engine accessory components, aircraft heaters, sparkplugs and instruments.

Also aboard is a dining room for VIPs and entertainment purposes, and a dispensary, where an X-ray machine is used for treatment of personnel injuries and occasionally for checking thin aircraft forgings and castings.

Two Quonset huts on the craft's main deck house these shops: engine teardown and build-up; propeller; wood work; parachute, including a 36-ft. high heated parachute drying tower; paint and fabric; model and plating; darkroom, and a print shop equipped with a small offset press.

On the LST's poop, CAT has assembled Diesel-driven generators and air compressors to supply power for the vessel.

▶ **Shop Operation**—M. A. Garrold, CAT shops manager, pointed out these features of maintenance units on the LST:

• **Electrical.** Civil Air Transport mechanics have built a complete electrical test stand that checks navigation lights in steady or blink position, with simulated air loads; all positions of ignition switches; and all circuit breakers.

CAT tests circuit breakers at the first 1,000-hour period; a second check is made at 2,000 hours. Rejection rates were quoted at 10% for coil-type breakers and 25% for bimetal types.

Also included on the test bench are means of checking voltage boosters, luminescent lights, prop relays, radio tubes, heater blower switches, feather switches, starting vibrators, condensers, inverters, thermocouples, overheat switches and fire-warning systems.

The panel mounts a precision voltmeter and a Dumont oscilloscope. An engine analyzer tester is being installed to check Scintilla instruments recently bought by CAT for its C-46s and C-47s.

• **Hydraulic.** A Greer hydraulic tester, Model FPS5-2, is used to check engine-driven and fuel booster pumps. Other Greer machines are used to test the airline's vacuum and hydraulic pumps. CAT built its own hydraulic valve and component tester and is awaiting arrival of two additional pieces of equipment to check propeller governors and oil temperature control valves. A flexible hose pressure tester is being constructed.

In an effort to reduce ball bearing failures, CAT mechanics are assembling a ball bearing cleaning machine. Fluid used to clean the bearings will be screened, cloth-filtered and micro-filtered before reuse.

• **Sparkplug.** CAT currently is phasing out BG RB-19 and -21 plugs in favor of the BG RB-27 and is preparing to service Champion R37S-1 sparkplugs. The airline overhauls all its BG plugs at 250 hours. They are reconditioned for additional life until plugs no longer are usable by manufacturer's specifications.

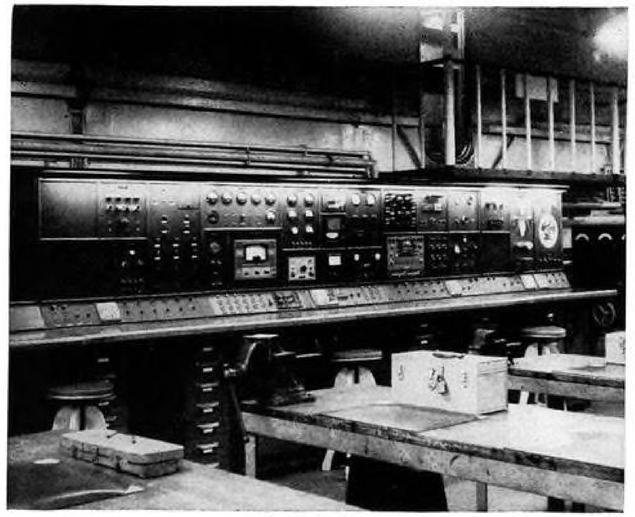
• **Instrument.** The air-conditioned instrument shop has teakwood work benches that do not shrink or warp and are exceedingly strong. All instrument spares are stocked in the shop to take advantage of controlled humidity of air conditioning.

The shop includes a dark room for checking luminiscent instrument numerals, which are used by CAT as protection against failure of aircraft electrical system.

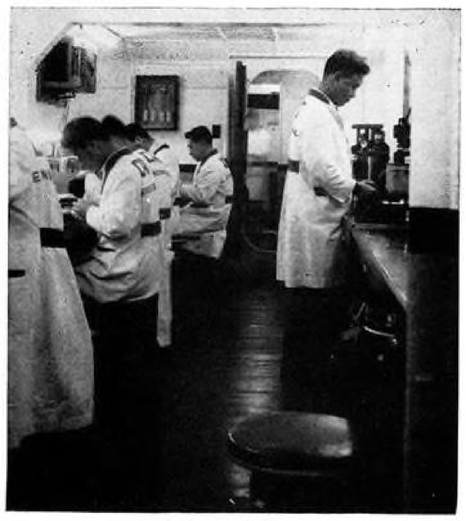
The instrument mechanics built their own torque wrench check machine, which uses a British balance scale and can check either right- or left-hand wrenches. The unit is simple and inexpensive and is said to have an accuracy of 2% of full-scale readings.

• **Inspection.** CAT inspectors say they get excellent results with Zyglo inspection methods on wheels and other non-

Aboard CAT's LST Maintenance Base . . .



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Instrument Shop



Propeller Shop



Accessory Shop

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ferrous metal parts. Extra large tanks and trays have been provided in the LST to accommodate such bulky parts as landing gear struts. Magnaglo is used on ferrous parts. Components that are difficult to remove from aircraft are inspected by the Dy-Chek method, which CAT says is easy to use and effective.

• **Carburetor.** A leveling device keeps the carburetor flowmeter bench in proper position during pitch and roll of the LST.

• **Propeller.** The carrier uses three methods of balancing propeller blades: knife edge, double overlapping roller, and horizontal or suspension. The LST must be trimmed before vertical balancer can be used.

The shop includes a homemade test rig for Curtiss electric props. Weighted arms are attached to the blades to simulate air loads as blade pitch is changed.

• **Wood work.** Chinese carpenters tailor shipping boxes to fit each instrument and line the boxes with a two-inch-thick foam rubber to protect against jarring.

• **Photography.** Photo technicians put all maintenance records on microfilm to provide permanent records in a minimum amount of space. The shop is well stocked with darkroom equipment.

• **Parachute.** CAT is one of the few airlines to provide its crews with parachutes. They are used on military and cargo flights. The shop contains a snag-proof 38x2½-ft. packing table covered with doped aircraft fabric. An estimated 200 chutes are kept in a dehumidified locker in the air conditioned shop. The 36-ft. drying tower is heated to speed drying process.

Airborne Radar

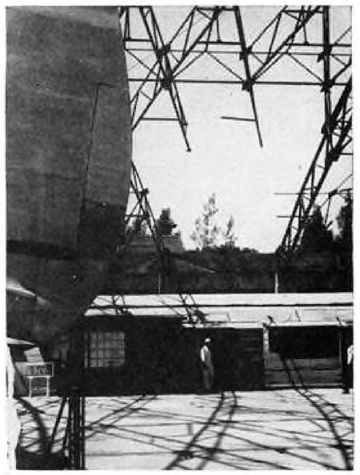
Civil Air Transport pilots use, as a matter of routine, DME-type airborne radar installed in the airline's fleet, while most major carriers still are experimenting with the devices.

The equipment, labeled APN-2, is a ranging unit that interrogates an omni-directional ground transmitter. CAT pilots rely on ADF for directional guidance. Between APN-2 and ADF, CAT pilots are given a running log of distance and direction of destination.

▶ **APN-2 Operation**—In operation, a vertical light line appears on the APN-2 scope and stretches its full diameter. This trace is intercepted by a blip that shows up as a shadow and moves from top to bottom of the scope as an aircraft approaches destination. The set may be adjusted for ranges up to 10, 50 and 100 miles. Dual Yagi array receiving antennas are mounted on the side of the plane's cockpit.

Four loran ranges give the airline's pilots additional navigational aid.

CAT pilots are enthusiastic about APN-2. They say it has allowed them



SKELETON (foreground) of hangar CAT itself bombed to keep from Japanese.

to maintain scheduled flights in and out of Formosa in weather that grounded other carriers.

Officials indicate the unit also has saved money for CAT, although no figures are available.

The APN-2 sets transmit on a frequency of 228 mc. and receive on 223 mc. CAT has received no complaints about interference.

The sets are not difficult to maintain and have a reliability comparable to ADF equipment, according to W. F. Henderson, CAT assistant chief of communications.

CAT paid $400 for each set, purchased as war surplus equipment. Installation cost was approximately $100 and required about 32 manhours per aircraft, the airline says. Sheet metal work cost an additional $30 and required 58 manhours.

▶ **Radar Upkeep**—All radar and radio equipment is pulled out of the aircraft every 125 hours for overhaul and tests.

Avionic stocks are kept in dustproof drawers and closed closets because of Formosa's humid climate and particle-filled air. CAT built a moisture-proof heating room to store completed assemblies such as APN-2 receivers and transmitters. The room is tightly sealed, and thermostatically controlled infrared lights keep the temperature at a constant 96 deg.

Flight Operations

CAT air operational problems are increased by high humidity and salt air corrosion on the carrier's routes. Other hazards are cattle that graze unattended on grass airfields. Landing gear and airframes take a beating from the unpaved runways.

The airline flies over long stretches of open sea and around mountain peaks

STARTLING FACTS ABOUT GILFILLAN GCA RADAR

A Gilfillan GCA Radar now costs less than $375,000. But one Gilfillan GCA Radar on Iwo Jima alone, saved *100 B-29 aircraft,* valued, even at that time, at $600,000 each—a total of $60,000,000.

One Gilfillan GCA Radar in the Azores, during a period of 6 hours, saved *three C54s, seven C47s, and two B-25 aircraft.*

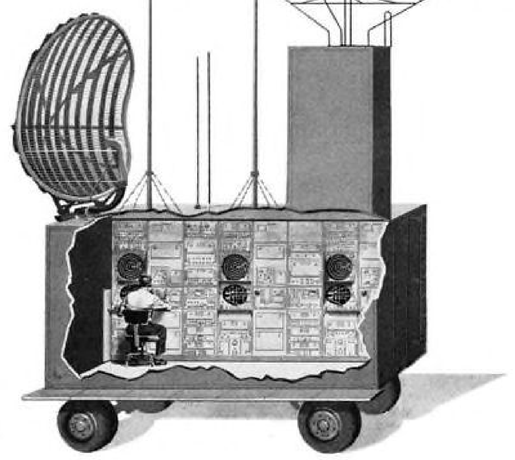
On the Berlin Airlift one Gilfillan GCA Radar landed *54,000 aircraft* during a ten-month period.

Eight civilian GCA Radars in the United States are officially credited by the CAA with saves of *77 aircraft under extreme emergency conditions.*

The 14 U.S. and foreign airlines operating through Gander, Newfoundland have, by mutual decision, selected Gilfillan GCA Radar as the exclusive navigational aid. This Gilfillan GCA Radar has a perfect record of 14,000 safe landings.

Gilfillan GCA Radar equipment is used in landing *2,000 planes every day* around the world.

Even these few examples, taken from a phenomenal record of more than 3 million Gilfillan GCA landings, make one fact unmistakable: the value



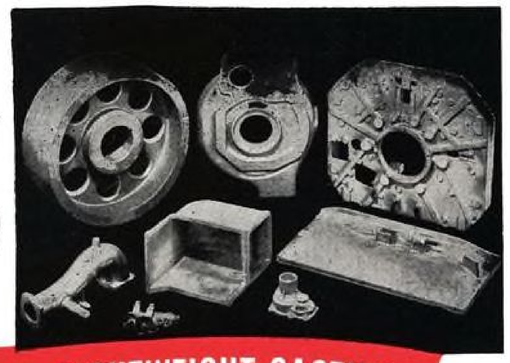
of safely landed aircraft *alone* completely overshadows the original Gilfillan GCA Radar cost.

To this must be added the incalculable value of human lives, of international good will, of increased public acceptance of air travel.

Gilfillan GCA Radar is the official landing aid of the U.S. Air Force, the U.S. Navy, the U.S. Marine Corps and the air forces of Australia, Belgium, Canada, Denmark, Great Britain, Italy, Netherlands, Norway, Portugal and South Africa.

Only Gilfillan GCA Radar is standard equipment among 24 nations of the free world.

In GCA and Radar Research,
Design and Production—the FIRST name is... **Gilfillan** GCA Los Angeles

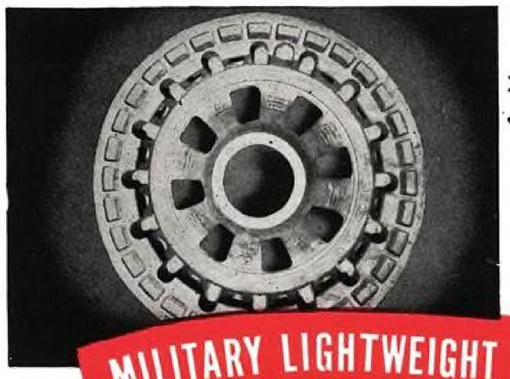


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CAT WELDERS set up shop on LST ramp runway on dock at Kaohsiung base.

of from 9,000 to 12,000 ft. high that run the length of Formosa. Yet it has a near-perfect safety record.

▶ **Takeoff Weights**—CAT uses three different sets of takeoff weights for its C-46 transports.

• **Freight operations** into civilian fields and planes chartered by the U.S. Air Force may be loaded to 48,000 lb.

• **Passenger flights** in and out of civilian fields and those carrying commercial cargo carry a maximum of 45,000 lb.

• **Commercial flights** operating into military fields are restricted to 45,000 lb. because of regulations applied by U.S. Civil Aeronautics Administration on civilian operations at armed forces airports.

CAT spokesmen say the airline has operated for five and a half years without a single accident to C-46 aircraft carrying the 48,000-lb. weight maximum approved by Nationalist China's CAA.

▶ **Takeoff Rato**—Rato installations for CAT's C-46s are being developed by Sze Yao Yuan, Grundy's technical assistant. The plan, still in design stage, calls for six Aerojet Corp. bottles—three on each side of the center wing panel.

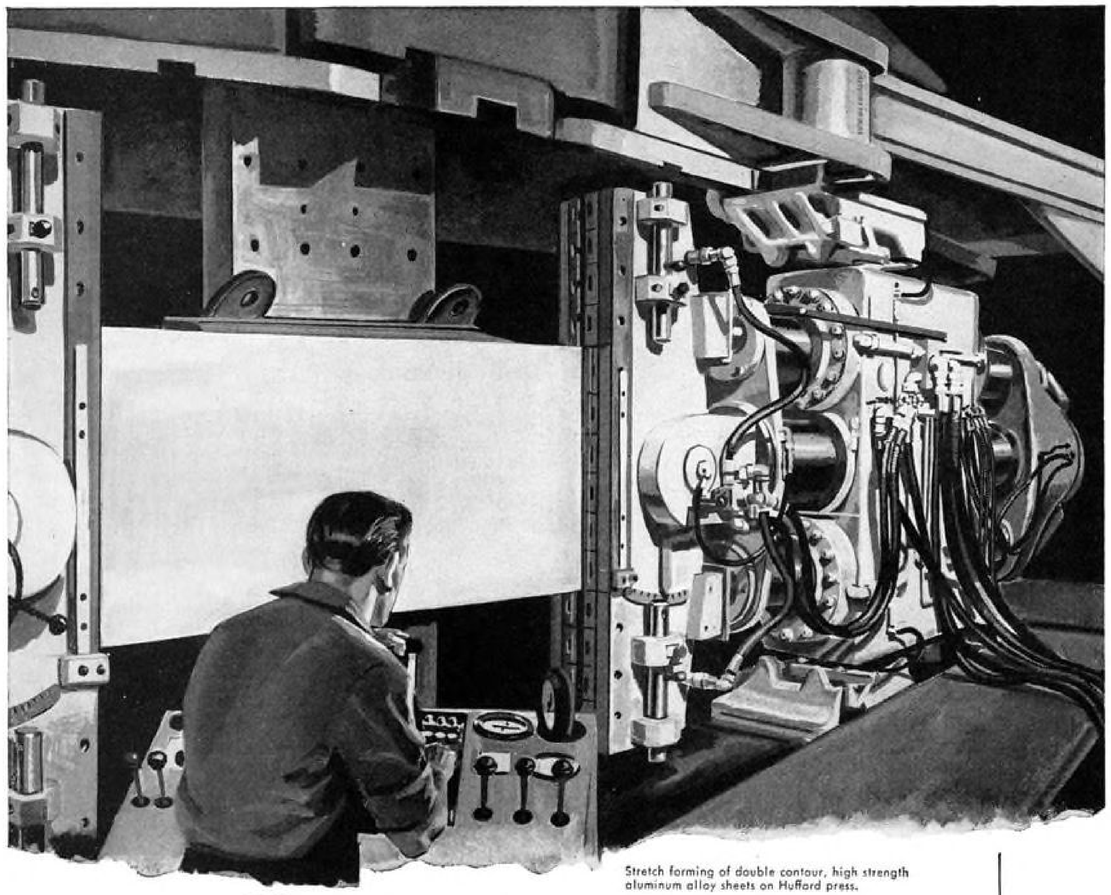
The airline hopes to use rockets as an emergency auxiliary power in case of engine failure during takeoff.

The U.S. CAA has not approved CAT's Rato development yet, but Sze says he hopes test installations will bring about a certificate for the Rato development.

Another change scheduled for all CAT aircraft except the PBY is installation of Scintilla ignition analyzers. Grundy says his choice was motivated by the immediate availability of Scintilla units, their cost advantage and portability. The chief engineer says CAT will use Scintillas as airborne instruments on long hops when flight engineers are added to the plane crews.

The airline already has fixed cowl flaps on its C-46s in a 9½-to-10-deg. open position—as did Philippine Air Lines—in an effort to reduce maintenance, weight and cost. CAT is working out a plan with Slick Airways for exchange of C-46 maintenance information.

▶ **Polyglot Line**—All CAT captains are



Stretch forming of double contour, high strength aluminum alloy sheets on Hufford press.

Equipment COUNTS—
AT CANADAIR

Finer tolerances . . . more complex forming methods . . . precision machining: these are factors confronting aircraft manufacturers today.

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The HOSTESS CALL LIGHT SWITCH "GOES TO TOWN"



Frequently, where indicator lights must be used in conjunction with switches, modern aircraft design affects a worthwhile weight and panel space saving by using Hetherington switches with *built-in* lights. Developed originally by Hetherington as hostess call lights, these compact little units are now available for a broad range of exacting commercial or military aircraft services. Write for catalog.



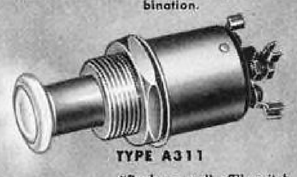
TYPE A300
Push-pull snap switch with "on-off" light and auxiliary momentary contact.



TYPE A304
Push-button momentary-contact switch-indicator light combination.



TYPE A8500
"Push off—pull on" or Type A13800 "push on—pull off" snap switch with built-in "on-off" light.



TYPE A311
"Push on, pull off" switch also operates "on-off" independent lamp circuit. "Pull on, push off" Type A312 also available.



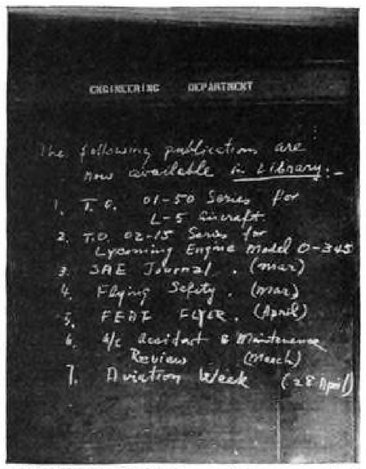
TYPE A314
Push-button normally-open momentary-contact switch plus independent, unbroken lamp circuit. Type A315 (not shown) has normally-closed contacts.



TYPE A325
"Push off — pull on" switch with independent unbroken lamp circuit. Developed for bomber fire extinguisher panel.

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SWITCH-INDICATOR LIGHT COMBINATIONS
PUSH-BUTTON AND SNAP ACTION SWITCHES
AIRCRAFT AND ELECTRICAL EQUIPMENT ASSEMBLIES

HETHERINGTON, INC., Sharon Hill, Pa.
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AVIATION WEEK is carried on suggested reading list for CAT's repair crews.

American, except for one British pilot. Co-pilots are American or Chinese, and most radio operators are Chinese.

At least 13 other nationalities are employed by the airline: Filipinos, Siamese, Japanese, Korean, New Zealanders, Australians, Viet Namese, Portugese, Costa Ricans, Belgians, Italians and French.

Despite the mixture of nationalities, CAT officials say they have no major labor troubles, and the whole polyglot group works together harmoniously.

► **Supplies**—Supply problems plague CAT procurement officers. Engines sent to the United States for overhaul take at least six months to return. Shipping costs alone are $600 per engine.

The airline is forced to stock parts six months in advance, making it necessary to fill the supply barge hold with pieces, parts and components required to keep an airline in operation. This is a strain on the carrier's capital budget.

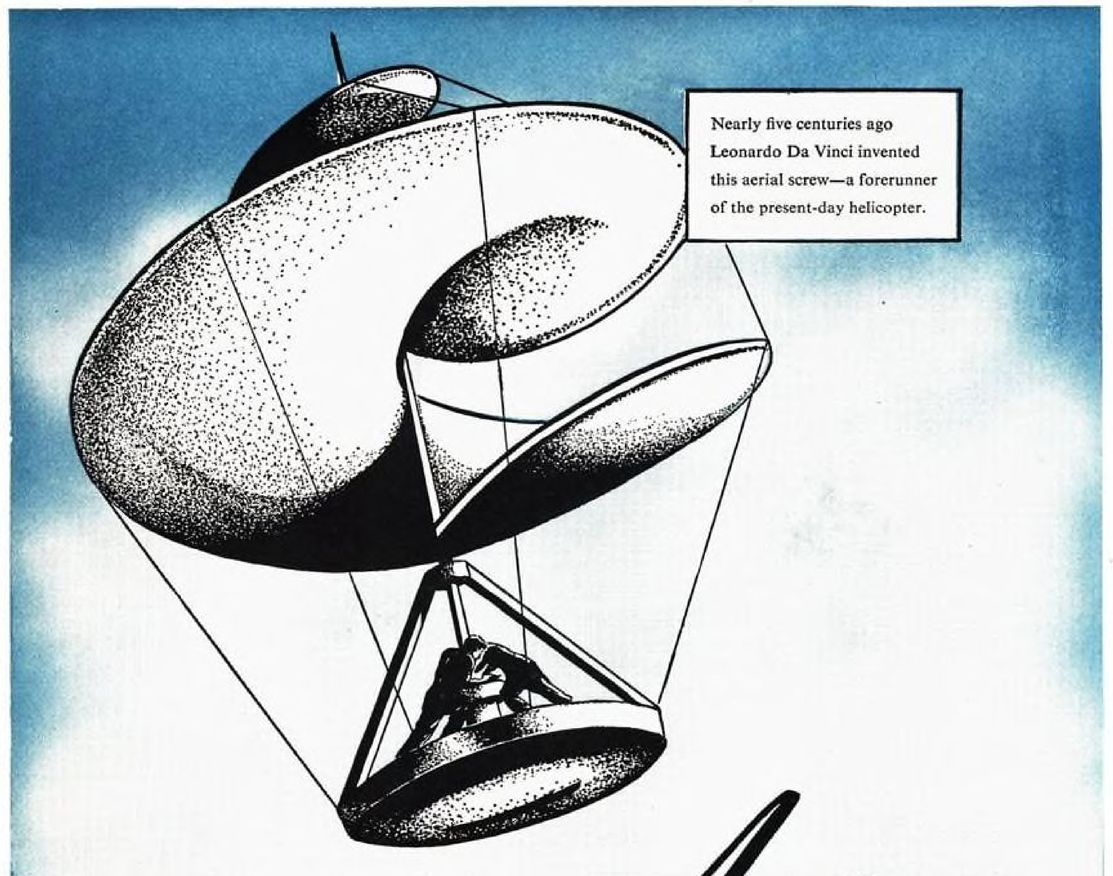
Shipping parts into Formosa involves export and import licenses and applications for duty waivers.

► **Combat Carriers**—Assistant general manager C. H. Shildhauer describes CAT as "the combat carrier of the area today."

CAT's background prepared it for the task, he says. Starting with many former Flying Tiger and ex-AVG pilots, the airline began dodging Communists in 1948 when CAT was forced to move out of Mukden, Manchuria. But the carrier had built up a passenger and cargo business while it still was operating on the mainland.

"We dealt the camel quite a blow when we convinced the Chinese on the mainland that air transportation was feasible and economically sound," J. L. Orlowski, assistant operations director, says. "Chinese are not easily sold by propaganda. They have to be shown.

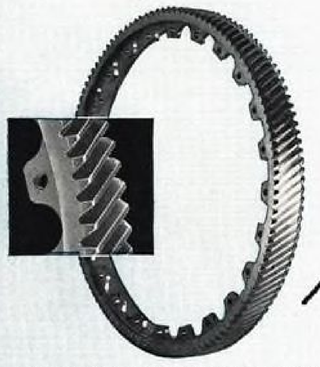
"One effective method was to buy



...out of this came Aviation

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To serve this great industry there are many manufacturers with imagination and vision. Indiana Gear is such a company—a group of able craftsmen equipped with the best of tools and machines—producing the finest in precision parts. At I.G.W. we accept the challenge of this and all other precision industries. We will match their visionary design with creative production.



Indiana Gear fabricated this large steel ring gear for the main transmission of a recent model Sikorsky Helicopter without grinding and without heat treat distortion. Originally, the helical teeth on this gear were ground, but a necessary power increase overloaded the part and it failed.

It was assumed to be impossible to successfully heat treat the unground teeth, but I.G.W. produced the part without distortion and the gear operated successfully.

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N3E-2
Low harmonic content, dual frequency alternator with less than 3% total distortion on each frequency

N2B-2
Two phase, 30 cycle alternator with less than 2% total distortion on each phase

There's an EAD Alternator for Your Every Application

TYPE	OUTPUT	VOLTS	PHASES	FREQUENCY (CYCLES)	SPEED (RPM)
N2A	45 Volt Amps	115	3	400	6000
*N2B-1	.....	7	1	30	1800
**N2B-2	.....	7	2	30	1800
N3C-1	.....	10-15	1	1000	20,000
†N3E-2	.....	7	1	90/150	1800
N5B	8 watts	20/40	1	1000	5000
N6A	20 watts	40/80	1	1000	5000
N6B	60 watts	30	1	400	8000

*Less than 2% Total Distortion **Less than 2% Total Distortion on each phase

†Dual frequency alternator less than 3% Total Distortion on each frequency.

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a shipment of merchandise from a merchant, fly it to destination, sell it and show the merchant the profit that could be made. The Chinese, being astute businessmen, soon caught on and their shipments took the full capacity of the airline."

▶ **Guts and Gall**—It took "guts and gall" for CAT to give support to anti-Communist groups on the mainland, Schildhauer says.

Many CAT transports were perforated by bullet holes and engines were knocked out by gunfire in the process. But not a single plane was lost to enemy action, Schildhauer reports.

▶ **Korean Shuttle**—When war started in Korea, CAT crews flew their planes into every military airfield in the combat zone—delivering ammunition, fuel, spares, blood and food to the United Nations troops.

On outbound flights, the airline took aboard wounded soldiers, battle-weary veterans and reparable aircraft components.

Orlowski says no other civilian airline probably has been so closely connected as CAT with active hostilities.

▶ **Pilot Training**—CAT chief pilot R. F. Rousselot says the airline's pilots are trained "to do everything."

"We indoctrinate them first to be good commercial airline pilots and also competent combat cargo pilots," Rousselot says. "We check them out on para-dropping, for instance. And we stress good instrument work."

The chief pilot says CAT's training program is well underway, but gas shortages and unavailability of equipment are curtailing to some extent efforts to advance Chinese co-pilots to captains.

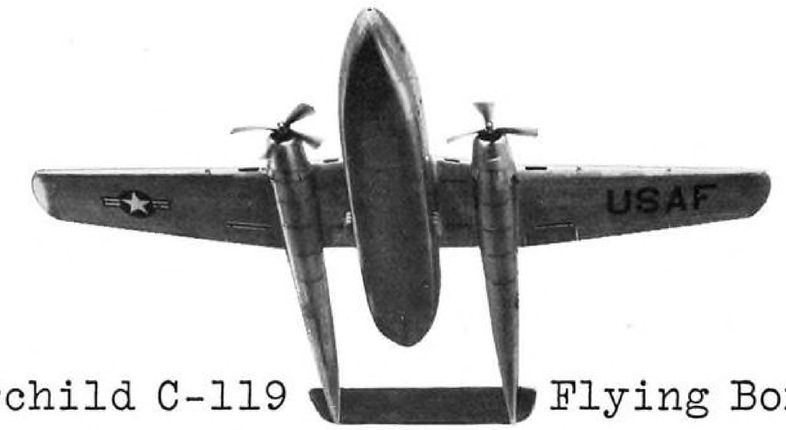
Rousselot sums up CAT's operation this way:

"We fly all over the Pacific; make many long overwater hops with a pilot, co-pilot and a radio operator, using twin-engine equipment; yet we never seem to have any trouble."

▶ **Metamorphosis**—CAT spokesmen say the airline gradually is changing from a cargo carrier to a combined freight-passenger line. Passenger loads have been increasing steadily for the past 18 months, and CAT is changing over from bucket-seat planes to "plush jobs" designed for comfort.

About one-third of CAT's flying is done for the AF's Far East Command and another third is taken up by miscellaneous commercial charters, according to airline officials.

Characterizing the carrier as "extremely flexible," one official defines CAT's operation as "a non-scheduled operator with small scheduled appendages" routed to build the airline structure from Bangkok to Korea and to provide Nationalist China with a reliable link to other free nations.



A Fairchild C-119 Flying Boxcar
can easily transport
a Medical Unit



consisting of two ambulances,
ten men, twenty litters
and twenty medical chests...



to an airhead and unload it
in a matter of minutes
and it is being done every day!

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NWA Stripping Raises DC-4 Load

Northwest Airlines will soon be able to load an additional 147 lb. into the rear cargo compartments of its fleet of 25 DC-4s. Most of NWA's DC-4s were designed for glider tow operations. By removing only 44 lb. of unneeded glider tow provisions from the planes' tailcones, NWA gained 147 lb. in capacity because the cargo compartment has a lesser moment arm than the tailcone.

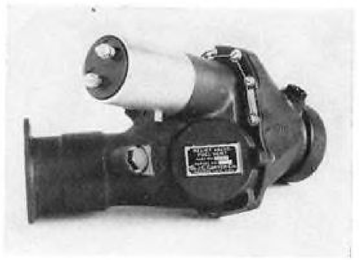
FJ-2 Flap Actuator

A new landing flap actuator made by Air Associates, Inc., has successfully passed preliminary engineering tests for installation in the FJ-2, Navy version of the F-86 Sabre.

The unit can stop the flap in any position within its travel range. Five limit switches in the component provide a high degree of control, according to the firm. The new actuator, Model M-5250, is a descendant of the smaller M-3320, used in earlier F-86s.

In the Navy craft, Air Associates expects to supply the complete flap system, which includes two actuators, two flexible shafts and an H drive.

NEW AVIATION PRODUCTS

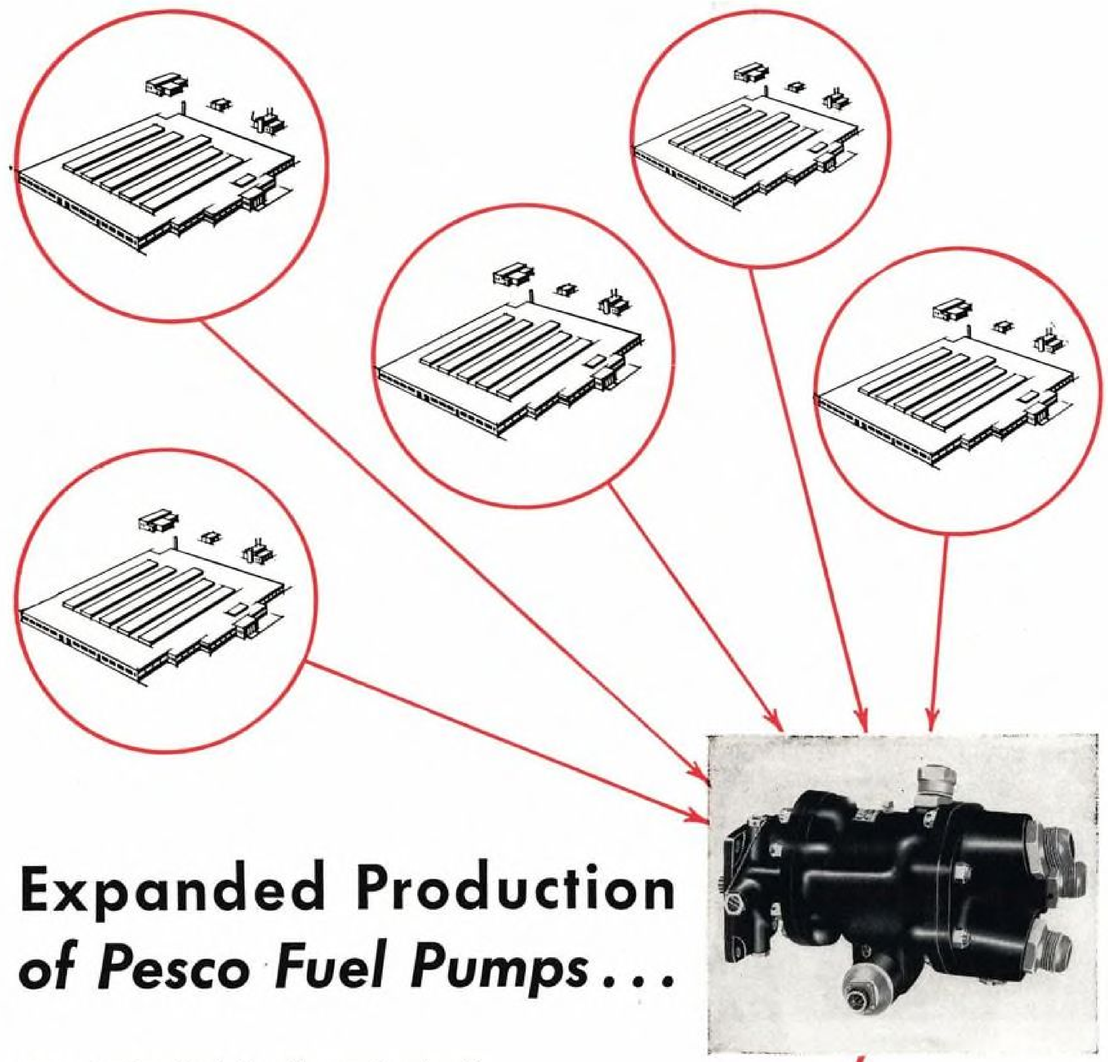


Sabre Dive Relief

Relief valves to prevent fuel tanks in the F-86 Sabre and its Navy counterpart, the FJ2, from collapsing or being over-pressurized are being produced by J. C. Carter Co.

In the F-86, it is Fuel Vent Relief No. 5058 with a capacity of 200-cfm. airflow. It is actuated by a 1-psi. pressure change. The Navy version is called Dive Relief No. 5059. It had a 100-cfm. airflow capacity and is triggered by a ¾-psi. change.

Both valves, designed for 2-in. line size, are normally open. When a solenoid is energized, they close, but are free to reopen at a predetermined pressure, even though the solenoid may re-



Expanded Production of Pesco Fuel Pumps . . .

Today, five factories, in five cities, are devoting all, or part of their manufacturing facilities to building Pesco fuel pumps. The result is a three-fold increase in the production of these vital jet engine and aircraft parts.

In each of these five plants, Pesco's rigid statistical quality control, high standards of precision craftsmanship, and grueling production tests give complete assurance that these Pesco pumps will operate more efficiently and more safely over a longer period of time . . . will not fail when human lives are depending on them.

engineering Pesco production

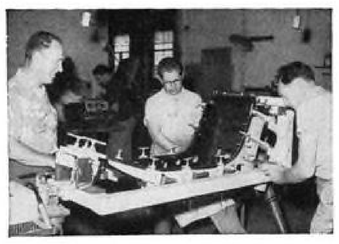
PRODUCTS DIVISION

Pesco Products Division, Borg-Warner Corporation, 24700 North Miles Road, Bedford, Ohio



An Open Letter to Executives in charge of...

AIRFRAME Manufacturing







This message is addressed to the executives responsible for airframe assembly or fabrication who have a production problem involving such things as cowlings, wing tips, wheel doors, fairings, air-scoops & ducting, seats, ailerons, flaps, trim tabs, dorsal fins, elevators, rudders or related jobs. We operate a fine, modern and completely equipped plant for aluminum metal forming and fabrication of aircraft parts and assemblies. Our equipment and facilities include:

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Our plant, with 50,000 square feet, is within quick hauling distance of every aircraft manufacturer and prime contractor on the West Coast. Our organization includes executives and engineers with years of aircraft experience. Work gladly accepted on negotiated or bid basis. We invite your inquiry and personal inspection of our facilities.

W. Bill Modglin
President

MODGLIN CO., INC. 3235 San Fernando Road, Los Angeles 65, Calif.
Phone CLeveland 6-2213

main energized. The valve is always open on the ground, providing a vent for pressure refueling, and they are designed to fail-safe in the open position if the electrical system malfunctions.

J. C. Carter Co., 253 N. Fair Oaks, Los Angeles.



Fuel Level Control

A new fuel tank switch produced by Revere Corp. of America provides automatic cut-off control for single point high-pressure fueling. It can incorporate a single or dual float system, which can be actuated by liquid levels any distance between one and 18 inches from the mounting flange.

Each system has a magnetically operated switch hermetically sealed in a glass tube. An actuating magnet, positioned by a float, opens or closes the switch at a predetermined level set at the factory. Revere stresses these switches have many other liquid level control uses besides those in fuel systems. They are available in a variety of configurations, including fully submerged types.

Revere Corp. of America, Wallingford, Conn.

Hardy New Rubber

Rubber that stays flexible down to −120F and can be used for seals and gaskets on the fuselages of aircraft has been developed by General Electric Co. The same rubber can also take 500F. Developed after two years research, it has been field tested successfully by major aircraft companies, GE reports.

A $5-million expansion of manufacturing facilities has just been completed at Waterford, N. Y., to produce the silicone-type material, tagged SE-550. It is believed by GE engineers to have the lowest change in bending modulus of any commercially produced elastomer, showing less than 25 points durometer increase throughout its full temperature range. The brittle point is well below −120F, the company says.

The product is said to mill and extrude easily and have good tear strength that permits stripping from hot molds.

General Electric Co., Pittsfield, Mass.

to the

ELECTRICAL ENGINEER

or

PHYSICIST

with experience in

RADAR

or

ELECTRONICS

Hughes Research and Development Laboratories, one of the nation's leading electronics organizations, are now creating a number of new openings in an important phase of their operations.

Here is what one of these positions offers you:

THE COMPANY

Hughes Research and Development Laboratories, located in Southern California, are presently engaged in the development and production of advanced radar systems, electronic computers and guided missiles.

THE NEW OPENINGS

The positions are for men who will serve as technical advisors to government agencies and companies purchasing Hughes equipment—also as technical consultants with engineers of other companies working on associated equipment. Your specific job would be essentially to help insure successful operation of Hughes equipment in the field.

THE TRAINING

On joining our organization, you will work in the Laboratories for several months to become thoroughly familiar with the equipment which you will later help users to understand and properly employ. If you have already had radar or electronics experience, you will find this knowledge helpful in your new work.

WHERE YOU WORK

After your period of training—at full pay—you may (1) remain with the Laboratories in Southern California in an instructive or administrative capacity, (2) become the Hughes representative at a company where our equipment is being installed, or (3) be the Hughes representative at a military base in this country or overseas (single men only). Compensation is made for traveling and moving household effects, and married men keep their families with them at all times.

YOUR FUTURE

In one of these positions you will gain all-around experience that will increase your value to our organization as it further expands in the field of electronics. The next few years are certain to see large-scale commercial employment of electronic systems. Your training in and familiarity with the most advanced electronic techniques now will qualify you for even more important future positions.

How to apply:

HUGHES
RESEARCH AND DEVELOPMENT LABORATORIES

Engineering Personnel Department
Culver City,
Los Angeles County, California

If you are under thirty-five years of age, and if you have an E.E. or Physics degree, write to the Laboratories, giving resumé of your experience.

Assurance is required that relocation of the applicant will not cause disruption of an urgent military project.

ENGINEERS NOTEBOOK

ONE COUPLING

HEATING SYSTEMS

ONE SET OF FLANGES

For ALL Heat Duct Connections

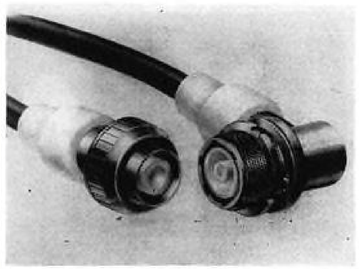
Any ducting problem in low pressure heating systems can be solved by a standard Marman V-Band Coupling and its integral welded flanges. The small type coupling (Series #4426) is usable for diameters from 4" to 8" and the large type (Series #4451) for diameters of over 8". Both will withstand temperature ranges of −65°F to 450°F and operating pressures of 2.5 p.s.i. and provide a highly efficient lightweight seal. The patented Quick Coupler type latch speeds production and simplifies maintenance.

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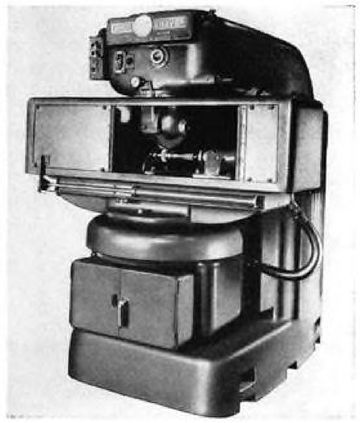
Plastic Connector

Polyethene molded connectors from England, with aluminum outer case, are claimed to have improved insulating and vibration characteristics despite reduced weight and size. High resistance to mechanical failure and dimensional instability have been retained.

Connectors are produced in right-angle, and straight models, making them suitable for confined spaces.

Wiring is molded into the plastic.

Plessey Co., Ltd., Ilford, Essex, England.



Gear Output Raised

Higher gear production, greater accuracy and a 200% increase in cutter life are claimed for new supplementary mechanism for Red Ring gear-shaving machines which permits conventional or diagonal shaving in the same unit, making either operation fully automatic. Operator simply loads and unloads the machine.

Versatility of the gear shaver has been increased in the new design, maker says. In diagonal shaving, cycle no longer is limited to two strokes but may include several cutting strokes (each with its own increment of up-feed) and idling strokes. Up-feed increments may be constant or varied. In spite of greater number and variety of strokes, cycle time is less than in previous models.

National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich.



Recently, The Consolidated Edison Company (in New York City) faced this problem: It had to produce a direct-process print from each one of more than ten thousand Brooklyn Underground Record Maps, showing the distribution system of electric service.

But satisfactory prints could not be produced directly from these maps. They were up to 30 years old . . . had been referred to constantly . . . and as a result were soiled, stained, creased, and "dog-eared."

What to do? Retracing was out of the question, since it would take a draftsman from two to three days to trace and check just one of these 17" x 25" drawings.

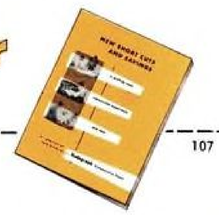
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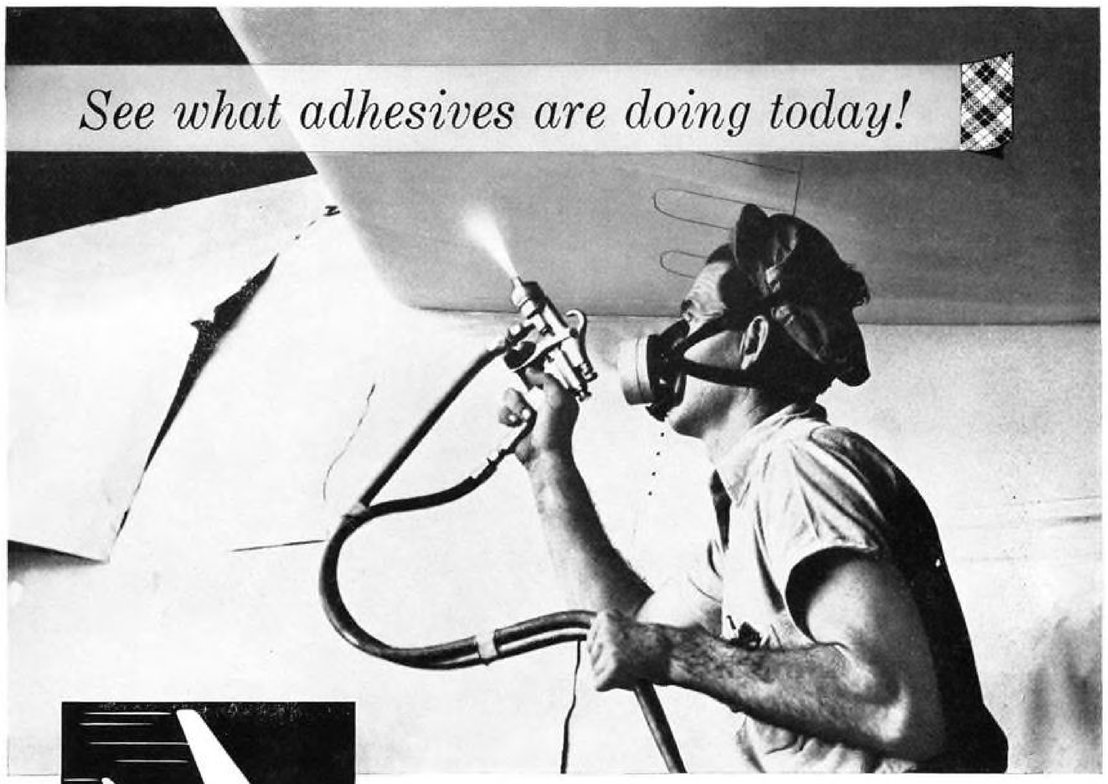
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Raindrops can do a lot of damage—especially when you meet them head-on at the speed of sound. Dust particles can be equally harmful when they blast the leading edge of an airplane wing in high-speed flight.

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3M's solution to this problem was a rubberized plastic coating known as "Corogard" No. 14. When this material was sprayed on the airfoil surfaces of the Boeing Stratojet, it formed a light-weight, long-lasting finish that could be quickly applied on the production line.

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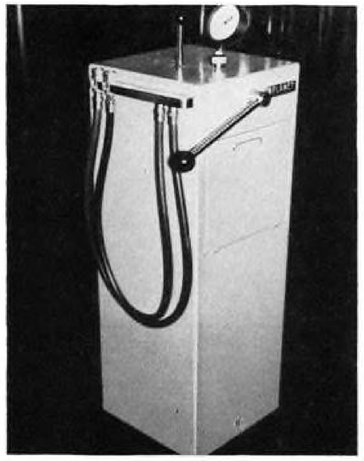
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Leak Tester

A hydrostatic check stand for testing leaks in small castings and inter-drilled passages in various components has been developed by Planet Products Corp.

A poppet type four-way valve is used for evacuation, as well as filling, of a cavity. Pressures up to 1,000 psi. are provided by an aircraft-type hand pump which delivers about one cubic inch per stroke. The pump is supplied from a 5-gal. reservoir built into the bottom of the test stand. A needle valve in the system maintains pressure over a long period of time, the firm says.

Planet Products Corp., 6305 Warrick St., Cincinnati 27, Ohio.



Sealed Solenoid

A new series of hermetically sealed solenoid contactors of high ampere rating has been developed by Guardian Electric Mfg. Co. to meet increased power requirements of jet aircraft.

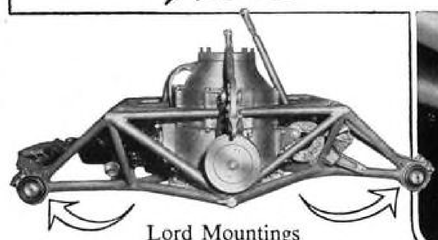
The 50-to-250-amp. units are suitable for 120C ambient temperature operation and meet resonance requirements for all jet-powered planes, Guardian says.

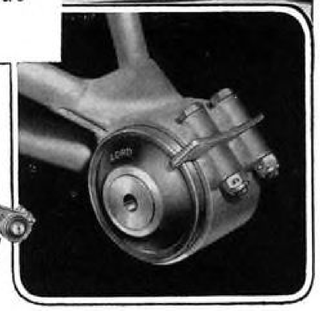
The manufacturer claims the solen-

MODEL 47 HELICOPTERS *by* BELL *Aircraft* CORPORATION



VIBRATION CONTROL MOUNTINGS *by* LORD





Lord Mountings on the upper engine basket

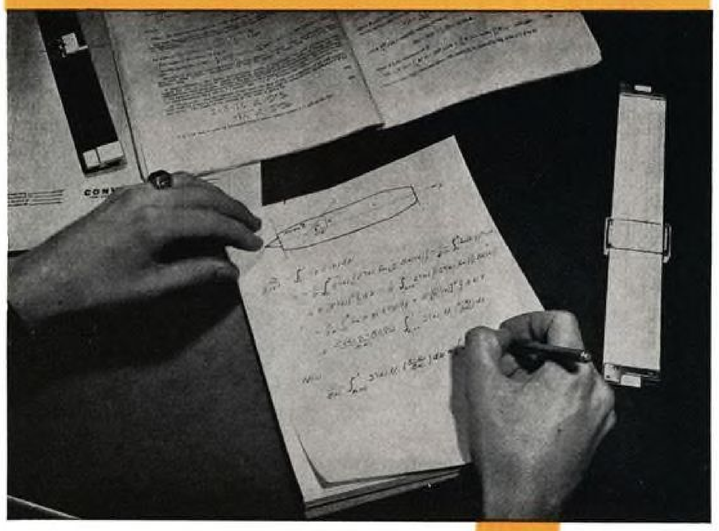
Nearly every day the valuable services of military and commercial helicopters make newspaper headlines. But one contributing factor never meets the eye . . . the continuous efforts of Design Engineers to improve helicopter performance. For example, the Model 47 Bell Helicopter. Its smooth power delivery and control characteristics are improved by the Lord Mountings used as standard equipment on the upper engine basket and lower sprags shown in these close-up photos. Combining the experience of Lord Engineers with that of airframe and engine designers results in the more nearly perfect and economical operation of military and commercial aircraft. In like manner the machines of business and industry are improved. You are invited to consult with us on the control of vibration and shock to improve the operation of your product.

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oids have been tested for shocks of 50G and higher.

The 50-amp. solenoid is directly interchangeable with current 10- and 25-amp. sealed power-relay or time-relay units. Models of 100, 200 and 250 amp. are interchangeable with AN3350 and AN3370 contactors.

Guardian stresses the rugged design of the solenoids, saying they are built to withstand severe punishment while being installed.

Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill.

ALSO ON THE MARKET

Tapping blind holes is said to be speeded and simplified with Hypertap, a lubricant in solid stick form which is inserted in hole prior to tapping. It permits use of finishing or bottoming taps at start of operation and cutting to within 1½ threads of the bottom without backing out to remove chips. Instead, these are continually ejected in the lubricant which exudes up along the flutes in the tap and out of the hole under pressure. Destiny Products Co., 2970 W. Grand Blvd., Detroit 2, Mich.

Molykote M-55, a colloidal suspension of molybdenum disulfide in a synthetic fluid, has been developed as an extreme bearing pressure additive for force-feed lubricating systems by Alpha Corp., Greenwich, Conn.

Molynamel hard surface paint, utilizing the anti-friction qualities of molybdenum disulfide, can be used on chutes, work tables, drill presses to make a slippery bearing surface where heavy weights must be shoved around. The Lockery Co., Southampton, N. Y.

Electrode cuts metal twice as fast with same heat input as comparable equipment, with somewhat more splatter the only disadvantage, according to developer. It may be used on steel, stainless steel, iron, cast iron, copper and its alloys, and nickel and its alloys with either a.c. or d.c. All-State Welding Alloys Co., Inc., White Plains, N. Y.

Rolling fixture that checks size, eccentricity and roll smoothness of cluster gears and similar types having integral shafts and centers has been announced by Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

Machine bundles metal scrap, such as wire and strips of material, into compact cylinders up to 24 in. in length and diameter for easy handling, shipping, and remelting. McLanahan and Stone Corp., Hollidaysburg, Pa.

PROSPERITY IN THE USA: How Wealthy Are We?

Again, how prosperous *are* the people of the United States?

This is the third of a series of messages devoted to this crucially important and much-debated question. The first two messages dealt with what has been happening to our national income, both in terms of its growth and how it is divided among individuals.

This third message deals with what has been happening to the resources—factories, farms, mines, and equipment of all kinds—out of which income is created. It deals with what economists call our wealth.

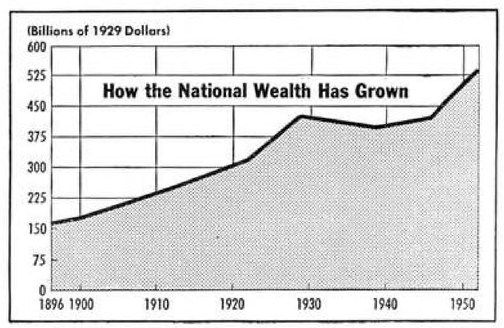
It is possible for a nation to enjoy apparent prosperity for a time by rapidly exhausting its resources. But to sustain prosperity over the long pull a nation must see that its wealth is not dissipated. Hence what is happening to our wealth now is a harbinger of what is going to happen to our prosperity later on.

How Wealth is Measured

It is often asserted that the most vital element in a nation's wealth is its people. There is a lot in this idea. For example, the full value of a country's hospital and surgical equipment depends on its physicians and their skill in handling the equipment.

However, no one has ever devised a satisfactory way to put a value on human beings. So people are omitted from calculations of national wealth. So, too, is military equipment. It is regarded as basically destructive and hence not a real addition to wealth. Otherwise, the wealth of a nation is calculated in terms of the dollar value of its physical resources.

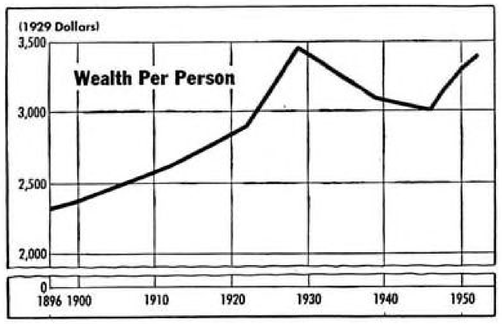
The following chart shows the wealth of the U.S.A. at various intervals during the past 50 years. For the period through 1948 the figures come from a pioneering study by Raymond Goldsmith of the National Bureau of Economic Research, which is widely regarded as the foremost organization in its field. The figures since 1948 are estimated. To remove the effect of price changes, all of the wealth figures are calculated in 1929 prices.



From this chart one fact stands out clearly. It is that since 1929 our national wealth has not been increasing as steadily as it did during

earlier periods. Indeed, in 1946 our total national wealth was actually less than it was in 1929. Only in the last six years have we been able to make any consistent additions.

Even these gains are less impressive when the growth in our population is taken into account, as illustrated by the following chart.



This chart makes it clear that when the nation's wealth is divided by the population, we are slightly worse off per person today than we were in 1929. This is the case in spite of the large additions to our national wealth since 1946.

Depression and war are the two principal reasons we have made no progress in increasing our wealth per person since the 1920s. The depression brought mass unemployment and greatly reduced production which ruled out any increase in wealth. During World War II and again during the post-Korean mobilization program, U.S. production has reached new peaks. But a considerable portion of this record breaking output has been in the form of military equipment, which is not included in an accounting of national wealth. Consequently, we have been unable to regain the level of wealth per person which we had in 1929.

A Brake of Prosperity

What does this failure to raise our wealth per person mean? It means that we have fewer resources with which to create income for each individual. It means that we have made no progress in the crucial task of assuring future increases in prosperity.

As the second editorial in this series demonstrated, we have gone so far in equalizing individual incomes that "the possibilities of increasing the income of the rest of the people by 'soaking the rich' have largely disappeared." From now on the only promising way to increase our individual incomes is to increase our national earning power.

During the past four years it has taken about $3.60 of national wealth to yield $1 of income after taxes. This is a low figure for the wealth needed. Prior to World War II there were long periods when it took at least $5 of national wealth to produce $1 of national income. The experts in this field are by no means certain that it will not again take $5 rather than $3.60 of wealth to increase income by $1.

But let us assume that $3.60 of wealth will suffice to provide $1 of income in the years ahead. If by 1960—seven years from now—the income of the average American is to be increased from about $1490, where it stands at present, to $2000, we must add $310 billion to the national wealth. This is nearly three times as much as we have added to our wealth since the end of World War II, seven years ago.

Because we have made large additions to our productive equipment in recent years, fears are frequently expressed that we shall soon be plagued by an excess of such equipment. But the facts about our national wealth do not support this conclusion. They indicate that we still have ahead of us a tremendous job of increasing our resources if the American standard of living is again to resume the steady climb which was interrupted by depression and war.

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CHALLENGING JET PROBLEMS FOR CREATIVE ENGINEERS

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- **Designing lightweight, reliable electronic control circuits.**
- **Increasing air flow through a fixed diameter compressor.**

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TURBOJET ENGINEERS — Future jet problems at G.E. need the knowledge, creative thinking, and stamina of keen-minded engineers. Independent thought coupled with joint endeavor produce new and better jet engines.



IN NAVY BLUE — New fighter for the Navy's carrier fleet is the North American FJ-2 "Fury." Powered by a new model of the combat-proved J47 engine, this Navy fighter will be a potent part of America's air arm. Among other planes powered by G-E jets are Boeing's B-47 Stratojet bomber, and North American's F-86 Sabrejet fighter and F86-D Sabrejet Interceptor.

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Typical of Ryan's high-temperature developments is this ceramic-coated exhaust system for Boeing Stratocruisers. The first company to put ceramic-coated engine parts into production, Ryan has proved they are highly successful in inhibiting corrosion and carbon absorption, thereby extending service life. Now ceramic coatings are available for jet engine components, too.

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Airfreight Carriers Pool Their Problems

- **Six lines set up "mutual benefit" transport group.**
- **Slick Airways president heads new organization.**

Leading airfreight carriers last week took first steps toward setting up an active trade association. They plan to make it somewhat comparable to the combination passenger-cargo lines' Air Transport Assn., whose members often are business rivals of freight carriers.

Representatives of six carriers meeting in Los Angeles appointed air cargo engineer L. R. Hackney of Lockheed Aircraft Co. as executive vice-president to head the new airfreight association. And four carriers at this founders meeting committed funds for Hackney to organize a staff and headquarters in Washington, starting this week.

Chief aims: "To promote recognition of the independent carrier" and "exchange technical and economic information for mutual benefit." Name is to be Transport Air Group, signifying that the major aim is to show defense officials the contracting and reserve mobilization potential of the airfreight industry.

▶**Founders**—The founding companies are the two largest certificated all-freight carriers, Flying Tiger Line and Slick Airways, plus four of the biggest noncertificated, nonscheduled airfreight and Pacific airlift contractors: California Eastern Airways, Overseas National Airways, Seaboard & Western Airlines and Transocean Air Lines.

California Eastern and Seaboard have not yet definitely committed themselves to participate, although they helped organize the program. They signified that they probably will join in active support of the association later.

Attending the final Los Angeles organization meeting: Slick Airways president Thomas L. Grace; Flying Tiger president Robert W. Prescott; Overseas National president George W. Tompkins; Transocean executive vice-president Sam L. Wilson; California Eastern vice president and general manager Robert E. Caskey and Seaboard's Pacific manager, F. Robert Warner.

They elected Grace as president, but he told AVIATION WEEK that Hackney will act as chief operating executive of the association. They also elected a tentative slate of directors—presidents of five of the six founding companies: Grace, Prescott, Tompkins, Samuel J. Solomon of California Eastern and Orvis M. Nelson of Transocean.

▶**Organization**—Initial financing of TAG provides for a $1,000 stock purchase by each member, plus $300 a month in flat dues. Industry observers expect that additional monthly payments will be pro-rated on a fixed percentage of members' prior-year transport revenue, the usual formula for association support.

President Thomas L. Grace told AVIATION WEEK that the founders expect that other independent carriers will come into the association.



L. R. Hackney

▶**Association Program**—The association announcement says it will work full time in the joint interest of its members to:

- **Promote recognition** of the independent air carirer as a "vital instrument to the security . . . and economy" of the U. S.
- **Promote "better understanding** of the benefits to both military and civil agencies by providing flexible air charter and all-freight air services in both domestic and international operation."
- **Pool technical and economic** information.
- **Develop air cargo equipment and planes,** as well as specialized operating standards and regulations.

Fulfillment of all these aims entails active promotion with a number of government agencies in Washington, including military, commerce, Civil Aeronautics Board, Civil Aeronautics Administration and Congress, a Washington official of one of the members said.

Previously, members have been dealing separately, and often ineffectively, with these agencies, he said. Sometimes rival aims of the better-organized Air Transport Assn. and its members have upset the TAG carriers' individual efforts, he added.

Here are some projects cited by a top cargo airline official for activity by the new association through key government agencies:

- **Air Force.** Some cargo operator aims

New Airfreight Association

Two domestic certificated all-freight airlines and four international nonsked operators agreed last week to set up a full-scale "Transport Air Group" association in Washington.

The two domestic carriers:

- **Flying Tiger Line.** Certificated for scheduled service between industrial North, Midwest, Northwest and California; is a Pacific airlift contractor.
- **Slick Airways.** Certificated for scheduled service between industrial North, Midwest, Texas and California.

The four international nonskeds:

- **California Eastern Airways.** A Pacific airlift contractor; also owns and operates extensive aviation services in the U. S. and was a domestic freight nonsked carrier until 1948.
- **Overseas National Airways.** Pacific airlift contractor.
- **Seaboard & Western Airlines.** Operates large-scale commercial airfreight service from the U. S. to Europe and Near East plus Pacific airlift and other cargo and passenger contracts abroad.
- **Transocean Air Lines.** Flys air cargo anywhere in world and serves Pacific airlift; also has many varied aviation service and nonaviation interests in the U. S. and abroad.

are to: convince budgeteers and Air Materiel Command of the economy of cargo and troop movement by independent carrier; gain policy support for lease of more planes and equipment to commercial operators; plug for financial support for commercial cargo operators to develop and buy specialized cargo planes and equipment as a development project and as a cheap way to increase reserve airlift for mobilization.

• **Defense, all agencies.** TAG will use the same arguments to seek more active support of the military departments for the carriers' certification by CAB.

• **CAB.** Slick and Flying Tiger seek renewal of their temporary certificates next year, plus extension of their operating authority and routes. The nonsked members also have applications for certificates. Two major cases, the trans-Atlantic freight case and trans-Pacific route case, are tentatively scheduled for CAB decision this year.

The freight lines, backed by Post Office Department, seek amendment of their certificates to permit bulk carriage of mail and air express at around 16-20 cents a ton-mile, compared with the 45 cents and more now paid passenger lines for their "first available plane" service.

The cargo carriers also want constant representation at CAB, aimed toward adapting economic and safety regulations to the specialized problems of the all-cargo operator. This includes the current conflict between Board policy, insisting on a minimum tariff for contract operations, and military policy, requiring competitive bidding. (CAB soon may propose to exempt large, long-term military contract bidding from tariff-filing requirements, but that is not yet determined.)

• **CAA.** Routine safety promotion, information and technical service will be supplied members by TAG, as has been done by ATA for its members for many years. At CAA, as at CAB, the new association will seek more recognition of cargo operators' special needs and problems.

• **Congress.** "We want to be on guard at all times when legislation is pending," an airfreight carrier official said. "First and foremost is subsidy separation from mail pay, so there won't be any question in Congress' mind what it's voting in direct subsidy of the passenger lines."

Next, he says, airfreight operators want to amend the Civil Aeronautics Act to allow shipment of mail parcel post at cargo rates on independent as well as certificated passenger lines. Third, the association will try to get prototype aircraft development appropriations through Congress.



CARGO GIANTS GET TOGETHER

An interesting bird's-eye view of four big Douglas C-124A Globemaster 2 transports grouped together at an airbase in Japan during a routine maintenance check. By parking the planes thus, maximum utilization can be made of tools and other equipment. These C-124As of the 374th Troop Carrier Wing, each capable of carrying 200 soldiers, are busy hauling needed men and matériel to Korea.

U.S.-British Talks Seek Jet Standards

Representatives of Civil Aeronautics Administration, State Department, Civil Aeronautics Board and the British Air Registration Board began discussions in Washington last week aimed at formulating mutually satisfactory standards for certification of commercial jet transports. The talks are expected to continue for about two weeks.

British representatives offered a considerable volume of technical data on commercial turbine-powered airliners built by British manufacturers and operated by British airlines. U. S. representatives indicated they expect to explore fully the present U. S. proposals for airworthiness requirements for the operation of de Havilland Comets by U. S. flag airlines.

The discussions are aimed, according to CAA spokesman, at eventual agreement on airworthiness standards that will lead to reciprocal certification of jet airliners similar to agreements already reached on certification of piston-powered transports.

▶ **PAA Comet Certification**—Present discussions were triggered by a clause in the Pan American Airways contract with de Havilland Enterprise, Ltd., specifying the British must take steps to insure U. S. certification of the Comet 3 before Mar. 31, 1953. The current British mission to Washington is offered as evidence of good faith in fulfilling the Pan American contract clause.

Although the immediate problem of the Anglo-American talks is certification of the Comet 3, it is believed that airworthiness problems of the Vickers-Armstrongs Viscount turboprop transport also will be considered. The Viscount has been sold to foreign flag airlines that will operate into U. S. terminals.

Participating in the talks for the British Air Registration Board are R. E. Hardingham, J. G. M. Pardoe, R. H. Warde, H. C. Black, and F. W. Austin.

U. S. representatives are Charles Horne, CAA administrator; Fred B. Lee, deputy CAA administrator; Ernest Hensley, head of the CAA Office of Aviation Safety; G. W. Haldeman, head of the CAA Jet Transport Study Group; Omer Welling, acting head of the CAA Engineering Division, John Chamberlain, head of the CAB Safety Bureau; and Henry T. Snowden, State Department.

United Keeps 500-Ft. Ceiling at Youngstown

United Air Lines still is keeping a 500-ft. ceiling limit at Youngstown, Ohio, Municipal Airport, put into effect for UAL flights when the Army Corps of Engineers erected a 146-ft. water tower on the field, AVIATION WEEK learned last week.

The UAL minimum is being continued as a safety precaution despite the fact Civil Aeronautics Administration has notified the Youngstown Airport that a waiver has been issued and that the CAA minimum has been lowered to 400 ft.—the minimum ceiling before the tower was erected.

CAA's action restoring the 400-ft. minimum instead of insisting that the Army and Air Force comply with full safety precautions at the airport has come under fire from pilots and aviation users of the Youngstown field (AVIATION WEEK Jan. 26, p. 15).

▶ **ATA and ALPA Action**—A spokesman for the Air Coordinating Committee told AVIATION WEEK that a supplementary memorandum had been issued by the Regional Airspace Committee at Chicago, correcting minutes referring to the tower to meet criticism from Air Transport Assn.

The correcting memo which they issued pointed out that ATA and Air Line Pilots Assn. did not concur with the recommendation in the original minutes.

The spokesman said ATA had taken a position consistently opposing the tower at Airspace Subcommittee meetings in Washington and at the regional meeting.

He said the CAA regional office at Chicago and the Washington Airspace Subcommittee would be receptive to any further discussions on the Youngstown tower situation so long as they were not merely a repetition of those complaints which had been previously voiced.

New Airport Service

A speedy bus service linking Newark Airport with the Port of New York Authority bus terminal at 41st St. and Eighth Avenue has been set up by Public Service Interstate Transportation Co. of Newark, N. J.

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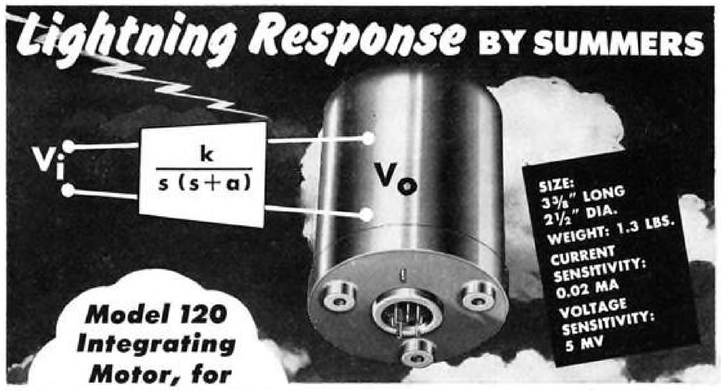
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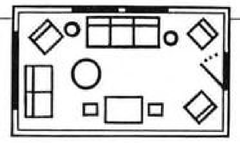
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Alaskan Nonsked Pushes Court Fight

Air Transport Associates, Inc., Alaska-Seattle nonsked, has one last chance to get Supreme Court review of the Civil Aeronautics Board decree putting the company out of business for flying more often than allowed under CAB's economic restrictions.

If president Amos Heacock wins a review of his case, it may open the way for broad court study of the Board's power to restrict business volume of nonskeds on specific routes.

Whether the court reviews the case depends on possible change of mind by one of the six justices who refused jurisdiction of a circuit court decision against Heacock's company. It takes a vote of four justices to grant certiorari (review of the case), and three—Justices Black, Douglas and Reed—have favored such a move. If one other justice rules favorably on the plea for rehearing the petition for certiorari, it clears the way for review of the case.

► **Still in Business**—Meanwhile, ATA continues its operations pending the outcome of court action on his petition for rehearing.

"We're still in business," says Heacock. "If one more justice believes this is an important enough case, it will swing the court over to hear the nonsked airlines' case."

Air Transport Associates claims this case is vitally important. Heacock says, "Few operators in this $100-million business of irregular air transportation can continue existence on common commercial carriage if CAB finally wins absolute court sanction of its present regulation."

Heacock, who also is founder and president of the nonskeds' Air Coach Transport Assn., long has challenged the authority of CAB to put an arbitrary ceiling on business volume of companies on specific routes, once the Board has granted them operating authority.

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U. S. to Aid Italy in Air Traffic Control

Frank J. Monaco of Civil Aeronautics Administration's International Region office in New York heads the seven-man mission which left for Italy Jan. 20 to assist Italian air traffic controllers in standardizing their operations.

Assigned by Charles F. Horne, CAA administrator, in cooperation with the Mutual Security Agency, the mission will spend a year in Italy putting into effect American techniques and procedures in air traffic control. With headquarters in Rome, the American mission will concentrate on obtaining standardization in air traffic control at Italian airports.

Other members of the CAA mission: Fred E. Starr, Chicago; Francis E. Finnan and Alfred P. Riccio of the New York Air Route Traffic Control Center; Patsy J. Filippelli of the Pittsburgh ARTC; Bernard B. Campagna of the ARTC tower at Hartford, and Dominic J. Rosi of the Washington ARTC center.

Douglas Reports on Jet Liner Progress

Donald W. Douglas, president of Douglas Aircraft, says his company is making "most satisfactory progress" in developing a jet-powered airliner that will fly faster than 560 mph. and carry more than 60 passengers.

He forecasts that the day is "not too far away" when new Douglas jet transports will be flying.

Douglas says he is not excited or worried by speculation that the American aviation industry cannot catch up with Great Britain in production of commercial jet aircraft.

"When we are ready to deliver jet transports, they will be able to make money as well as headlines," he says. "American-built air transports today dominate the world because we have always produced airplanes that can produce profits for their owners.

"Our airline operators prefer a few lines of small type in the income columns of the financial page to just big type on the front page."

The aircraft company president predicts that the race to develop the best jet airliner will not be won by the first to start production.

"When our new jet liners zoom into the skies—and that should not be too far away—they will fly at speeds of more than 560 mph. . . . carry in excess of 60 passengers and be capable of crossing the United States in four hours or flying across any ocean or continent nonstop," he says.

KLM Traffic Up

(McGraw-Hill World News)

Amsterdam—Dr. Albert Plesman, president of KLM Royal Dutch Airlines, says high-density seating on the carrier's North Atlantic routes largely was responsible for a considerable increase in total passenger traffic last year.

KLM carried 518,000 passengers in 1952, approximately 20,000 more than 1951.

Plesman also announced a planned expansion of the KLM fleet this year and during 1954 by purchase of 21 new aircraft, bringing the airline's total to 93 transports at the end of the two-year program.



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Damon Calls Present Jets Uneconomical

Trans World Airlines president Ralph Damon says his carrier has "no present commitments" to buy commercial jet airliners, predicting that it will be impossible for anyone to buy an economically self-sufficient jet transport before 1958.

Damon says he believes de Havilland Comets are not making a profit for airlines despite recent claims by Sir Miles Thomas, president of the British aircraft manufacturing firm.

Thomas' contention that the Comet is making money in operation is "misleading," Damon says, because the de Havilland chief did not make clear that non-operational expenses involved in flying Comets were not included in the profit claims.

Flying Tribesmen

(McGraw-Hill World News)

Johannesburg—Central African tribesmen are taking to the air in large numbers. The cooperative African labor recruiting service for South African mines, Witwatersrand Native Labor Assn., is running an eight-flights-weekly service between Johannesburg and the Okavango River in Northern Bechunaland and Lilongwe in northeastern Nyasaland.

El-Al Plans New Fleet

(McGraw-Hill World News)

Tel-Aviv—Israel National Airlines is planning a multi-million-dollar program aimed at putting into the air by 1954 a new fleet made up of jet liners, Lockheed Super Constellations or Douglas DC-6Bs.

An El-Al spokesman says the carrier has asked the Israeli government for a $3-million loan to finance the program. He predicts the airline will be reduced to a small company flying old aircraft on a charter basis unless the expansion is approved.

New African Airport

(McGraw-Hill World News)

Johannesburg—Proposals are being made for an alternate all-weather airport, probably at Salima, a railhead of the western shore of Lake Nyasa. The field would complement the present terminal at Chileka, 11 miles from Blantyre in Nyasaland. Construction of the new terminal would mean that planes from Nairobi and Salisbury could dispense with the present practice of carrying large fuel reserves for use in the event that the present terminal became weathered in.

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66	10078-1AG	Eclipse	Gyro Indicator
62	CQ-9	Eclipse	Clutch Switch (PB10)
11	12086-1C	Eclipse	Amplifier
19	15100-1B-A1	Eclipse	Pitch Trim Gauge
8	20000-43A-13A1	Eclipse	Magnesyn Indicator
67	23000-2A	Eclipse	Magnesyn Indicator
15	22101-11-A4	Eclipse	Pressure Trans.
6	2226-11C-3A	Eclipse	Dual Tach.
9	20100-42B-14A2	Eclipse	Torque Ind.
9	20000-8A-14	Eclipse	Magnesyn Pos. Ind.
23	20100-11C-4-A1	Eclipse	Wing Flap Indicator
11	DW-33	Eclipse	Transformer
23	CQ-2	Eclipse	Switch Box
75	1195-4-A	Eclipse	Vibrator
80	DW-28	Eclipse	Transformer
11	2227-11-D3A	Eclipse-Pioneer	Tashometer
75	1416-12C	Eclipse	Starter
100	716-3A	Eclipse	Generator (NEA-3A)
384	564-2A	Eclipse	Oil Separator
71	828TY13Z2	Weston	Oil Temp. Indicator
26	827TY14Z2	Weston	Cyl. Head Temp. Indicator
40	119862	Weston	Carb. Air Temp. Indicator
400	AN5780-2	Weston	Wheel & Flap Position Indicator
1000	AN5780-2	G.E.	Wheel & Flap Position Indicator
40	828TY12Z2	Weston	Dual Carb. Temp. Gauge
11	727TY70Z2	Weston	Air Temp. Ind.
85	727TY72Z2	Weston	Air Temp. Gauge
88	727TY73Z2	Weston	Air Temp. Gauge
83	727TY74Z2	Weston	Air Temp. Gauge
10	728-40Z2	Weston	Air Temp. Gauge
21	8DJ29AAY	G.E.	Cowl Flap Ind.
22	77C5	Lewis	Carb. Air Temp.
16	76B19	Lewis	Cyl. Head Temp.
23	77C3	Lewis	Oil Temp. Gauge
13	77C4	Lewis	Oil Temp. Ind.
30	47B21	Lewis	Free Air Temp.
33	47B22	Lewis	Air Temp. Gauge
28	47B23	Lewis	Air Temp. Gauge
54	47B24	Lewis	Air Temp. Gauge
22	906-6-011	Kallsman	Diff. Press. Gauge
48	254BK-6-052	Kallsman	Diff. Press. Gauge
33	DW-47	Eclipse	Transformer
46	117-47	Edison	Fire Detecter
19	117-10	Edison	Control Box
345	981280	Walter Kidde	CO2 Cylinders
43	966090	Walter Kidde	Interconnector
104	966679	Walter Kidde	Pressure Control
225	981591	Walter Kidde	Tee
151	A-4614	Walter Kidde	Switch
47	M870036B	Walter Kidde	CO2 Cyl.
74	923748	Walter Kidde	Oxygen Cyl.
326	982585	Walter Kidde	Valve
325	AN6009-1B	Ohio Chemical	Valve
247	AN6009-2A	Ohio Chemical	Valve
47	2-1046-76	Parker	Valve (3000 PSI)
115	P4CA2A	Parker	Primer
98	SP4-2746-76	Parker	Restrictor Valve
68	SP4-2746-77	Parker	Restrictor Valve
105	SP4-2746-78	Parker	Restrictor Valve
68	6-746-10	Parker	Valve
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48	SP4-2746-80	Parker	Restrictor Valve
60	SP4-2746-81	Parker	Restrictor Valve
127	PL2-2546-75	Parker	Cone Check Valve
123	PL2-2546-76	Parker	Cone Check Valve
620	PL2-2546-77	Parker	Cone Check Valve
540	PL2-2546-78	Parker	Cone Check Valve
142	SP4-2746-76	Parker	Restrictor Valve
112	PLY-843-54	Parker	Check Valve
23	PL2-1846-77	Parker	Check Valve
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124	PF12-713-25BCE	Vickers	Hydraulic Pump
10	PF9-2713-20Z2	Vickers	Hydraulic Pump
327	PF4-713-20BCE	Vickers	Hydraulic Pump
57	MF45-3911-20Z	Vickers	Hydraulic Pump (3000 PSI)
28	AA31400	Vickers	Valve
125	D7818	Adel	Anti-icer Pump
250	AN4014	Erie Meter	Wobble (D-3) Pump
550	TFD8600	Thompson	Fuel Booster Pump
45	AN4103-2	Clifford	Brass (Valve #U4785) Oil Cooler
70	AN3213-1	Scintilla	Ignition Switch
250	A-9 (94-3226)	Nesco	Ignition Switch
66	M862A	Jos. Pollack	Master Switch
148	PG208AS1	Minn. Honeywell	Switch Air Ram.
40	PG208AS7	Minn. Honeywell	Air Ram Switch

Quan.	Part No.	Mfg.	Description
18	4582-AA-6C	Dynamic Air Eng.	Blower
24	U-702-15	Joy Mfg. Co.	Blower
20	V301B7	Aerotec	Pressure Relief Valve
419	450	Skinner	Filter
287	1033-4E1	White-Rodgers	Heater Control Switch
126	17322-2	Fenwall	Thermo-Switch
34	9804B	Vapor Car Heating Co.	Control Box
25	46B311	Vapor Car Heating Co.	Compensator
202	A812	Interstate Aircraft & Eng. Co.	Solenoid
46	146102	Bendix	Valve (0-500 PSI)
240	1265-900	Airex	Relief Valve
29	HC2109	Air Associates	Hyd. Cylinder
8	HC2110	Air Associates	Hyd. Cylinder
53	AN6203-3	Bendix	Accumulator 10"-1500 P.S.I.
90	JH950-R	Jack & Heinz	Starter Motor
140	K14949E	Marquette	Windshield Wiper Kit
188	EYLC-2334	Barber-Colman	Control
230	921-B	Stewart-Warner	Heater (200000 BTU)
22	0655-D	Aro	Oxygen Regulator
65	ASDC2	CO2 Mfg. Co.	Fire Detector
97	6041H-146A	Cutler Hammer	Relay (B-12)
237	6141-H69A	Cutler Hammer	Circuit Breaker
47	7264-404	Leach	Relay
22	M-2031	Air Associates	Actuator
11	FYLD2516	Barber Colman	Thermostat
51	AYLZ2284	Barber Colman	Micropositioner
20	72400	Ham. Stand.	Prop. Reversing Control
10	5X18	Woodward	Governor
46	A14-A-9708P	Westinghouse	Contactor
26	70G3	G.E.	Transformer
718	B2A	Square D	Relay
6	83A94	Surface Combustion Co.	Heater
115	C6363-15A	Spencer	Circuit Breaker
115	C6363-1-2A	Spencer	Circuit Breaker
33	18784	Adel	Restrictor Valve
1700	AM1614-80	Heinemann	Circuit Breaker
31	BOBX-2	Allied	Relay
85	12924-2	Adel	Lock Valve
805	58G926	G.E.	Ballast Core & Coil
140	58G946	G.E.	Ballast
40	7210-24	Leach	Relay
66	25432	Airesearch	Flex. Cable
518	MT48C	Bendix Radio	Insulator
20	M-101-B	Aerotec	Pressure Switch
12	MT68EG	Bendix Radio	Mount
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478	D9530	Adel	Selector Valve
668	D9530-2	Adel	Selector Valve
428	D9560-2	Adel	Selector Valve
179	D9632	Adel	Selector Valve
237	D9696	Adel	Selector Valve
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244	D10051	Adel	Selector Valve
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74	AN5830-6	Whittaker	Valve
60	AN5831-1	Parker	Valve
65	1011-2	Eclipse	De-icer Valve
130	612-4A	Eclipse	Valve
2200	37D6210 (AN4078-1)	United	Solenoid Valve
1888	K1593-6D	Kohler	Valve
500	NF3-5	Mallory	Noise Filter
20	TA-12B	Bendix Radio	Transmitter
35	RA10-DB	Bendix Radio	Receiver
2585	AN3096-4	Grimes	Dome Light
775	AN3096-5	Grimes	Dome Light
1365	AN3096-6	Grimes	Dome Light
6	610-2C	Eclipse	Vacuum Pump

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411	-C6	121	-C14A	210	-C30
8211	-CH6A	7742	-C20	102	-C36
173	-C7	345	AN5-C7A	246	-C41
90	-C11	2542	-C7	165	AN6-C7
457	AN4-C4	1531	-CH7	393	-C14
516	-CH6	2578	-CH7A	129	-C14A
6714	-C7	1660	-C11	450	AN7-C21A
80	-C10A	185	-C11A	194	AN8-C15

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SHORTLINES

► **Allegheny Airlines'** certificate renewal by Civil Aeronautics Board is considered certain by Washington observers who attended the oral argument. Mail rate tentatively is set by CAB at 87.05 cents per mile on base mileage of 7,500 mi. a day. Sliding-scale formula is fixed to yield a break-even income at a load factor of 36% at forecast mileage. . . . The carrier's split from All-American Engineering Co. has been approved by CAB and stockholders. Shares will be mailed Feb. 10 to holders of record Jan. 30 in a ratio of one engineering share for every two shares of Allegheny, formerly All-American Airways, Inc. All-American Engineering Co. has applied for listing on the American Stock Exchange.

► **British European Airways** carried 1,341,000 passengers in 1952, 17% more than a year ago. Passenger-miles were 357 million for 1952. Freight gained 16% to 14,000 tons, and ton-miles were up 15% to 5,120,000.

► **British Overseas Airways** has announced expansion of coach services starting Mar. 1, as reported in AVIATION WEEK (Jan. 26, p. 14). Rates will be reduced as much as $243 from standard roundtrip.

► **Capital Airlines** president J. H. Carmichael speaks to 4,100 employes in 36 cities each Thursday at 4 p.m. over the carrier's private telephone circuit. Personnel need not leave their jobs to hear the talk and may question Carmichael during the weekly conferences.

► **Canadian Pacific Airlines** publicity for trans-Pacific Comet service planned this year is adopting the slogan: "There's only ONE way to cross the South Pacific."

► **Caribbean Atlantic Airlines** certificate has been renewed for five years between Puerto Rico, Virgin Islands and Dominican Republic.

► **California Central Airlines** traffic gained 31% in 1952 to 63,090,841 passenger-miles. Four-year 1949-52 total is 160,413,103 passenger-miles.

► **Civil Aeronautics Administration** has written a brief on the civil aviation outlook for Secretary of Commerce Sinclair Weeks, former Pullman Co. director. One problem: stating tactfully that CAA believes the airlines have made long-distance Pullman travel obsolete.

► **International Civil Aviation Organization** has arranged a settlement between India and Pakistan, which previously forced Indian airliners to detour around Pakistan territory to reach Afghanistan. Both countries have agreed to an ICAO suggestion of two 20-mile wide corridors through Pakistan.

► **Miami International Airport** plans for a $12-million elevated expressway between Miami's business district and the field will be finished this year, says Port Authority director A. B. Curry. The new highway will cut auto time to 15 minutes. "We have definite plans to get it started in 1953," Curry says.

► **Mohawk Airlines** has transferred all station personnel and flight agents to the sales department and appointed Lee W. Holmes as customer service manager over the group. The company also has set up five regional sales regions, each with a district manager equal to the customer service manager. Sales and promotion formerly was directed by local managers.

► **North American Aircoach Systems,** largest non-scheduled passenger sales operation, has suggested by letter sent to Charles E. Wilson, Secretary of Defense, and Commerce Secretary Weeks that the 250 corporate executive DC-3s be included in the Civil Air Fleet Reserve Program for mobilization.

► **Pan American World Airways** has increased West Coast-Honolulu coach service to four roundtrips a week—two Los Angeles and two San Francisco. December, PAA's first month of coach, increased total traffic 73% over December 1951. One-third of the traffic was coach. . . . Pan American has transferred its eight C-46 cargo planes back to the Air Force. Pilots had demanded a cut in gross operating weight to 45,000 lb., as required by CAB for C-46 passenger carriage.

► **Seaboard & Western Airlines** December traffic of 3,124,254 ton-miles was 59% greater than a year ago.

► **Trans-Pacific Airlines (Aloha)** charges Hawaiian Airlines' subsidized Convair 340 operation is unfair competition. TPA says the island-hopping flights are too short to make Convairs economical.

► **Trans World Airways** traffic the first week of 1953 increased 33% domestic and 35% international over a year ago. . . . TWA flew 715 million passenger-miles in 1952 and "provided more low-cost (coach) transportation than any other airline in the world," sales vice president E. O. Cocke says.

WHAT'S NEW

Telling the Market

Manufacturing process for stainless steel tubing and pipe, from forming and welding through final inspection, and a chart of tubing and pipe sizes, are included in folder prepared by Damascus Tube Co., Greenville, Pa.

Virtually all **machine and cutting tools** produced by Ex-Cell-O, including basic machine specs and product descriptions, are listed in firm's general products catalog available by writing Ex-Cell-O Corp., Detroit, Mich.

Welcome to the McCook Plant is 24-page booklet describing Reynolds Metals Corp.'s aluminum sheet mill in Illinois. Write Desk 4552, Reynolds Metals Co., 2500 So. Third St., Louisville 1, Ky.

A method for **mounting lathes without drilling or lagging** into the floor, using Unisorb mounting pads and cement, is described in a bulletin issued by The Felters Co., 210 South St., Boston 11, Mass.

Flight Plan, a 36-page booklet issued by United Air Lines, details in non-technical language standard flight procedures, electronic navigation aids and other methods used by the carrier. Write 5959 So. Cicero Ave., Chicago 38.

New Addresses

United States Steel Corp. as of Dec. 31, 1952 has succeeded to all properties and rights of United States Steel Co. in a program to simplify USS corporate structure. The sole surviving corporation now is United States Steel Corp.

Emery Air Freight Corp. has formally opened a new 15,000-sq. ft. terminal facility at 237-241 E. 36th St., New York City, replacing its previous location, 314 E. 39th St. The new terminal will contain Emery's Eastern District headquarters and New York offices.

SBAC Show Film

A striking film presentation that highlights Britain's contribution to the fast-moving aeronautical picture is Shell Oil Co.'s "Society of British Aircraft Constructors Show, Farnborough —1952."

Copies of this 16-mm. sound film may be borrowed, without charge, for showing, by writing to the company at 50 W. 50 St., New York, N. Y.

The film is a masterly portrayal of the latest British jet aircraft in flight, including the newest delta-wing fighter and bomber types. And there are sequences showing jet fighters going through the sonic barrier.—IS

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EDITORIAL

'Keep Digging for the News'

It seems to us highly significant that the outgoing Secretary of the Air Force urged reporters at his farewell press conference to keep everlastingly at their job of digging out the news in the military services.

Mr. Finletter displayed increasing sympathy during his stay at the Pentagon for the American people's right to know more about what their government was up to. He displayed increasing impatience, as his administration progressed, with unnecessary secrecy demanded by uniformed brass of the Air Force.

In the last few months of his administration, Mr. Finletter took over his own press relations, and gave a number of interviews, including one with Miss Katherine Johnsen of AVIATION WEEK. He checked the story personally before its publication, and suggested minor revisions, which were made before press time.

During this magazine's experiment with a voluntary censorship plan for several months last year on the subject of the giant Boeing B-52 jet bomber, Mr. Finletter gave this magazine credit for exerting some beneficial influence on the press generally, by discouraging scoops on the one combat plane Mr. Finletter then urged utmost care in discussing publicly. He told us near the close of the experimental period, in the presence of his chief press officer at that time, that he felt our experiment had been a success, and that the nation's press had run up a negligible number of security violations. But, he added, he felt some of AVIATION WEEK's enforced regulations during its experiment had been "too strict," if any criticism could be made at all.

"The job of getting the news out to the people is of the highest importance," Mr. Finletter told his last press conference. "I think there has been a tendency on the part of people in military establishments to hold back news on the theory of security and also because, I suppose, government officials have a congenital tendency that way anyhow. I hope you will continue to worm it out of our successors the way you wormed it out of us and the more you worm—it is a pretty safe rule—the better it will be."

Mr. Finletter probably has been familiar with the country's top secrets. He should recognize "security violations" when he sees them. He should also be capable of assessing the probabilities of damage or benefit in enlightening the people in individual cases. His vigorous plea for an informed public stands as a bright spot in the dying days of the Truman Administration, which generally held and followed the policies of public secrecy. His plea also is worth the consideration of a new administration in government.

A Sage Decision for Safety

Decision of the military services to cancel a "fly-by" of nearly 500 combat aircraft over the congested streets and roadways of the District or Columbia on Inauguration Day was a sage move, made in the interests of public safety and advancement of aviation.

Equal credit must go to the Aircraft Owners & Pilots Assn., which disclosed plans for this potentially hazardous exhibition some ten days before the ceremonies, and urged that it be drastically revised or canceled.

J. B. Hartranft, Jr., general manager of AOPA, wrote the Civil Aeronautics Administrator that "the effect of a serious accident in the heart of the nation's capital during the inaugural ceremony, when the entire world will be watching everything that happens, is so frightening to contemplate that we must address this appeal to you in the interests of all civil aviation."

The Administrator had already approved fully the Services' overhead spectacle.

USAF, which was directing arrangements, planned to fly 310 planes, the Marines 58, the Navy 50, the Army 42, and all four services were to furnish helicopters.

Normal and essential air services in a wide area surrounding Washington would have been paralyzed or disrupted, on a day when public demand for transportation into and away from Washington would be at a peak. Private pilots were being discouraged from using their planes at all. The hazards of aerial collisions would have been intensified. Hundreds of thousands of visitors to the area would have shared with the million inhabitants the added hazards from falling aircraft.

Up to a few days before the cancelation, Air Force spokesmen still were protesting that such a fly-by could be conducted with complete safety—a remarkable bit of prophecy—and were using as the questionable basis for this contention the fact that 621 planes had flown over the Truman inaugural four years ago without an accident. With such logic as this we could guarantee against any accident today because there happened to be none yesterday under similar circumstances.

Fortunately, wiser heads finally prevailed.

Perhaps, at last, we can note some progress in the fight being led by the more thoughtful elements of aviation to improve air safety by tempting fate and the laws of chance a bit less.

Two Great Records in 1952

Domestic certificated airlines hung up an all-time passenger safety record in 1952, equivalent to .38 fatalities for each 100 million passenger-miles. The final figure, expected to be available in a few weeks, may be revised to .37, industry spokesmen indicated to AVIATION WEEK.

This compares with 1.3 fatalities per 100 million miles in 1951, and 1.1 in 1950.

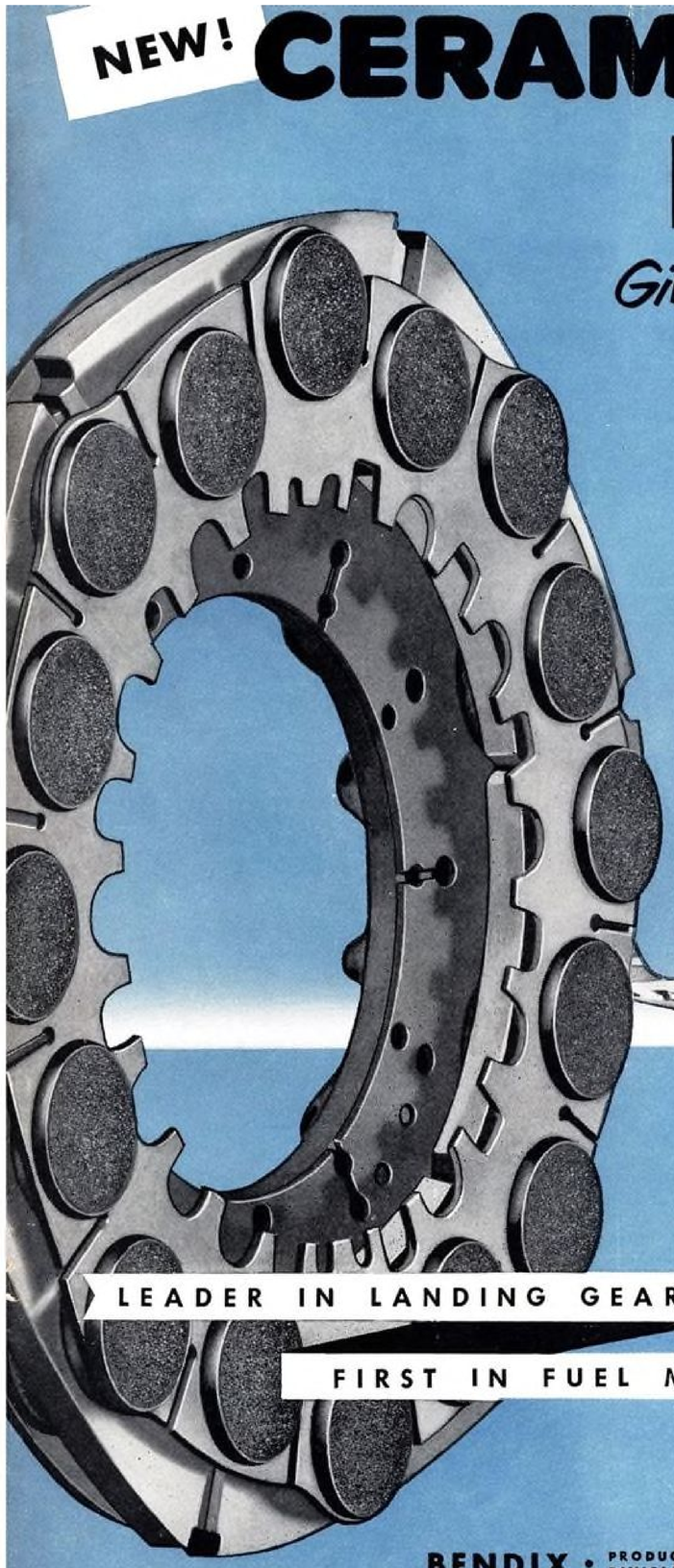
The railroads of the country also set a new all-time passenger safety record in 1952.

According to estimates for the year, based on preliminary reports for 11 months, the Association of American Railroads says there was one passenger fatality for each 2 billion, 200 million passenger-miles. This represents a fatality rate of .045 for each 100 million passenger-miles.

The association expects the final figures for the year to be "at least this good." This covers operations of the 128 Class I railroads, representing 99% of the country's railroad passenger business, the AAR told AVIATION WEEK.

These are both great records for public safety.

—Robert H. Wood



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