

AVIATION WEEK

AUG. 16, 1948

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1936 ... when MICHAEL DETROYAT

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1946 ... when the first postwar

Thompson contest was flown, and the first jet-powered planes competed in a Thompson Trophy Race. The "J" Division of the race was won by MAJOR GUS E. LUNDQUIST of the Army Air Force in a Lockheed P-80 "Shooting Star" at the brilliant average speed of 515.85 m.p.h.



1947 ... when COOK CLELAND,

World War II ace, flying a stripped-down Navy "Corsair", averaged 396.13 m.p.h. to set a new record for piston engine planes. There were "over 3,000 horses under his cowl" and his speed exceeded by nearly 113 m.p.h. the prewar record of Roscoe Turner.



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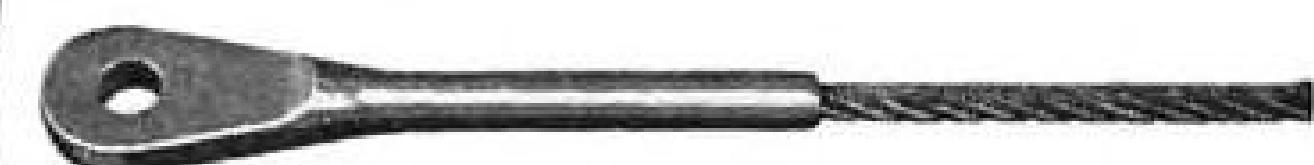
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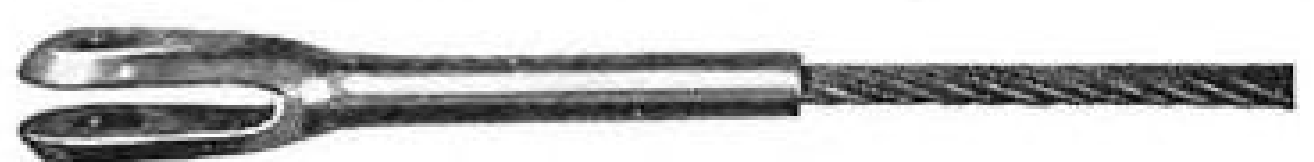
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AN 669 Standard Turnbuckle End



AN 668 Standard Eye End



AN 667 Standard Fork End



AN 666 Standard Stud End



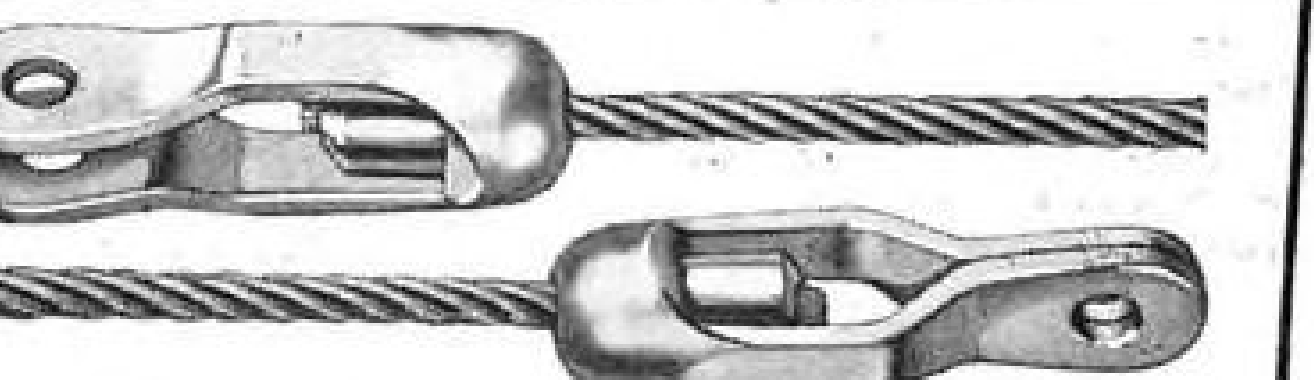
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AN 664 Ball and Shank



AN 663 Ball and Double Shank



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— Fork — Eye

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AVIATION WEEK

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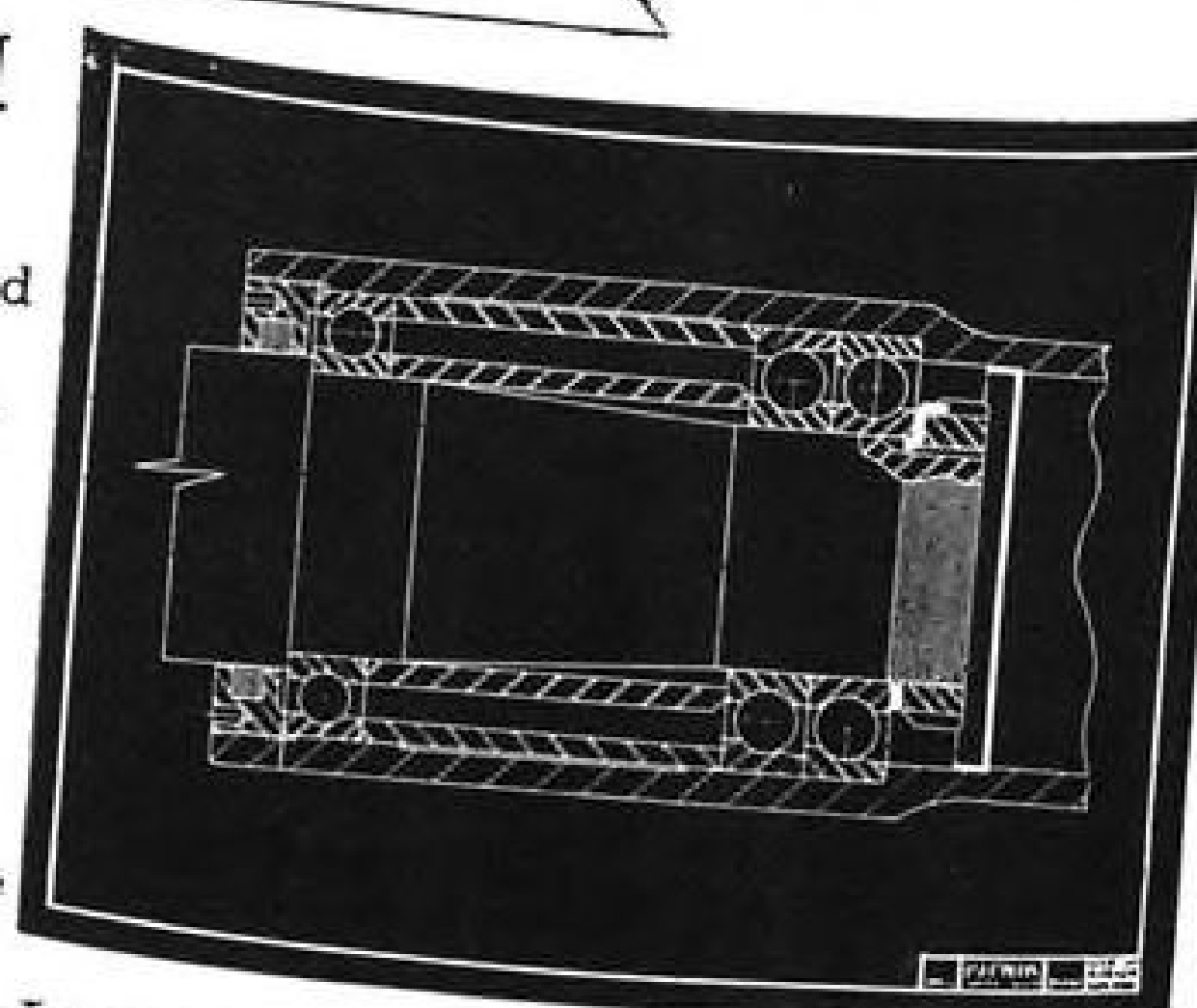
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Aircraft ball bearing development in step with aviation progress

SPECIFICATION

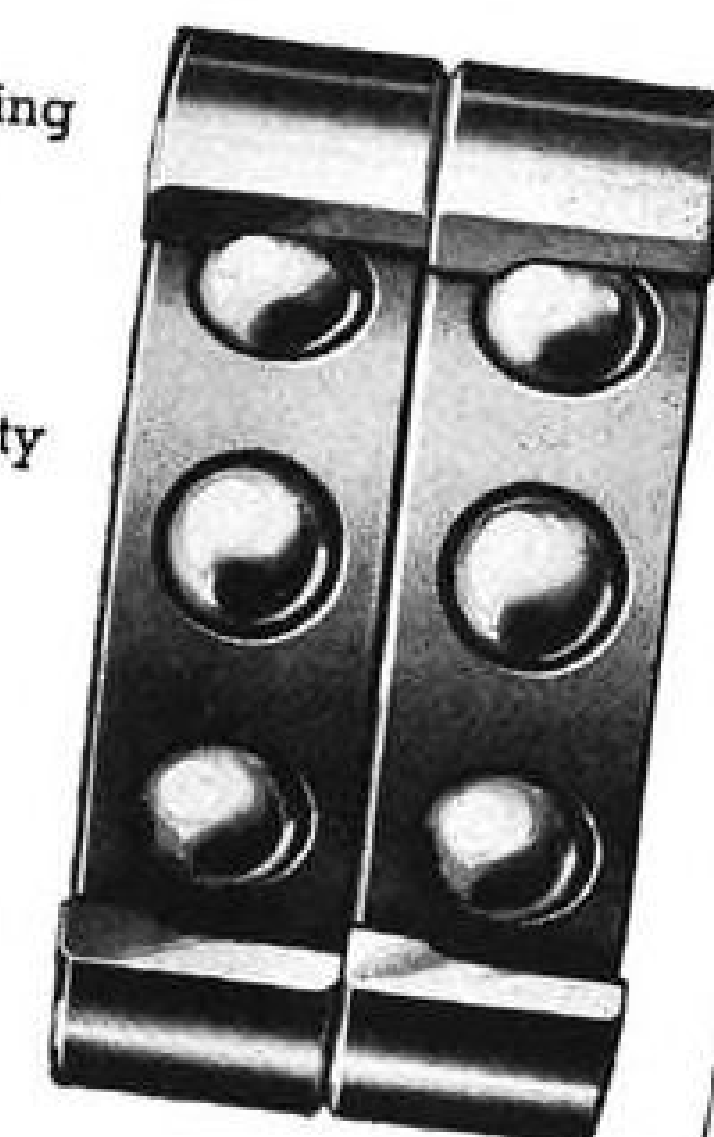
Ball bearing for rotor blade retention in helicopters
MUST withstand heavy thrust load from centrifugal force of blades.
MUST permit smooth, easy movement of blades for cyclic pitch change.
MUST maintain uniformity of operation of all blades.
MUST minimize friction oxidation resulting from reversing motion over small angle of travel.
MUST be compact and light, yet able to withstand heavy stresses.



SPECIALIZATION

Fafnir Angular Contact Blade Retention Ball Bearings

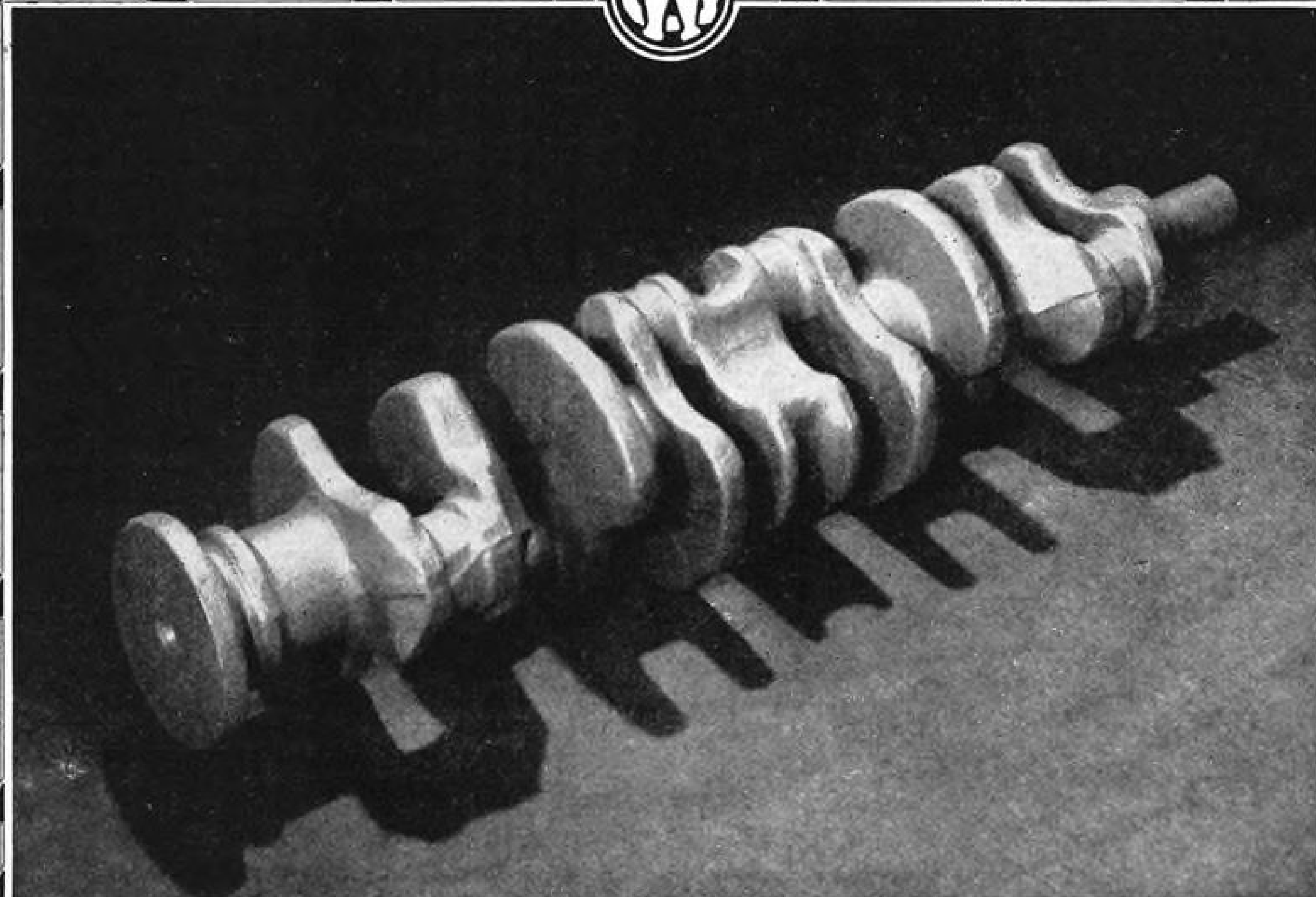
- ★ Close tolerances both in assembly of the bearing and in fit-up of the bearings in the blade assembly reduce friction oxidation.
- ★ Matched sets of these bearings in duplex or triplex mountings provide extra rigidity to handle extremes of centrifugal force and maintain uniformity of operation of all blades. Such assemblies are possible as a result of Fafnir's experience in providing matched pairs of ball bearings for high speed spindles.
- ★ Research provided lubricants that protect balls and races even in very small angles of reversal.
- ★ Bearing life in this vital helicopter part has been increased from 15 hours to several hundred.



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That is also why Fafnir has been responsible for the major developments in ball bearings for aircraft. And why Fafnir is the logical first choice for either aircraft ball bearings or for air-minded collaboration in solving new bearing problems. The Fafnir Bearing Company, New Britain, Conn.

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THE AVIATION WEEK

Challenge of the Sky-Coach

C. R. Smith's bright vision of a three-cents-a-mile passenger airline fare has not vanished with postwar inflation. In slightly different form and with new backers, the idea of cheap air transportation competitive with rail coach travel has flashed back to plague the certificated carriers.

The challenge of cut-rate "sky-coach" service to the regular airlines has developed in three important sectors of the American air transportation scene. Currently, the tussle between "irregular" operators and their certificated competitors on the transcontinental run has taken the spotlight. But bargain-counter fare on the Pacific Northwest-Alaska and New York-Puerto Rico routes also have been a continuing headache to the scheduled carriers since the beginning of 1946.

Operating DC-3s and an occasional DC-4, the "nonskeds" are flying between New York and Los Angeles for \$99 plus tax, and, in one instance, at \$88 plus tax. This compares to \$143.15 plus tax for transportation in the same equipment on the certificated airlines and about \$158 for DC-6s and Constellations. A further 10 percent increase on coast-to-coast regular fares may become effective next month.

Bargain Rates to Puerto Rico

On the heavily-traveled New York-San Juan route, irregular operators offer fares averaging about \$75 one-way (one operator has a \$40 tariff), compared with about \$133 for their two certificated competitors, Pan American Airways and Eastern Air Lines. Between Seattle and Alaskan points, the nonskeds have undercut Northwest Airlines and Pan American passenger fares by 20 percent or more.

Early in December, CAB plans to hold another hearing on new routes between the U. S. and Puerto Rico. Nonskeds and cargolines have flocked into the proceeding. Among the applicants are World Airways, which operates 80-passenger Boeing 314 flying boats (AVIATION WEEK, June 21), American Air Transport and Flight School, Inc., Peninsular Air Transport, Modern Air Transport, Trans Caribbean Air Cargo Lines, Willis Air Service and Riddle Aviation Co.

Passengers - - But No Mail

Three of the carriers emphasize they will continue to offer non-luxury service with second-class fares if certificated between the U. S. and Puerto Rico. In some cases, the nonskeds request authority to carry passengers and property only—no mail.

How much business potential exists between New York and San Juan was illustrated by Trans Caribbean Air Cargo Lines, which told CAB that 101,000 persons

traveled from Puerto Rico to the U. S. in 1947, and over 64,000 from the U. S. to Puerto Rico in the same year.

A somewhat similar situation exists on the Pacific Northwest-Alaska run. During the spring, summer and fall, such nonskeds as Mt. McKinley Airways, Arnold Air Service, Standard Air Cargo, Columbia Air Cargo, Northern Airlines and Golden North Airways have flown thousands of fishermen, miners, cannery workers, construction personnel and other non-white collar passengers between the Seattle area and Alaska.

Growth of the nonsked traffic from the Pacific Northwest to Alaska was pointed up recently by a Seattle Chamber of Commerce study. It disclosed the irregular carriers spent \$4,744,000 on wages, facilities, fuel and services in the Seattle area alone during 1947.

Still Make Profit

The principal transcontinental irregular carriers claim they are making a profit on their \$99 coast-to-coast fares despite the 10 to 35 percent commission paid to travel agencies which generate much of their business. The secret, they say, lies in their coach-type service.

Coffee is served aboard the planes, but no meals. During a 20-hr. transcontinental flight (compared to 12 hr. on the certificated lines) the nonsked plane refuels at fields where passengers have access to restaurants. At the departure point and destination, "frills" such as baggage handling are eliminated.

Often the irregular operators do not dispatch their flights until a high load factor is assured. Fifteen full seats on a 21-passenger DC-3 bound coast-to-coast usually means a profit, even with the \$99 fare.

New Field Open

The nonskeds claim they have opened a whole new field of air transportation in their sky coach service and that they divert very little traffic from the regular carriers. Whether CAB will agree is an open question.

The Board had before it this year an application for coach-type service in the request of Atlantic Airlines for a certificate in the Middle Atlantic Area Case. The bid was turned down last February on the ground that it would create severe competition for existing certificated lines which were suffering heavy financial losses and because Atlantic's estimated costs seem to the Board, to be unattainable.

CAB is now faced with a slightly different proposition—route applications by going companies with known costs, but its answer may well be the same as in the Atlantic case. Meanwhile, the certificated carriers could take the edge off the nonskeds' arguments by instituting coach-type services of their own and by following American Airlines' lead in luring the family trade with special first-of-the-week cut-rate fares.

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NEWS DIGEST

DOMESTIC

Civil Aeronautics Board Chairman Joseph J. O'Connell, Jr., has been named chairman of the Air Coordinating Committee, the Federal government's overall coordinating agency on aviation. The committee, which also advises the President on aviation policy matters, is composed of representatives from State Department, Air Force, Navy, Commerce Department, CAB and the Budget Bureau.

Court of Appeals for the District of Columbia has denied bail for Bennett E. Meyers, former Air Force procurement officer, pending action on his appeal from a conviction of inducing another person to give false testimony.

Joint Air Force-Army-Navy maneuvers will be held off the Florida Gulf coast between Sept. 27 and Nov. 3. Headquarters for the maneuvers will be split between Eglin Field and Pensacola.

FINANCIAL

Grumman Aircraft Engineering Corp. reports net profit of \$1,027,706 for the first six months of 1948. Earnings per share are \$1.02, based on the two-for-one stock split in June, 1948. Comparable figures last year were \$311,072 and \$1.31, also based on the split. A \$1 dividend was declared on new common equal to \$2 on the old stock.

Air Associates, Inc., has net income of \$110 for the quarter ended June 30, 1948, as compared with an adjusted loss of \$98,663 for the same period in 1947. Sales for the period totaled \$1,540,092 compared with \$1,498,566 for the same quarter a year ago.

Bell Aircraft Corp. showed profit of \$142,741 for the first quarter of 1948 on sales of \$2,237,906.

FOREIGN

Navy Carrier Sicily arrived at Glasgow with 75 Lockheed F-80 jet fighters destined for Germany. The jets will fly from Scotland to their permanent stations in Germany.

Second Bomb Group of the USAF Strategic Air Command will send 30 Boeing B-29s to England on "routine training mission." They will replace the 301st Bomb Group now "training" in Germany.

Aero Service Corp., Philadelphia, will make an aerial mapping and airborne magnetometer survey in Africa for Mozambique Gulf Oil Co., subsidiary of Gulf Oil Corp. The survey covers 45,000 square miles in Portuguese East Africa.

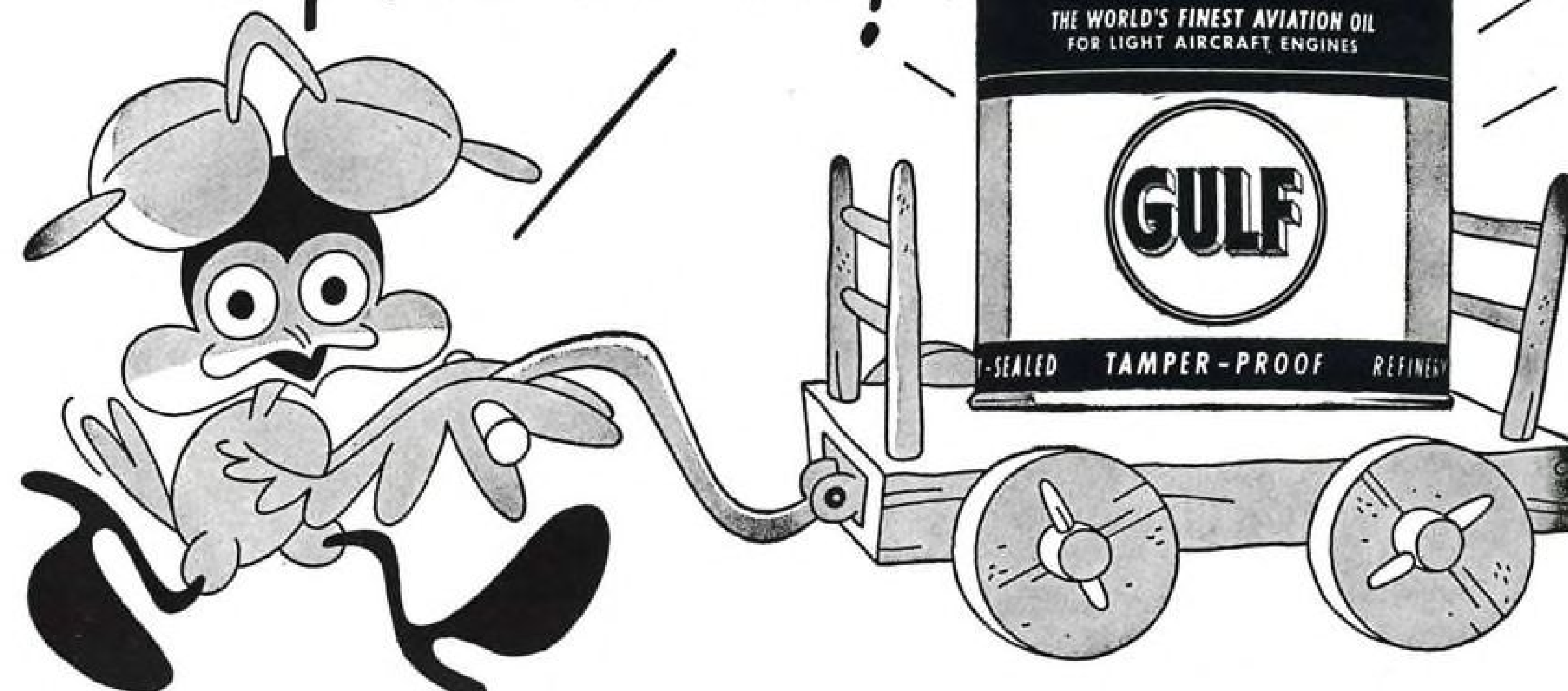
AVIATION WEEK, August 16, 1948



The Birdmen's Perch

By Major Al Williams, ALIAS, "TATTERED WING TIPS,"
Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh 30, Pa.

Good News
by the Canful!



And in case you weren't around last month, here's what the great new oil in that can does:

1. Exhaustive tests have proved that this oil will free sticking valves and rings and keep them free *much* longer. That means money saved on top overhauls.

2. It keeps foreign matter cleaned from engine surfaces and in suspension, so that

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Does that sound good? Here's more:
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is a fully detergent dispersent type with oxidation inhibitors and anti-foam agents. It took us *six* years of experimental work to bring you the world's finest oil for light aircraft engines!

But remember . . . Gulfpride Aviation Series D is for horizontally opposed engines. For all other types, keep on using Gulf Aviation Oil or Gulfpride Motor Oil.

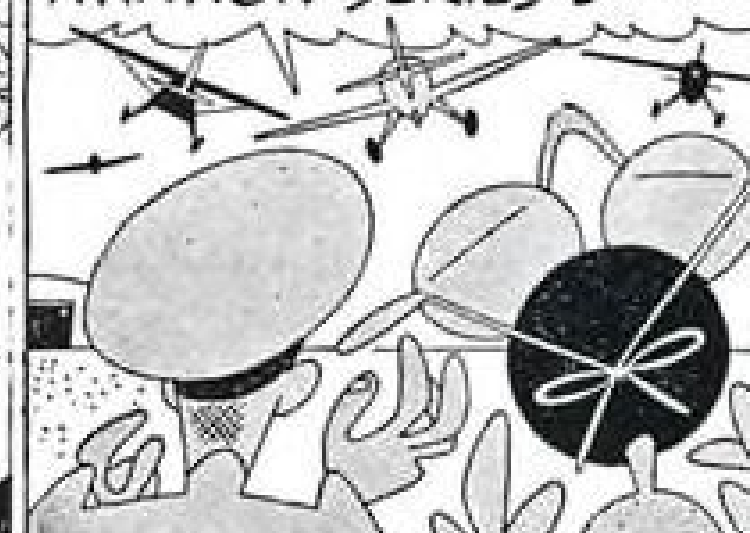
EVEN IF YOUR DEALER OR OPERATOR IS NOT A GULF MAN, TELL HIM THAT...



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BECAUSE EVERY PILOT WILL WANT TO USE GULFPRIDE AVIATION SERIES D....



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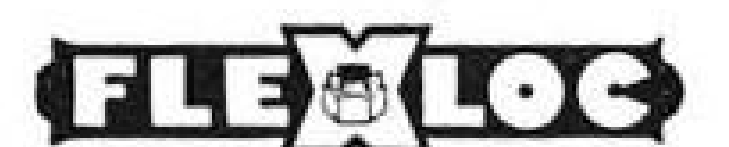


SOCKET SCREW PRODUCTS

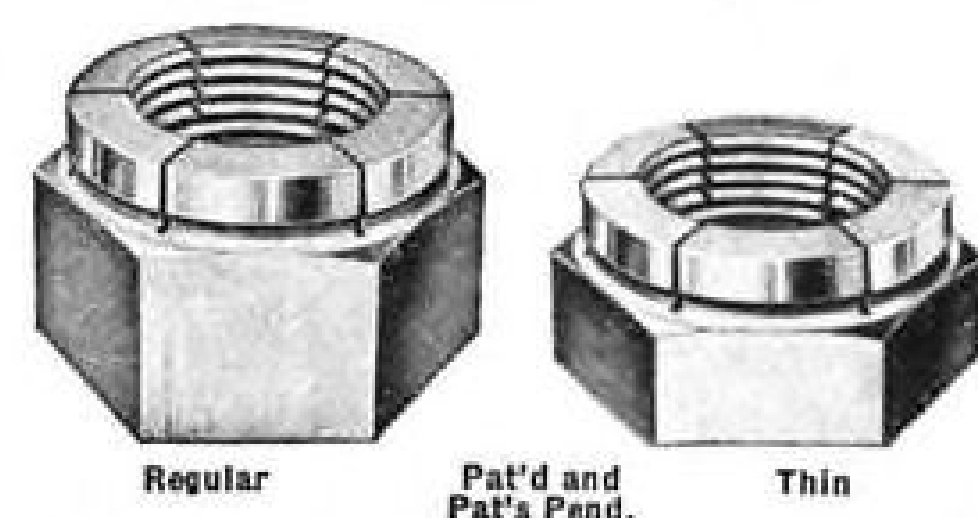
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PAT'D AND PATS. PEND.

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Vol. 49, No. 7

AVIATION WEEK

August 16, 1948

Group Formed to Plan Plane Development

Working as ACC branch, board will study design, cost and airline need of transports.

A five-member inter-agency group, functioning as an arm of Air Coordinating Committee, has set to work to blueprint a program for development of commercial transport and cargo prototypes.

The group has the hearty endorsement of Sen. Owen Brewster (R., Me.) and Rep. Carl Hinshaw (R., Calif.), the chairman and vice chairman, respectively, of the former Congressional Aviation Policy Board, who sponsored legislation authorizing a government-financed commercial plane development program.

► **Progress Expected**—"The establishment of this group means that the prototype development program will progress almost as well between now and next January as it would, had our bill been enacted," Hinshaw commented.

The Brewster-Hinshaw measure was unanimously passed by the House, after airline and aircraft manufacturing interests and all government agencies concerned approved it. But when last-minute opposition developed, Senate Republican leaders, aiming at a quick adjournment, dropped plans for its consideration by the Senate at the special session. Opposition came from the Senate Armed Service Committee and some aircraft manufacturers.

► **Seek Delay**—Both pleaded for delay until the new Congress meets in January, so they could give the matter further consideration. Armed Service Committee members, led by Sen. Chan Gurney (R., S. Dak.), are concerned over the policy of using military funds to finance planes for commercial air transport and the costs of the program.

Manufacturers suddenly have become apprehensive that the government prototype program would be too big a jump toward nationalization of the industry and that it might interfere with sales of commercial planes now on the market.

Hinshaw hit back sharply at the manufacturers' objections. "They have repeatedly testified, both before the

President's Air Policy Commission and the Congressional Aviation Policy Board, that they positively cannot undertake any commercial plane development on their own—that the costs are too great and cannot be written off with sales to the airlines," Hinshaw declared. "Therefore, it is a question of either no

commercial plane development in the United States, or of a government program. It is a question of our government promoting advanced types for our airlines or having our airlines buying foreign craft in four or five years.

► **Manufacturers Scored**—"The manufacturers are probably right in their concern that the government, under the program, will develop only two or three transport types and one or two cargo types, and commercial plane development will be concentrated in a few firms," the California congressman continued. "The manufacturers were all in favor of the program. But when they started to realize that they might not get business under it, some turned against it, and surreptitiously whipped up opposition to it."

Membership on the inter-agency group which has started planning on a government prototype program corresponds to that of the proposed Civil Transport Aircraft Evaluation and Development Board provided for in the Brewster-Hinshaw measure. It consists of Grant Mason, assistant to Assistant Secretary Air Cornelius Vanderbilt Whitney, representing the Air Force; Charles Cary, representing the Navy; Harold Jones, Civil Aeronautics Board member; George Burgess representing Civil Aeronautics Administration; and Ira Abbott, representing National Advisory Committee for Aeronautics.

► **Sub Committees Listed**—Three working subcommittees will be set up:

(1) A recovery subcommittee, to work out a plan whereby the government can, at least in part, recapture its expenditure in prototype development.

(2) Subcommittee on requirements, to determine the present and future demand of airlines, the armed services, and other aviation interests for transport and cargo craft. This subcommittee will also make a study of air cargo potentials.

(3) Technical subcommittee, to study the design requirements for prototypes.

Membership on the inter-agency group is still flexible. The five agencies concerned may designate different, or additional persons to represent them.

The group met informally with Brewster and Hinshaw and is functioning as a branch of ACC to preclude any

Channel Wing Flight

Up and down went the Custer channel wing airplane at Hagerstown (Md.) airport recently.

The strange-looking experimental aircraft with two U-shaped channels for wings, climbed to an altitude of about 25 ft. before pilot Frank Kelley cut the throttles of its two engines and it settled to the ground.

Willard R. Custer, inventor of the aircraft, said Kelley was taxiing the aircraft and feeling out the controls. He was endeavoring to synchronize the rpm. of the two engines and was watching his tachometers intently. Custer had expected the aircraft to lift about a foot off the ground and was crouched at the side of the runway to shoot a picture. But instead the aircraft flew past at about 25-ft. altitude.

When Kelley discovered he was airborne he chopped the throttles. The craft had enough forward momentum so that the flow of air continued through the channels and the plane came down to land with minor damage reported to a propeller tip and one channel. Additional flight tests are planned in September after repairs and modifications of the propeller and channel wing are completed. Kelley is president of the National Aircraft Corp., which has been formed to develop the aircraft.

AVIATION WEEK, August 16, 1948

HEADLINE NEWS

11

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criticism that the agencies concerned are over-stepping their jurisdiction in planning a commercial prototype program.

At the session with Brewster and Hinshaw the two main points of discussion were possibilities for recovering government expenditures and the "target date" for new types to be developed under the program.

► **Fund Retrieving**—On recapturing funds, the only proposal brought forth was that the government levy a fee on all planes manufactured from prototypes and use it to offset development costs. Hinshaw commented that this would interfere with one of the objectives of the program—to make advanced type planes available to the airlines at a price they can afford. "But it would not necessarily nullify this objective, unless the fee were too great," he commented.

A professional advisor to the Senate Armed Services Committee, Col. Justice Chambers, is independently making a survey of ways of recapturing government development costs. He has considered the possibility of reducing the mail pay rate of airlines enjoying the advantage of economic planes developed under the government program. The saving on mail pay would be applied to offsetting costs of the development program.

New Craft for Chile

Two new Martin 2-0-2 transports left Washington, D. C., National Airport early this month en route to Santiago, Chile, where they will be put in service by Linea Aerea Nacional. LAN has two other Martin 2-0-2s.



HOW SMALL CAN YOU BUILD THEM?

Convair employees Ken Coward, Karl Montijo and William Chana (shown in pilot's position) built the Weebee, their midget plane in 600 man-hours at a cost of \$200. All metal, the craft weighs 135 lb. empty, has a wing span of 15 ft., and is powered by a 22-hp. engine. Design specifications

indicate high speed of 90 mph., 600 ft./min. sea level climb, and landing speed, full flaps, 45 mph. Piano hinging attaches all control surfaces. Pilot is held on by harness and reaches through two armholes to control the plane. Craft uses only air speed indicator, rpm. indication and altimeter.

Prop Reversing: Aid to Safety?

Airlines, CAA pilots study braking action of reverse thrust propellers. Greater payload one issue at stake.

The contribution of reverse thrust propellers to air transport safety is being weighed carefully by the airlines, their pilots, the aircraft manufacturing industry and the Civil Aeronautics Administration.

Object is to determine how much—if any—performance credit should be allowed transport aircraft equipped with the new type props. If credit is given for the reversible propellers' braking action (and approach and balked landing climb-out performance requirements remain unchanged), the airlines may be able to operate into small fields and show a marked increase in their useful payload.

Data are also being gathered to show whether reverse thrust propellers are of such importance to safety that they should be made mandatory equipment on all airline planes.

► **Accident Study**—Potential contribution of reversible propellers to air safety is illustrated by a CAA study of landing accidents—the most frequent type of airline mishap. During the three-year period 1945-47, 45 major landing accidents were recorded, 24 of which involved overshooting. It is believed that had reverse thrust propellers been used, some of these airline accidents might have been prevented, and the severity of others might have been reduced.

Takeoff accidents may also be fewer because of reversible-pitch propellers. W. A. Patterson, United Air Lines president, said the crash of a company DC-4 at LaGuardia Field on May 29, 1947, in which 43 persons were killed, probably could have been prevented had the plane been equipped with reverse thrust propellers.

During takeoff, with the gust lock inadvertently on, the UAL DC-4 was unable to leave the ground. The pilot cut his power, applied his brakes and attempted to ground loop 1800 ft. from the end of the runway; but the plane failed to stop, plunging beyond the field and catching fire.

► **Opinions Vary**—A recent CAA-sponsored meeting in Los Angeles disclosed widely divergent opinions on the additional safety margin presently provided by reverse thrust propellers during landing and takeoff. The Air Transport Association is currently attempting to coordinate the views of its membership so that further comment can be made to CAA this month.

Approximately two years ago, CAA issued a safety regulation release permitting installation of reverse thrust propellers on aircraft when certain minimum safety requirements were met. It indicated that consideration would be given to the use of reversible propeller installations in showing that a duplicate set of wheel brakes was unnecessary and in the establishment of accelerate-stop distances on takeoff. But CAA at that time stated it would not permit the use of reverse thrust propellers in determining landing distances.

To date, several aircraft types, including the DC-6, Constellation, Convair-Liner and Martin 2-0-2, have been certificated with reversible propeller installations, although none has used reverse thrust in determining performance data. At the request of aircraft manufacturers, CAA has now reopened for discussion the entire subject of granting performance credit for reverse thrust propellers. And manufacturers and airlines have been quick to discuss.

► **Los Angeles Meeting**—At the Los Angeles meeting, spokesmen for Consolidated Vultee Aircraft Corp. and Boeing Airplane Co. told CAA that use of reverse thrust propellers should be permitted in showing that a duplicate set of wheel brakes is unnecessary. They said that even with a single set of wheel brakes the use of reverse thrust should be allowed in determining the accelerate-stop and landing distances.

ate-stop and landing distances.

Douglas Aircraft Co. and Glenn L. Martin Co. also believe use of reversible propellers should be considered in showing that a duplicate set of wheel brakes is unnecessary. But they added that dual wheel brakes should be required if reverse thrust propellers are used in determining the accelerate-stop and landing distances.

Representatives of Lockheed Aircraft Corp. declared reversible propellers should not be used to substitute for a duplicate set of wheel brakes since the weight penalty of a dual brake system is very small. They agreed, however, that if dual brakes are employed the use of reverse thrust should be permitted in determining accelerate-stop and landing distances.

► **Trouble Cited**—Citing difficulties still being experienced with reversible propellers, several airlines and the Air Line Pilots Association urged caution in allowing credit for their braking action. Eastern Air Lines stated bluntly that present reverse thrust propellers are unsatisfactory and, therefore, the company does not favor their use in performance determinations.

On the basis of its experience, American Airlines said that in approximately one landing in ten at least one propeller will stop during the reversing cycle. This is attributed mainly to carburetion difficulties, particularly at high altitude, since the idling settings are not compensated for altitude.

► **Tests Made**—AA has been testing an installation with a double detent, whereby the pilot can pull the throttles through the reversing detent and to the second stop without taking his eyes off the runway. Up to about 4000 ft. this provides adequate rpm. (at least in the test airplane) to prevent the propellers from stopping during the reversing cycle. But, American noted, it still does not provide assurance that at Mexico City, where the elevation reaches a height of 7300 ft., the propellers will not stop during the reversing.

Use of reverse thrust propellers should not be permitted in showing that a duplicate set of wheel brakes is unnecessary, AA declared. It added that reversed props should not be used either in determining the minimum kinetic energy rating of the wheel brakes or in establishing accelerate-stop distances.

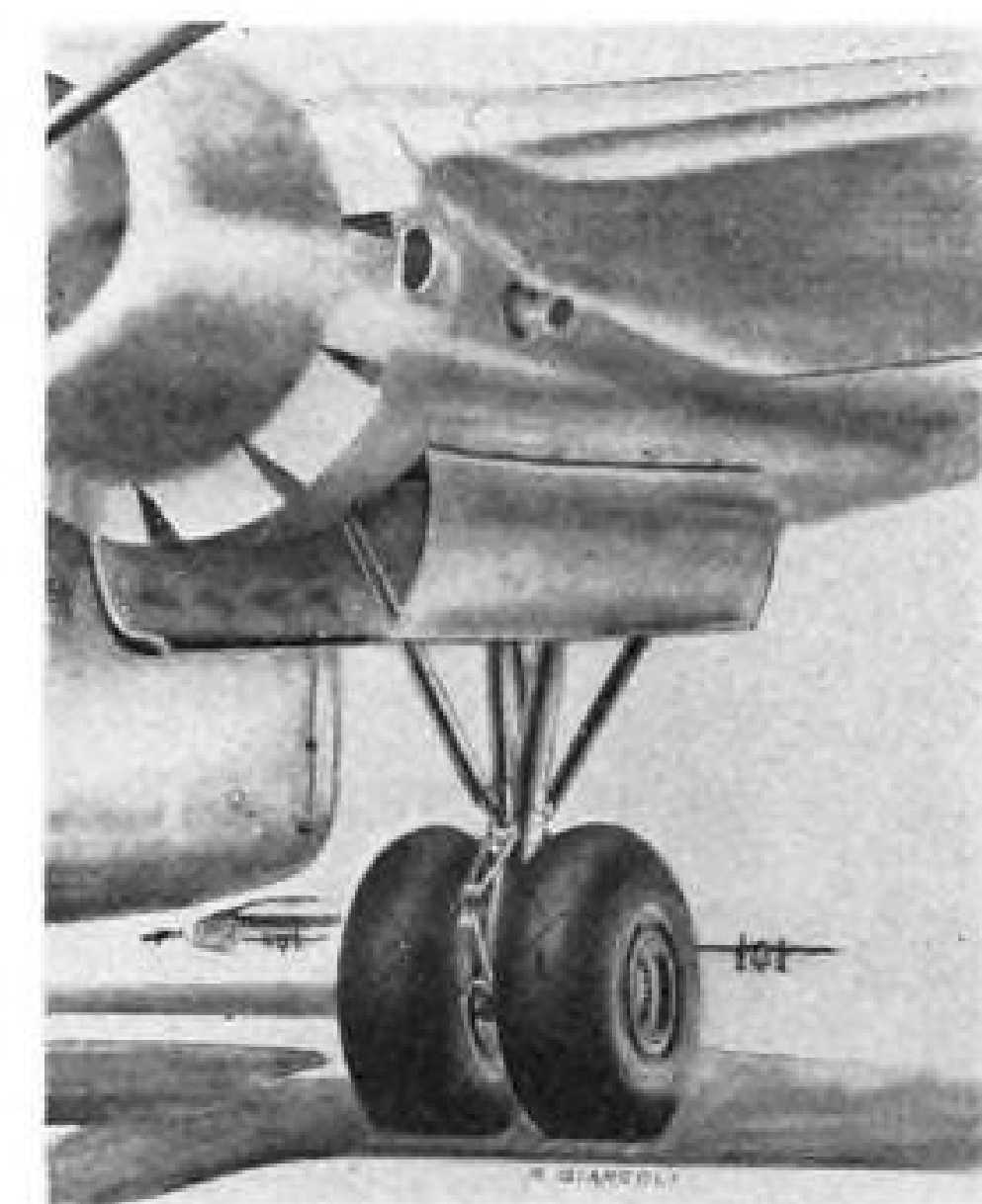
► **Caution Urged**—CAA representatives said the instances of failure cited by American and others point up the fact that unreliable factors must be completely corrected before permission to use reverse thrust propellers in performance data is given. "Until it is assured that the propeller will always reverse itself, the determination of data assuming their reversal would lower the safety level," CAA declared.

Northwest Airlines and TWA agreed with American that reversible propellers should not be used in determining accelerate-stop distances. Pan American Airways took a different position, arguing that employment of reverse thrust propellers should be permitted in showing that a duplicate set of wheel brakes is unnecessary and stating that use of reversible propellers should be allowed in determining the accelerate-stop and landing distances with a single brake system if an emergency system is provided.

The Air Line Pilots Association emphasized it is happy to see reverse thrust propellers on new airplanes "because they generally increase safety." The union added, however, that in their present state of development reversible props should not be used in determining minimum landing distances or in developing figures for accelerate-stop distances.

Fairchild Favored

Federal District Court in Philadelphia expressed preference for the Fairchild Engine and Airplane Corp. offer of \$185,000 for the helicopter division of the Kellett Aircraft Corp. The court termed Fairchild's offer "firmer" than a bid of \$150,000 submitted by the Hughes Aircraft Co.



NEW GEAR FOR PACKET

Another Fairchild Packet landing gear, this time a dual-wheel main gear installation, will be installed on the C-119B production model. Adaptable to skis, track gear and conventional single wheel gear, the Packet will be able to land practically anywhere. The new dual-wheel installation reduces the ground pressure to accommodate the increased gross weight of the new Pratt and Whitney Wasp Major powered version. Two 45-in. tires replace the single 56-in. tire of the C-82 in the gear to be built by Cleveland Pneumatic Tool Co.

Sonic Review

Fast flying planes have brought a host of new considerations to the attention of the aircraft engineer and aerodynamicist. Latest basic knowledge on this subject is wrapped up in one clear-cut review—a "Primer of Sonic Aerodynamics"—on page 21 of this issue of AVIATION WEEK.

Military 2-0-2

Martin bids for USAF business with design for seven versions.

Glenn L. Martin Co. is offering seven basic modifications of its Model 2-0-2 airline transport for military use.

These include staff transport; cargo transport; hospital plane; airborne troop carrier; twin engine pilot trainer; navigation trainer and radar bombardier trainer.

► **Cargo Modifications**—Cargo version of the 2-0-2 includes a beefed-up cabin floor, standard cargo tie down facilities, large cargo doors permitting fore and aft loading and an increased payload. The military or cargo 2-0-2 would gross 43,000 lb. in contrast to its commercial certification at 39,500 lb. and carry a 15,100 lb. payload.

Cruising speed is 281 mph. at 12,000 ft. Staff, hospital and troop carrier versions involve standard interior modifications for those functions. Cargo version is designed to take off and clear a 50 ft. obstacle in 1730 ft.

Pilot trainer has two extra flight and engine instrument panels in the cabin for use by trainees when they are not flying. This version is designed for a gross weight of 36,000 lb. and will take off in 1300 ft. of runway at that weight.

► **Navigation Plans**—Navigation trainer has a cabin modified to accommodate 17 navigation students and their equipment. The cabin is equipped with several duplicate flight instrument panels, loran scopes, individual drift meters and working tables for the navigators. This version has a 43,000 lb. gross and requires 1780 ft. for takeoff. Maximum range at cruising speed of 206 mph. is 3400 miles.

Bombardier-radar trainer is modified with a radome under the belly just forward of the wing and a bomb bay just behind the wing designed to carry 23-100 lb. practice bombs. Five visual bombsights are provided for the student bombardiers with another post forward for radar bombing. All radar bombsight equipment is contained in a special compartment aft of the cockpit.

Weather Bad, Traffic Clearing

Combination of radar and VHF beam approach system already has begun to untangle the instrument weather airport traffic snarl.

Report from the Civil Aeronautics Administration on a 16-hour period of instrument weather at Chicago Municipal Airport on May 13 showed an average landing interval of 3.6 minutes and a maximum holding delay in the "stack" of only 42 minutes. Only holding delays over 15 minutes were caused by two missed approaches which delayed 20 aircraft between 20 and 42 minutes each.

During this period, 113 aircraft landed and 110 departed—all under instrument conditions. Weather was close to the minimum with about a 600-ft. ceiling and scattered clouds at 400 ft. Only 14 range approaches were

used. The remainder used ILS monitored by radar. Of the 105 airline approaches only eight used the range.

CAA reported that by constant use of surveillance and precision beam (GCA) radar tower personnel were able to reduce materially the time interval between approach and landing without the use of a device such as the General Railway Signal Corp. Timer used in the LaGuardia tower. Biggest remaining problem in the use of radar for traffic control is positive identification of individual aircraft on the radar scope.

The Chicago traffic included Twin Beech, Martin 2-0-2, Lockheed Constellation, and Douglas DC-3, DC-4 and DC-6. For one three-hour period between 10:30 a.m. and 1:30 p.m., 50 planes were landed with many touching down at two-minute intervals.

engineering school, Theodore Theodoresen, formerly of NACA; professor of structures, John E. Younger formerly head of the mechanical engineering department, University of Maryland; professor of aircraft engines, Ralph Dubois, formerly of Packard Motor Co.; professor of aircraft design, Frederick C. Phillips, formerly of Glenn L. Martin Co.; dean of the airways engineering school, Charles I. Stanton, formerly deputy administrator of CAA; professor of airport design, Robert L. Champion, formerly director of the Arcata Landing Aids Experimental Station; professor of aviation economics, William Grossman, formerly of New York University; and professor of applied mathematics, Francis D. Murnaghan, formerly head of the mathematics department at Johns Hopkins University.

Other three divisions will be organized as funds become available and construction is completed on facilities in the campus city near Sao Paulo. Over a million dollars worth of U. S. Aeronautical equipment has already been shipped to Brazil for use in the Center.

► **Air Ministry Project**—The Center was conceived by the Brazilian Air Ministry under Lieut. Brigadier Armando Trompousky and is being executed by a special commission headed by Col. Casimiro Montenegro Filho. Plan for the Center was strongly supported by Brazilian president Eurico Dutra.

Eventually when sufficient numbers of Brazilians have been trained the U. S. staff will be replaced by graduates of the Center. The Brazilian Center of Technical Aeronautics is one of the most ambitious post-war aeronautical education projects to be launched anywhere and its progress will be followed closely by aviation and educational circles throughout the world. If successful it will provide Brazil with a solution to its particular needs in aviation development, including a network of air transport closely integrated with its economic system; aircraft types best suited for its commercial needs; and a foundation of trained personnel to operate, maintain and develop its aviation.

In military aviation Brazil will continue its parallel development with the U. S. Air Force using USAF tactical planes and training methods.

Cargo Line to Buy DC-4

Trans Caribbean Air Cargo Lines, New York, plans to purchase another DC-4 through its second public offering of \$150,000 in airline equipment trust certificates. A similar issue last spring was over-subscribed. One of the nation's largest contract and nonscheduled carriers, Trans Caribbean had gross revenues of \$1,150,593 in the first half of 1948 compared with \$690,458 in the same period last year.

Air Navigation Board Gets Under Way

The Air Navigation Development Board, responsible for producing an all-weather airways system, began work in Washington last week. Selection of a permanent chairman and a director of development were the first order of business.

Permanent members of the board now include: Col. Sam Mundell, USAF; Walter Larue, Army; Capt. W. P. Cogswell, Navy and Burt Denicke, CAA. Denicke is also executive secretary of the group.

► **Additional Member**—The permanent chairman will be an additional member of the board who will have only part-time duties. He will be paid at \$50 per day plus expenses for the time he actually attends board meetings. He will be selected by the Secretary of Commerce from a list recommended by the board.

Director of development will be the head of the board's technical staff. This will be a \$10,305 per year Civil Service job. He will be named by the board.

► **Permanent Pact**—Terms of the tentative agreement between the Department of Commerce and the National Defense Establishment have now been formalized into a permanent pact with little change in the original plan (AVIATION WEEK, May 31).

A temporary engineering group working with the board is now compiling a complete catalogue of all equipment now available and contemplated in research and development programs that might meet the needs of an all-weather airways system. This catalogue is expected to be completed in another month.

First business of the board will be to evaluate equipment listed in the catalogue in comparison with the specifications of the Radio Technical Commission for Aeronautics report on the all-weather airways system (AVIATION WEEK, Mar. 1). The board will then realign present research and development projects to meet the needs detailed by RTCA and begin new projects where existing plans are not sufficient to fill the bill.

Baker Heads Committee

George Baker, of the Harvard Business School, former vice chairman of the Civil Aeronautics Board and of the President's Air Policy Commission, will head the Aeronautics committee of the National Military Establishment Research and Development Board. Baker's committee will take over functions of the old recently dissolved Army-Navy Aeronautical Board that were not assigned to the Munitions Board (AVIATION WEEK, August 9).

Other members of the Aeronautics committee: Artemus Gates, former asst. secretary of the Navy for air; T. P. Wright, former CAA administrator and now with the Cornell Aeronautical Laboratory; Hugh L. Dryden, NACA research director; Maj. Gen. E. M. Powers and Maj. Gen. A. R. Crawford both of the Air Force; Col. F. W. Farrell and Lieut. Col. George M. Griswold, of the Army.

The working committee of the Aeronautical Board on Aircraft Standards will continue to function independently under sponsorship of the Air Force and Navy. The Arcata Landing Aids Experimental Station steering committee, formerly under the Aeronautical Board will also continue on an independent basis.

CAB and Carriers Meet on Fare Raise

The Civil Aeronautics Board and representatives of the 16 domestic trunklines will meet in Washington late this week to discuss the need for an industry-wide passenger fare increase and to consider ways of achieving additional economies.

In calling the conference, CAB took notice of the 10 percent fare hikes proposed by United Air Lines, TWA and American Airlines beginning Sept. 1. Other carriers have failed to follow the lead of the transcontinental operators.

► **Charge for Meals Eyed**—The Aug. 19 meeting will take up the possibility of producing additional revenue through charging extra for meals served in flight and through institution of cut-rate "pro-

motional" tariffs to boost traffic during slack periods.

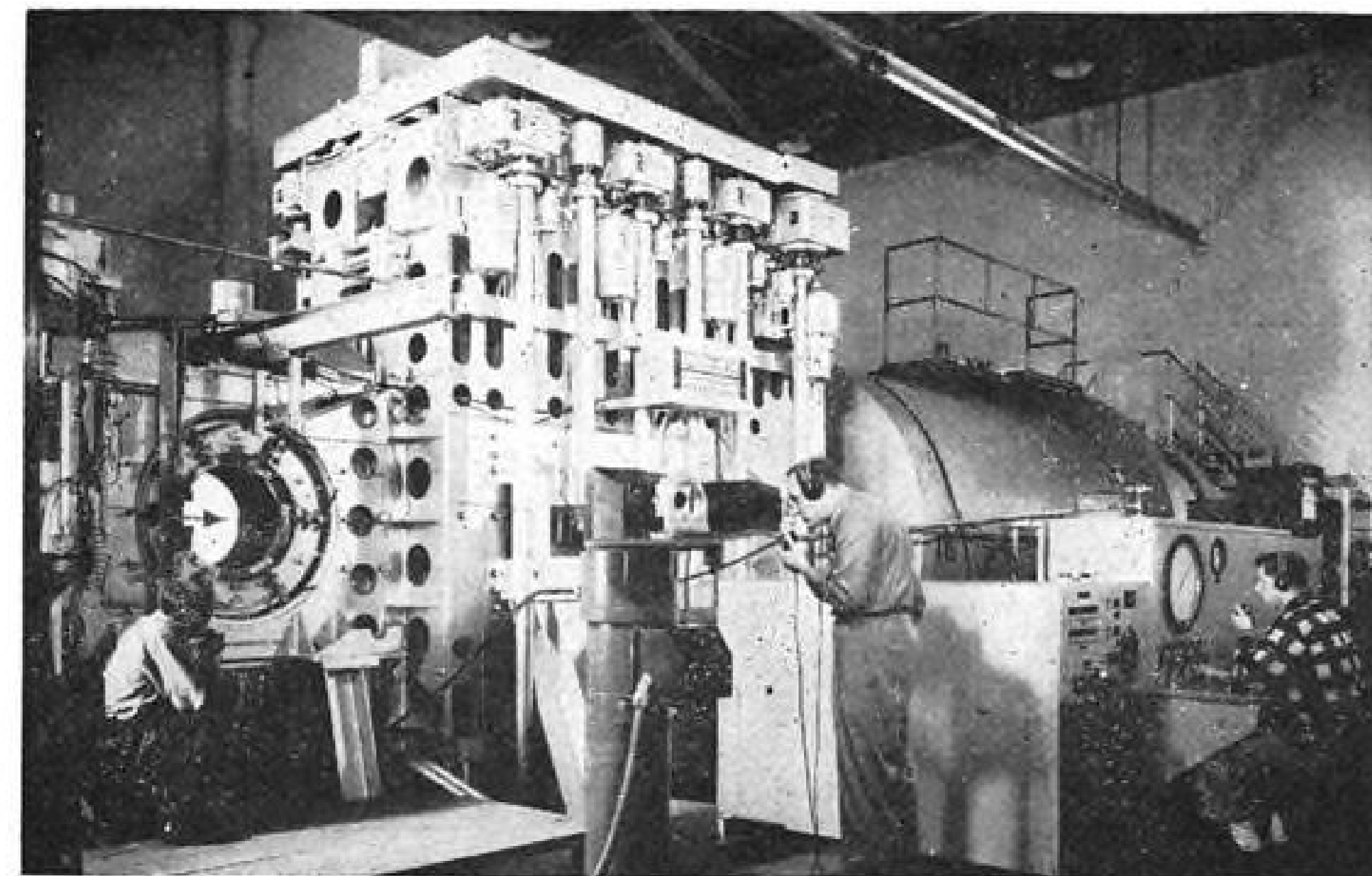
With eyes on declining load factors, CAB will point out instances of over-scheduling. Cost reduction possibilities to be examined include consolidation of ticket offices, joint use of ground handling facilities and other cooperative agreements.

Announcement of the meeting coincided with CAB's decision to defer action on the recent request of United Air Lines for an increase in its current temporary mail pay and on the bid of TWA for establishment of its current temporary rate as of Mar. 14 1947, instead of Jan. 1, 1948.

The Board reiterated its unwillingness to alter, or adjust retroactively, the carrier's temporary mail rates at this time. In deferring a decision on the requests, CAB took cognizance of the inauguration on Sept. 1 of air parcel post (with its revenue-producing possibilities) and the "generally favorable" airline earnings in May and June.

► **Mail Rate Study**—CAB promised to continue to follow the financial status of the carriers closely to assure adequacy of all temporary mail rates. It said it is proceeding as rapidly as possible to process the various mail pay cases now pending and expects that several of the proceedings will be completed in the next two months.

The Board plans to have its staff begin active processing of the "big five" mail rate case within 60 days. It pointed out the close connection between the "big five" proceeding and studies which it had been directed to undertake by congressional committee investigating the airmail situation.



FLEXIBLE THROAT SUPERSONIC TUNNEL

Supersonic wind tunnel of the Ames Laboratory of the National Advisory Committee for Aeronautics features a flexible throat to provide varied Mach numbers for the 1x3 ft. test section shown at the left. The

flexible throat apparatus is contained in the large square mechanism to the right of the test section. Wind tunnel control panel is located at the extreme right. Pedestal mounts Schlieren photo apparatus.

Aeronautical Center for Brazil

With an American staff, it will attempt to produce a generation of Brazilians completely versed in aeronautics.

By Robert Hotz

Brazil is organizing an American-staffed Center of Technical Aeronautics to spearhead development of its civil and military aviation.

The Center will make a unique attempt to combine in a single organization functions similar to those now covered in the United States by the National Advisory Committee for Aeronautics; the Civil Aeronautics Administration's experimental stations at Indianapolis and Arcata; USAF's Wright Field and advanced aeronautical engineering schools.

► **Training Project**—Out of the Center, Brazil eventually expects to get generations of Brazilian aeronautical engineers, research technicians and aviation economists with which to expand and develop an aeronautical system suited to the special needs of that country. Organization of the Center is planned on a vast scale including construction of a specially planned city and recruitment of top level U. S. authorities on various phases of aviation to staff the Center and act as consultants to the Brazilian Air Ministry in drawing up a master blueprint for Brazilian aviation development.

The Center will be located on a plateau about 40 miles from Sao Paulo. It will include an airport with 12,000 ft. runways; ultra-modern housing and recreation facilities for 2000 students, technicians and teachers; classrooms and research facilities, including several wind tunnels. Construction has already begun on these projects.

► **Organization Plans**—The Center is planned in four divisions. The first—an Aeronautical Institute of Technology—is nearly completely organized and is already functioning. This institute will consist of five schools: aeronautical engineering; airways engineering; meteorology; electronics; and aircraft production and maintenance. It will be staffed by 18 U. S. full professors and 30 associate professors.

Present head of the AIT is Dr. Richard Smith, formerly of the theoretical aerodynamics department of Massachusetts Institute of Technology. Smith is also in charge of recruiting U. S. personnel for the project, assisted by Dr. Artur S. Amorim, Brazilian representative of the Center in the United States.

► **Professors Listed**—Others who have already signed contracts to teach at the AIT include dean of the aeronautical

INDUSTRY OBSERVER

► Convair B-36As are undergoing a tough service testing by the Air Force. One B-36A took off with a 311,000-lb. gross weight in 5600 ft. of runway at standard temperature and flew a 6000-mile nonstop simulated bombing mission at an average speed of better than 300 mph. Bombing run was made at an altitude of 30,000 ft. Although the giant bomber was picked up by radar, jet fighters failed to locate it for interception. On another mission a B-36A dropped 72 one-thousand-pound bombs in the Gulf of Mexico.

► Second Glenn L. Martin Co. XB-48, six-jet bomber, has been completed and is now undergoing taxi tests at the Martin Airport near Baltimore, prior to making its first test flight.

► Convair's six-engine transport the XC-99 now has about twelve hours of experimental flight time. The giant transport has been equipped with the same type double tandem landing gear as the B-36A.

► Grumman is working on a new Navy jet fighter, the XF10F. The new fighter is still in the design engineering stage.

► Douglas Aircraft of Santa Monica is converting six of All-American Aviation's DC-3s for feederline operations. Modifications will include a 24-passenger seating arrangement, air to ground radio-telephone equipment, cabin loudspeakers and built-in entrance door steps.

► Navy transport Squadron VR-2 at Alameda has completed final modification and overhaul of the JRM-2, latest model of the Martin Mars flying boat. Operational tests with a 165,000-lb. gross weight are scheduled to begin next week.

► Army has contracted with Johns Hopkins University for a research study on the feasibility of supplying an airhead established by airborne troops in contrast to the supply problems of a beachhead made by amphibious forces.

► CAA officials are trying to interest the Air Force in utilizing military search radar installations for civil airways traffic control. First deal proposed would involve piping air traffic data from the USAF V-beam radar at Sandy Hook, N. J., to the LaGuardia Field airways traffic control center. This would replace the CAA search radar at Queens College destroyed by fire last April.

► Australian government has ordered twelve de Havilland trimotor Drovers at a cost of \$45,500 each. Export campaign is planned to sell the Drover as a feederliner in South America, Canada, India, Siam, South Africa and Sweden. Drover production is expected to get under way in Australia this fall with deliveries beginning next summer.

► Glenn L. Martin Co. will probably ask CAA for permission to operate its Stratovision planes under all weather conditions. First Stratovision aerial relay is planned for Pittsburgh and hearings have begun on the enterprise before the Federal Communications Commission.

► Vincent Burnelli, developer of "body-lift" type aircraft for the past 30 years, has returned his designs to the United States after an absence of seven years in England and Canada. Central Aircraft Corp. of 501 5th Ave., New York, is now handling the Burnelli plans which include new designs for a larger, four-engined version of his Loadmaster and a jet military version.

► Col. Marion Carl's marine fighter squadron equipped with McDonnell Phantoms made a four-day swing around the circumference of the United States last month as the first operational test of the mobility and reliability of this type Navy jet fighter. Four of the eight starting planes finished the tour which began and ended at Cherry Point, N. C. Mechanics followed the squadron in a Beech transport to do routine maintenance work en-route.

AVIATION CALENDAR

Aug. 17-18—AIA National Aircraft Standards Committee Eastern Division Meeting, Philadelphia.

Aug. 18-20—Society of Automotive Engineers, West Coast meeting, St. Francis Hotel, San Francisco.

Aug. 20-22—AIA Engine Technical Committee Meeting, Continental Lodge, Bitely, Mich.

Aug. 24—ICAO African-Indian Ocean regional air navigation meeting, Seattle.

Aug. 24-27—American Institute of Electrical Engineers, Pacific General Meeting, Davenport Hotel, Spokane, Wash.

Aug. 25-26—AIA Engine and Propeller Technical Committees Meeting on AN-D-13 drawings and data lists, Hotel Statler, Washington.

Aug. 26-27—International Wakefield Trophy Model Airplane meet, Akron, Ohio.

Aug. 27-29—Annual convention Ninety-Nines, Hotel Muehlbach, Kansas City, Mo.

Sept. 2-4—National Flying Farmers Association convention, Ohio State University, Columbus, Ohio.

Sept. 4-6—National Air Races, Cleveland.

Sept. 5-11—Seventh International Congress of Applied Mechanics, Imperial College of Science and Technology, South Kensington, London, England.

Sept. 6—ICAO Air Navigation Committee, Montreal.

Sept. 7—ICAO Council fifth session, Montreal.

Sept. 7—ICAO Air Transport Committee, Montreal.

Sept. 7-12—SBAC aircraft show and display, Farnborough, England.

Sept. 9—IATA legal committee, Brussels.

Sept. 11-12—Second Annual AOPA Summer Round-up Flight, Rehoboth Beach, Del.

Sept. 13—IATA executive committee, Brussels.

Sept. 13-17—National Instrument Conference, Instrument Society of America, Convention Hall, Philadelphia.

Sept. 14-15—AIA Airworthiness Requirements Technical Committee, Joint Division Meeting, Chicago.

Sept. 14-18—IATA fourth annual general meeting, Brussels.

Sept. 17-19—First annual convention, Fourteenth Air Force Association, Biltmore hotel, Dayton, Ohio.

Sept. 19-21—Twelfth International Convention, Northwest Aviation Planning Council, Vancouver, B. C.

Sept. 20—IATA executive committee, Brussels.

Oct. 20-21—National Safety Council, Air Transport Section, Hotel Stevens, Chicago.

Oct. 6-8—National Association of State Aviation Officials, Copley Plaza, Boston.

Oct. 6-9—Society of Automotive Engineers aeronautic meeting, Biltmore Hotel, Los Angeles.

Oct. 14—Annual Air Line Dispatchers Association convention, Edgewater Beach Hotel, Chicago, Ill.

Oct. 15-24—International aircraft exhibit, Royal Danish Aeronautical Society, Copenhagen.

Oct. 17-21—National Aviation Clinic, Detroit.

Oct. 21-22—Society of Automotive Engineers production meeting, Statler Hotel, Cleveland.

Oct. 22-23—4th Annual Arizona Aviation Conference, sponsored by Chamber of Chamber, Prescott.

Nov. 4-5—Society of Automotive Engineers, fuels and lubricants meeting, Mayo Hotel, Tulsa, Okla.

Nov. 9—ICAO operations division, Montreal.

Nov. 15-17—Aviation Distributors and Manufacturers Assn., sixth annual meeting, Hotel Statler, Cleveland.

Nov. 15-17—National Aviation Trades Assn., annual meeting, Allerton Hotel, Cleveland.

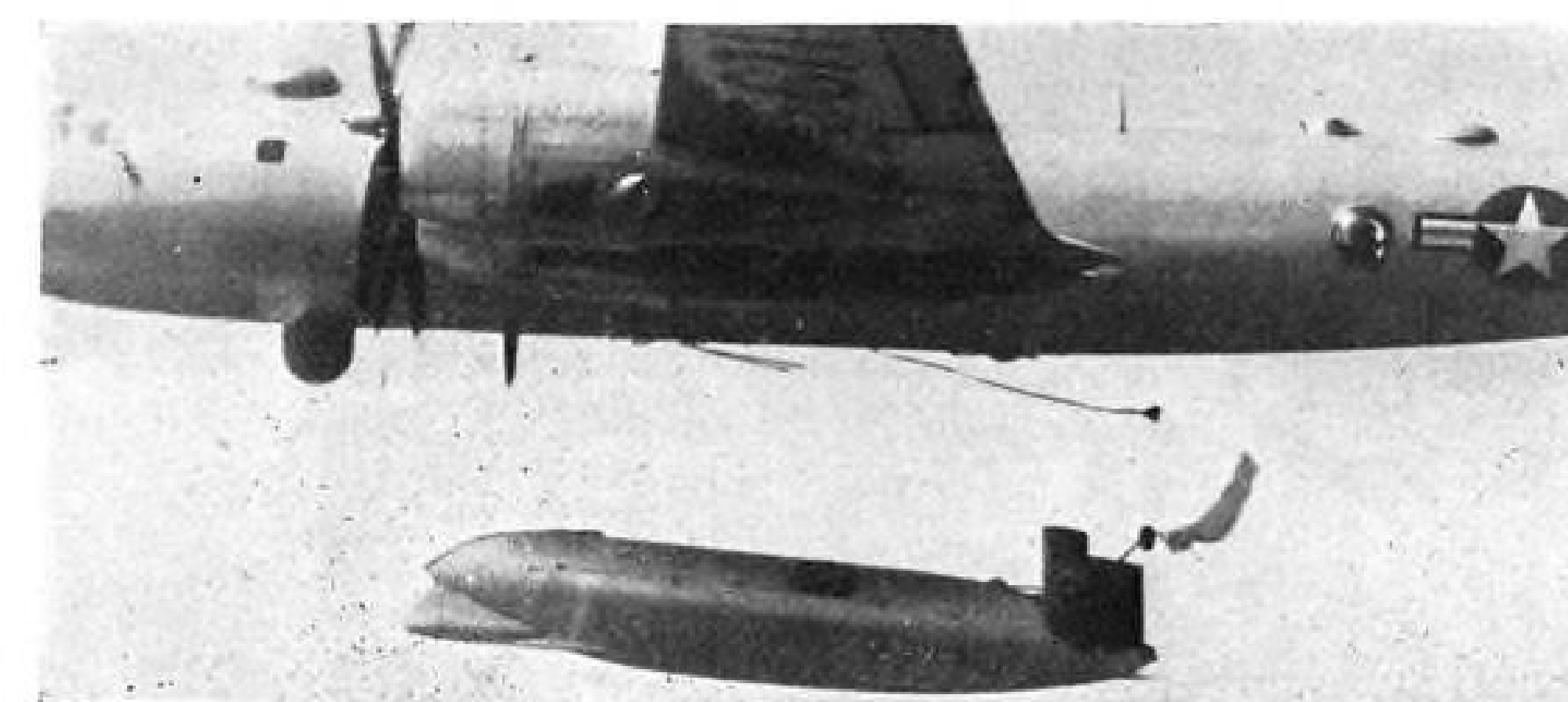
Nov. 16—ICAO airworthiness division, Montreal.

Nov. 16-18—National Association of Travel Officials, Miami Beach.

ENGINEERING & PRODUCTION



Latest item from Edo's house of variety is this 30-ft. lifeboat carried under a B-29 . . .



. . . and dropped by parachute. Edo's float-making skill goes into production of the boat.

Lightplane Floats to Rescue Boats

Edo Corp., leading producer of seaplane pontoons, now turns its metal-working skill to other products.

By William Kroger

Edo Corp. has put a new twist on the familiar story of an aircraft manufacturer turning its metal-working skill to other products.

A year ago Edo Aircraft Corp. was building more airplane floats than it had ever done before in its 22-year life. More lightplanes were using floats than ever before. Yet, in nine months of 1947, Edo lost more than \$67,000 on its float business.

► Floats to Boats—Now it stands to get a lot of it back. The Edo know-how in fashioning lightweight, carefully formed seaworthy floats is going into the production of 30-ft., two-ton, all-metal lifeboats specifically for the U. S. Air Force.

Prototype boat last week was scheduled for the first public drop from a B-29 to Long Island Sound. Designated the A-3 by the Air Force, the

boat is slung under a B-29 for use in aerial search and rescue work and is dropped by means of a 100-ft. diameter parachute. The boat contains stores, navigational equipment and sufficient fuel for its four-cylinder engine to range more than 500 miles.

The fact that the boat was conceived by the Air Force and built to its specifications spotlights Edo's present role. The company got the business in competition with others, and some larger companies.

► Ups and Downs with Floats—Edo Aircraft Corp. (From the initials of Earl D. Osborne, founder, president and practically sole owner) set up shop in 1925.

For years it was chiefly known as a builder of seaplane pontoons. It went into aircraft occasionally, and only last year completed an order for 12 Navy ship-based observation planes, XOSE-1s. In its best prewar year it built less than

100 pairs of commercial floats and just before the war employed about 100 people.

During the war employment shot up to 2500 and work branched out. After the war, Edo saw a bright future in floats for personal planes. In the spring of 1947, employment by prewar standards was high more than 700; about 6 percent of personal planes being built were equipped with floats (as against 2-3 percent prewar); but lightplane sales were falling and production costs were soaring.

By fall it was apparent that Edo's financial future couldn't be buoyed by float business.

► "Aircraft" Out—Most obvious indication of the company's change was in the name. The word "aircraft" was dropped and in November, 1947, the corporate title became merely Edo Corporation. Reason given was that "Edo Aircraft" no longer was truly descriptive of the company's activities.

It was a good explanation. Today the fairly small (87,000 sq. ft.) Edo plant at College Point, L. I., just across Flushing Bay from LaGuardia Field, has 416 persons working on some 30 different items. Better than 25 percent of the employees (110) are engineers.

As more and more of the developments of these engineers evolve into prototypes, the ratio of production workers will go up. By the end of the year, total employment is expected to be more than 600.

► House of Variety—Edo's business now is nearly all military. Of the anticipated 1948 sales of \$2 million, only 10 percent will be from floats. Another 20 percent will represent payment for government engineering work. Of the company's \$5 million backlog, about half covers the Air Force's order for 151 A-3 boats.

Edo is now tooling for production of the boats, and they will start moving down the production line later this year.

Meanwhile, any lack in quantity at Edo is made up in variety. The plant is working for the Navy on electronic equipment and an elastic packaging system; for the Army Field Forces on utility boats and materiel handling equipment; for the Air Force on dropable fuel tanks. It has subcontracts with the propeller division of Curtiss-Wright (aluminum spinners), with Raytheon Manufacturing Co., with Republic Aviation (parts for wing tips), and with Sperry Gyroscope.

Maintenance Course

University of Illinois has announced a two-year course in aircraft maintenance engineering, which will be offered at the Institute of Aeronautics, Champaign, Ill., beginning Sept. 16.

AMC Sideline

Overhaul work scarce, firm selling equipment, taking nonaviation jobs.

In face of diminishing overhaul business, Aviation Maintenance Corp. has been unloading now-surplus equipment and is looking for nonaviation business.

While it will continue to handle aircraft maintenance and overhaul, AMC already has embarked on one likely-looking sideline: manufacture of photographic equipment. Clearing the decks for further concentration on such products, the company has put on the block a major portion of its aircraft overhaul equipment.

► **Nod from Argentina**—Regan Stunkel, president of the Van Nuys, Calif., firm, is awaiting an assenting nod from the Argentine government for the purchase of about 60 percent of his equipment, valued at \$700,000. But the Argentines are taking their time about consummating the deal. Meanwhile, Stunkel is lining up orders for his newly formed photo business. He already has small experimental orders for dryers, developers and printers, and hopes to emerge as a manufacturer of precision equipment.

Aviation Maintenance recently sold engine overhaul equipment and parts to a Hong Kong maintenance firm for just short of \$250,000. What Stunkel hopes to have left after the new deal is a small airplane overhaul business, and a photo business.

► **Bleak Picture**—Stunkel blames the bleak maintenance picture on an over-saturation of the maintenance field, and the letting of maintenance con-

tracts to overhaul shops of companies primarily in the air transportation field.

For the dismal outlook in aviation of his company, Stunkel cites the fact that 48 firms (including Aviation Maintenance Corp.) recently bid on a contract to overhaul 49 R4D Navy planes. He believes a similar number will bid on other relatively small Navy contracts. ► **High Bids**—With large facilities (the firm has 23 maintenance shops at Van Nuys), overhead and insurance taxes have forced Aviation Maintenance to enter high bids on what maintenance contracts exist.

The firm is interested in selling to Argentina, but as Stunkel puts it, "the Argentine sales are not a deciding factor in our staying in business. . . . We would like it because we could dispose of our surplus in a single package."

► **Reduces Loan**—What Stunkel means is that while business has not been good, it once was, and the firm's financial position is such that he can take six months to sell his surplus equipment to a good piecemeal market. He has already reduced a million dollar RFC loan to \$25,000.

Meanwhile, his plant, which at peak employed 2700 and grossed over \$1,500,000 monthly in overhaul and maintenance contracts, shut down for 45 days, so that the firm could mull over reorganization plans.

Ryan Gets USAF Order For 158 Additional Navions

A \$2,500,000 contract to Ryan Aeronautical Co. to provide the Air Force with 158 Ryan Navion four-place planes, plus components and spares equal to 60 more Navions, bears out the craft as a military "all-service" plane.

The Ryan-built Navions will be designated L-17B to differentiate them from the 83 L-17A Navions purchased by the Air Force last year from North American Aviation, Inc., original maker of the rugged all-metal four-placer. Air Force is acting as contracting agent for the Army Field Forces and the National Guard in the new order. Deliveries will start in September or October and continue until the first of the year.

More than a third of the L-17B planes will be used by occupation forces abroad, half in Europe and half in Asia. Another third will be distributed to Army Field Force bases in this country, and the remainder goes to National Guard bases. A three-man Ryan field service crew is making a three-weeks' familiarization trip to bases where L-17As are operated and will act as a liaison group for the L-17B project.

New Vice President At Curtiss-Wright

William C. Jordan, formerly general manager of the Curtiss-Wright airplane division, has been elected vice president and appointed general manager of the Wright Aeronautical Corp., Wood-Ridge, N. J., engine-building division of the company. He succeeds William D. Kennedy as general manager. Kennedy leaves shortly for a European trip.

T. B. Focke, formerly factory manager of the airplane division, has been appointed general manager of that organization, to succeed Jordan. The airplane division operates a plant in Columbus, Ohio.

Prior to joining Curtiss-Wright, Jordan was vice president and general manager of the Steel Products Engineering Co., Springfield, Ohio.

Focke joined the corporation in 1946. Prior to that, he served with the U. S. Navy as head of aircraft production, planning and scheduling, and as special assistant to the chief of the Bureau of Aeronautics in charge of postwar planning.

► In other personnel actions:

General Electric Co., Schenectady, N. Y., elected R. I. Parker, Chicago, a commercial vice president. He succeeds W. O. Batchelder, retiring after 43 years' service.

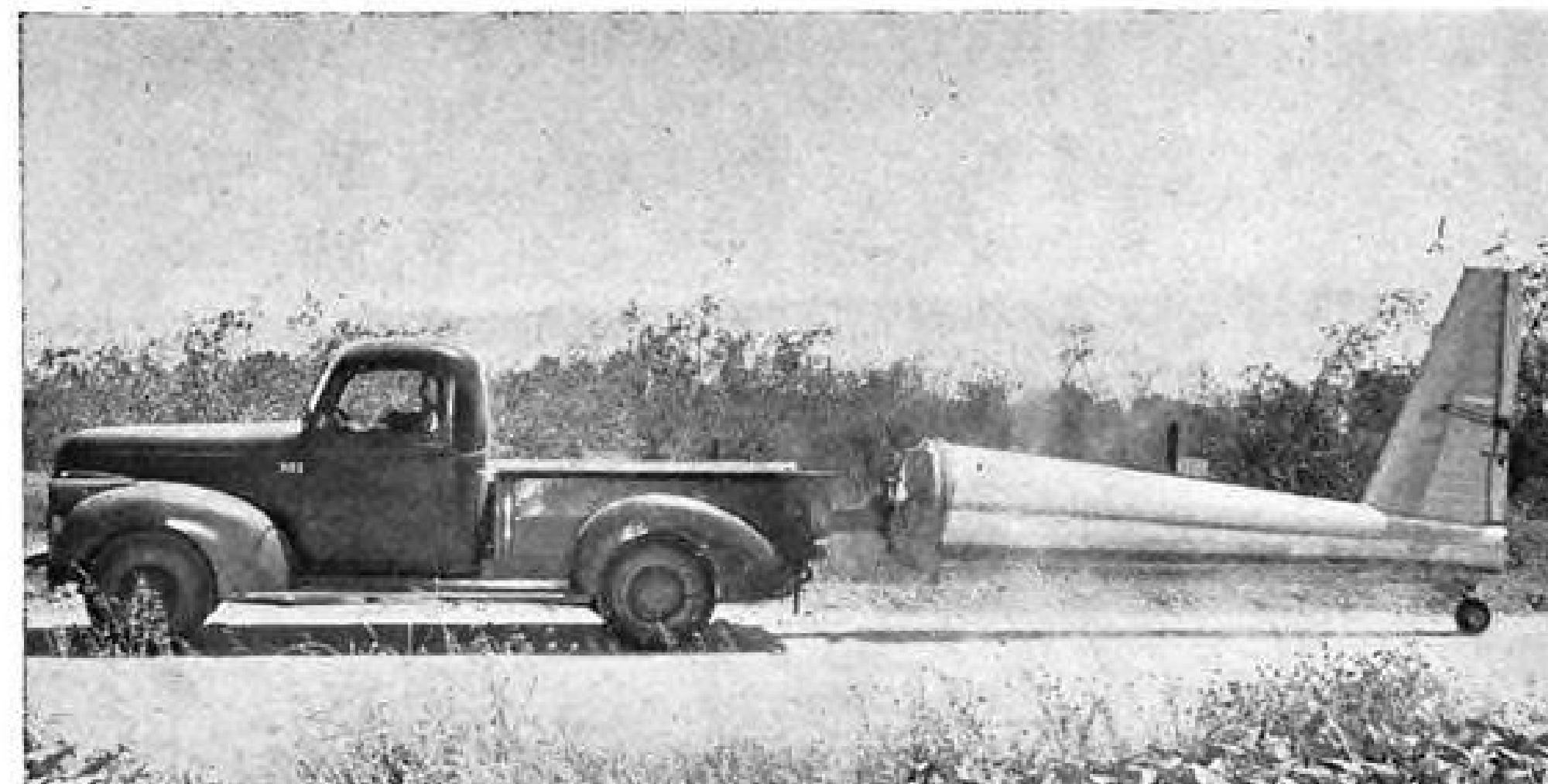
Timken Roller Bearing Co., Canton, Ohio, named Whitley B. Moore vice president in charge of sales, succeeding L. M. Klinedinst, retiring.

Kelite Products, Inc., Los Angeles, Calif., appointed George Buchner service engineer for aviation. He previously was chief of Douglas Aircraft's customer service and analysis department.

Lebanon Steel Foundry, Lebanon, Pa., named Edward H. Platz, Jr., manager of alloy sales. He succeeds William B. Sullivan who retired recently.

Boeing Airplane Co., Seattle, appointed Edward C. Wells, Lysle Wood and N. D. Showalter as vice president-engineering, chief engineer and assistant chief engineer respectively. All have been with Boeing more than 15 years.

Plasecki Helicopter Corp., Morton, Pa., named E. J. Huber to direct public relations. He was previously in the Air Force.



L-13 LANDING GEAR TESTED

Convair test engineers drove this odd-looking contraption over 724 miles of dirt roads and fire trails in a 25-hr. road test of redesigned tail wheel installation for the L-13 liaison plane. At the conclusion of the test

the gear was still in excellent shape. New tail wheel design includes a pre-loaded compensated hydraulic cylinder which prevents tail wheel shimmy by changing the oscillation frequency of the tail wheel fork.

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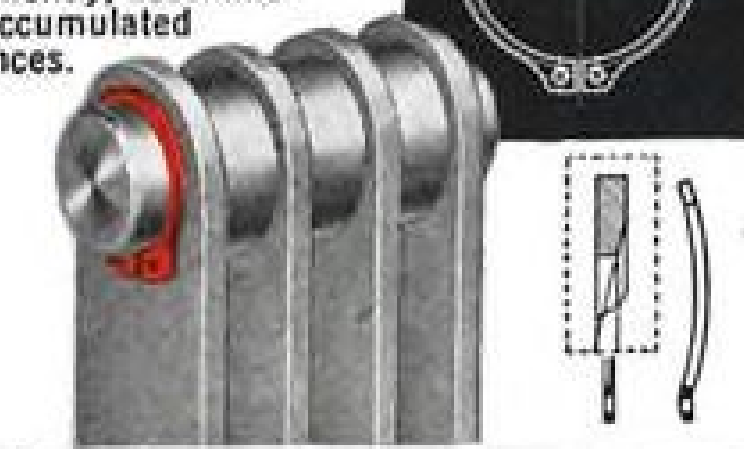
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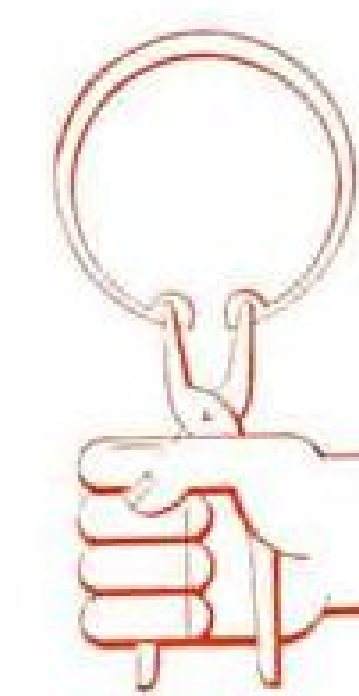
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A Primer of Sonic Aerodynamics

Basic phenomena associated with high-speed flight are analyzed in relation to newest aircraft design.

By Robert McLaren

Sound travels in waves through the medium of pressure pulses transmitted by the molecules of a substance. Rate of transmission is dependent on the rate of change of density with pressure, $dp/d\rho$.

For gases, this relationship is expressed as the ratio of specific heats, γ , times the pressure-density ratio: $\gamma p/\rho$.

Since the pressure-density ratio may be expressed as the gas constant, R , times the temperature, T , the speed of sound in air is:

$$a = \sqrt{\gamma RT}$$

Because the ratio of specific heat for air is 1.40 and the gas constant for air is 1715,

$$a = \sqrt{1.4 \times 1715 \times T} = 49 \sqrt{T}$$

in which a is in ft./sec. and T in degrees R. (Rankine, = degrees F. + 460).

To obtain a in mph., the expression becomes:

$$a = 33.4 \sqrt{T} \quad (1)$$

► **Effect of Altitude**—From the foregoing it is apparent that speed of sound varies only with temperature.

Since temperature in the atmosphere decreases linearly with altitude up to the lower limit of the isothermal layer (35,332 ft.) at the rate, dT/dh , of 0.00356617 deg. F. per foot of altitude, it is possible to determine the speed of sound at any altitude below this limit as follows:

$$T = T_0 - 0.0036 h$$

in which T is Fahrenheit temperature at which the speed of sound is desired, T_0 the temperature at sea level, and h altitude desired.

Eq. (1) may then be written:

$$a = 33.4 \sqrt{T_0 - 0.0036 h}$$

Substituting NACA standard sea level absolute temperature 518 for T_0 , this now becomes:

$$a = 33.4 \sqrt{518 - 0.0036 h} \quad (2)$$

Above the lower limit of the isothermal layer, the NACA standard atmosphere temperature remains constant at 392.4 F. absolute, hence speed of sound remains constant at 662.0 mph.

The isothermal layer extends to approximately 105,000 ft., after which the temperature begins to increase. However, the data extended to 105,000 ft. are adequate for present aircraft design and performance calculation purposes.

► **Mach Number**—Since the speed of sound is the rate of propagation of minute pressure changes in still air, when the air is set in motion the relationship between this airspeed and sound speed becomes of considerable importance.

Thus, when the airflow is equal to half the speed of sound, these pressure pulses can travel upstream at only half their still-air speed; in an airstream equal to the speed of sound they cannot travel upstream at all.

This phenomenon was first studied by Prof. Ernst Mach in his experiments with artillery shells at the University of Vienna early in the 19th Century in cooperation with his son, Ludwig, an artillery officer in the Austrian Army.

They determined that the ratio of the free stream velocity to the speed of sound was a useful index to the density changes (compressibility) and its effects on the behavior of the flow.

For this reason, the relation:

$$M = v/a \quad (3)$$

in which v is the local velocity and a is the local velocity of sound, is now known as the Mach number, M .

► **Shock Wave**—In an incompressible fluid, which air may be considered to be at comparatively low speeds, slight changes in pressure are communicated instantaneously to all parts of the flow.

For example, with an airplane flying at 200 mph., changes in pressure as the air flows over the wing are transmitted forward at the speed of sound an infinite distance ahead of the wing in such a manner that the air is "prepared" for the approaching wing by creating a gentle pressure gradient.

But if the wing is flying at the speed of sound, it becomes impossible for these pressure changes to be propagated forward into the inflowing air. As the air is accelerated over the leading edge it becomes supersonic ($M > 1$) and has a pressure less than atmospheric, whereas the pressure at the trailing edge is atmospheric.

This pressure difference comprises a surface of discontinuity, on the upstream side of which, the pressure, density, temperature and velocity are at one set of values and on the downstream side are at a different set of values.

As a result, the air must undergo a sudden transition during which its pressure, density, and temperature increase, and its velocity decreases. Since this transition takes place in a distance of 0.0012 in., it is apparent that it must be of a violent nature. It is this phenomenon that has been given the name normal compression "shock wave."

Normal shock waves occur in regions where the flow is normal to the plane of the shock. They always represent a deceleration from supersonic to subsonic speed, that is, the flow behind a normal shock is always subsonic in order to satisfy the continuity equation:

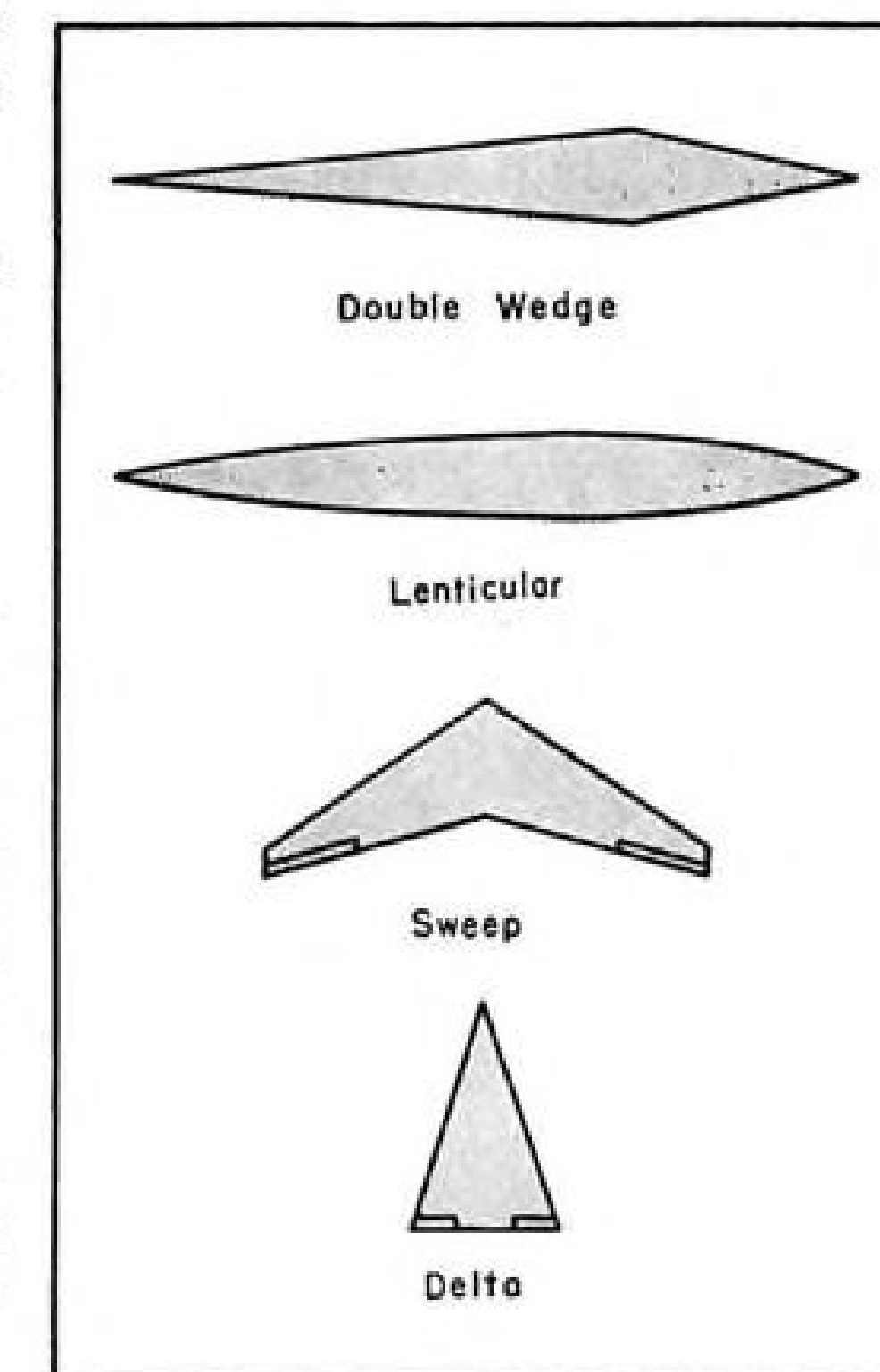
$$V_1 V_2 = a^2 \quad (4)$$

where V_1 is the velocity upstream of the shock, V_2 velocity downstream.

It is apparent that downstream velocity must be subsonic by the degree to which upstream velocity is supersonic in order that eq. (4) be satisfied.

When the flow is oblique to the plane of the shock, the result is an "oblique" shock wave—of less intensity than a normal shock. Air passing through an oblique shock is slowed and its direction changed towards the plane of the shock. Normal shocks are usually accompanied by a family of oblique shocks as the air is turned into the normal shock.

An expansion wave is a shock wave in reverse, that is, the air is directed around an "outside" curve. In this region the air has a considerable distance over which to make the required tran-



Profiles and planforms for supersonic wings.

sition of state, hence an expansion wave is not severe. Through an expansion wave, also, pressure, density and temperature increase, and velocity decreases.

The preceding has dealt exclusively with plane shock waves, such as occur over wing and tail surfaces.

In supersonic flight, a conical shock wave is formed by the entering point of the aircraft or missile. This "bow wave" is known as the Mach cone and characterizes all supersonic flight. It originates as a point disturbance and extends outward and aft at an angle dependent on its speed and its shape:

$$\sin \beta = a/v \quad (5)$$

in which β is half of the cone angle. This angle is known as the Mach angle and is a function of the speed of the object. The boundary of the cone is termed the Mach line. By measuring the angle between the Mach line and the axis of the body, its speed may be determined by eq. (5).

At the formation of the initial bow wave as a missile or aircraft becomes supersonic, the wave will be detached a slight distance ahead of the bow.

Directly in front of the body the wave will be normal to the flow and a strong normal shock will exist.

Immediately aft of this normal shock will be subsonic speed and a stagnation point on the nose of the body against which the flow is brought to rest.

As the speed is increased, however, the bow wave will attach itself to the bow and a conventional Mach cone created. The speed at which the detached wave becomes attached is a function of the shape of the body, blunt nose shapes requiring a higher speed than do sharply pointed nose shapes.

► **Shock Stall**—As a normal shock is created over the after portion of a wing, the region behind the shock is at a pressure higher than that in front.

Since this pressure cannot be propagated forward, it increases the thickness of the boundary layer, forcing its separation, resulting in a stall similar to that occurring at low subsonic speeds. Thus, an aileron is rendered ineffective by the occurrence of a normal shock wave forward of its hinge line.

This phenomenon also occurs on after portions of canopies, air intakes, wing root fillets, thick fuselage shapes, etc. resulting in the undesirable increase in drag that characterizes compressible flow at sonic speed.

► **Mixed Flow**—As air flows around aircraft surfaces it accelerates to a velocity greater than that of the free stream, often as high as 50 percent more in the case of bluff bodies.

For example, sonic speed may be attained over portions of an airplane flying at only 330 mph. at 35,000 ft. Even well streamlined craft as represented by current jet fighter planes, may experi-

ence sonic speed over certain portions at airspeeds greater than 440 mph.

Let us assume, for example, that a jet fighter wing first experiences sonic speed at an airplane speed of 440 mph. As the shock wave forms, the flow aft of the shock separates and drag is increased. This changes the angle of downwash behind the wing impinging on the horizontal tail, resulting in a decrease in the download on the tail and a consequent diving moment on the airplane, causing it to "tuck under."

The pilot pulls back on the stick, which slows the airplane, causing the shock to disappear. This in turn reduces the drag and permits the airplane to accelerate until another shock forms.

Thus, an alternate occurrence of shock and normal flow characterizes flight at the critical Mach number of the wing, the airspeed at which the shock first occurs. During this period, portions of the plane are at subsonic speed, some at sonic speed and still others at supersonic speed.

Because of the action described, these three flow conditions are constantly and rapidly changing, resulting in high loads on the airplane surfaces, longitudinal instability and rapid pilot fatigue.

► **Three Flows Compared**—One of the clearest indications of the difference between the various flow conditions is contained in the definitions of lift coefficient:

$$\text{For any airfoil at low speed,} \quad C_L = C_{L_0} \quad (6)$$

$$\text{For any airfoil at subsonic speed,} \quad C_L = C_{L_0} / \sqrt{1 - M^2} \quad (7)$$

$$\text{For a thin airfoil at low angle of attack at supersonic speed,} \quad C_L = 4\alpha / \sqrt{M^2 - 1} \quad (8)$$

where C_{L_0} is the low-speed (incompressible) lift coefficient and α is the angle of attack.

From eq. (7) it is apparent that the lift coefficient is increased by compressibility effects up to near sonic velocity.

From eq. (8) it is seen that the lift coefficient depends only on the angle of attack and the speed down to just above that of sound.

Design Solutions

► **Thin Wings**—Because the increment in speed of the air flowing over an airfoil is a function of thickness and its camber, formation of shock waves may be delayed by the use of thin sections with little or no camber.

Thin wings, however, present serious aerodynamic and structural problems. Their low lift and narrow range of effective lift coefficients present stability and control problems since landing speeds are high and the steep lift-curve slope creates an extremely narrow range of flight attitudes over which the airplane would be stable.

Structural problems in the design of wings with thickness of less than 12 percent are acute because of the absence of spar depth required for strength and rigidity.

Some solutions have been offered, notably monocoque structures in which the wing consists of two cast shells welded along leading and trailing edges. Other solutions include solid wings milled out of bar stock or cast from magnesium- or aluminum alloy.

Wing thicknesses of less than 8 percent for highly loaded designs are not yet practical.

► **Low Aspect Ratio Wings**—Use of aspect ratios of less than 4 offers considerable improvement in high speed flight conditions. As a normal shock is formed along the span of a wing, there is a region of low pressure forward of the shock and of high pressure behind the shock. At the tip, this high pressure passes forward to the low pressure side of the shock, reducing its intensity and providing considerable drag alleviation.

Not only does low aspect ratio offer considerable drag reduction but tests have shown that its lift is preserved to a higher Mach number than that of the same wing at higher aspect ratio.

Structurally, low aspect ratio is highly advantageous since the spar length-depth ratio is increased, providing greater strength and rigidity.

► **Swept Wings**—Drag alleviation characteristics of swept wings were first conceived by Busemann in Germany in 1935 and discovered independently by Robert T. Jones of the NACA early in 1945 before German research on the problem, beginning during the war, became available in this country.

The principle of the swept wing stems from the fact that the pressure distribution over an airfoil is influenced only by that component of the velocity normal to the leading and trailing edges. The velocity, V_n , flowing directly across the chord of a wing swept back at an angle, β , to the airplane longitudinal axis at an airplane speed of V_1 is:

$$V_n = V_1 \cos \beta \quad (9)$$

Thus, from eq. (9), flow over a wing with 30-deg. sweepback would be only 0.866 that of the free stream, and only 0.500 that of the free stream with 60-deg. sweepback. For example, an airplane with 30-deg sweepback flying at the speed of sound would experience a speed of only $M = 0.866$ over its wings. This effect would, of course, be minimized slightly by the speed increment created by the wing profile.

This phenomenon provides substantial drag reduction over that of the straight wing airplane, particularly in the transonic speed regime, where it experiences the familiar precipitous rise in drag coefficient. (Cont. on page 24)

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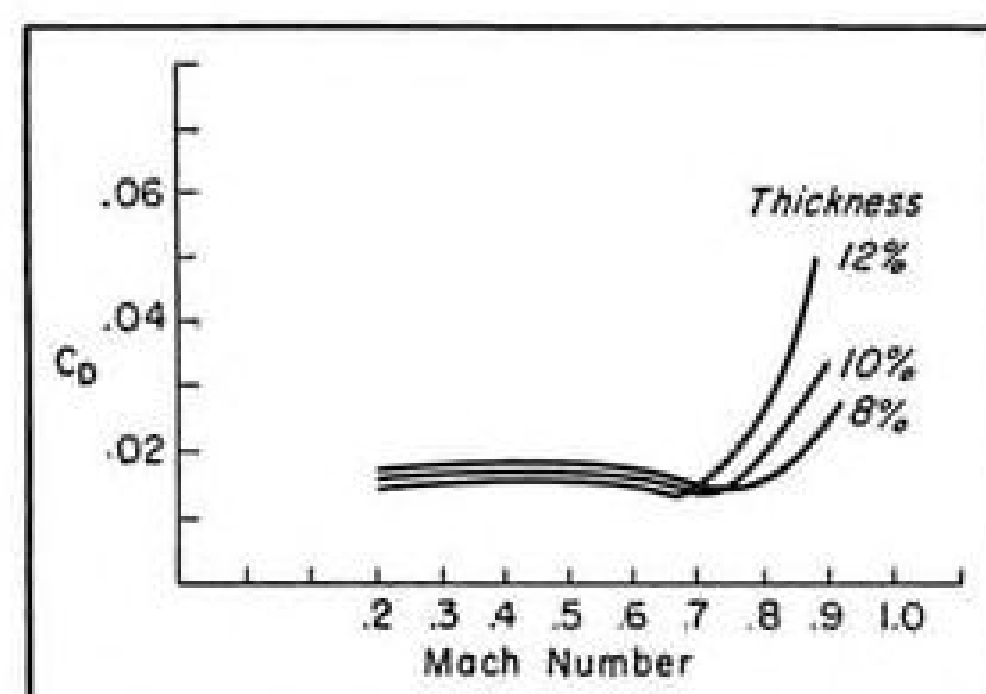
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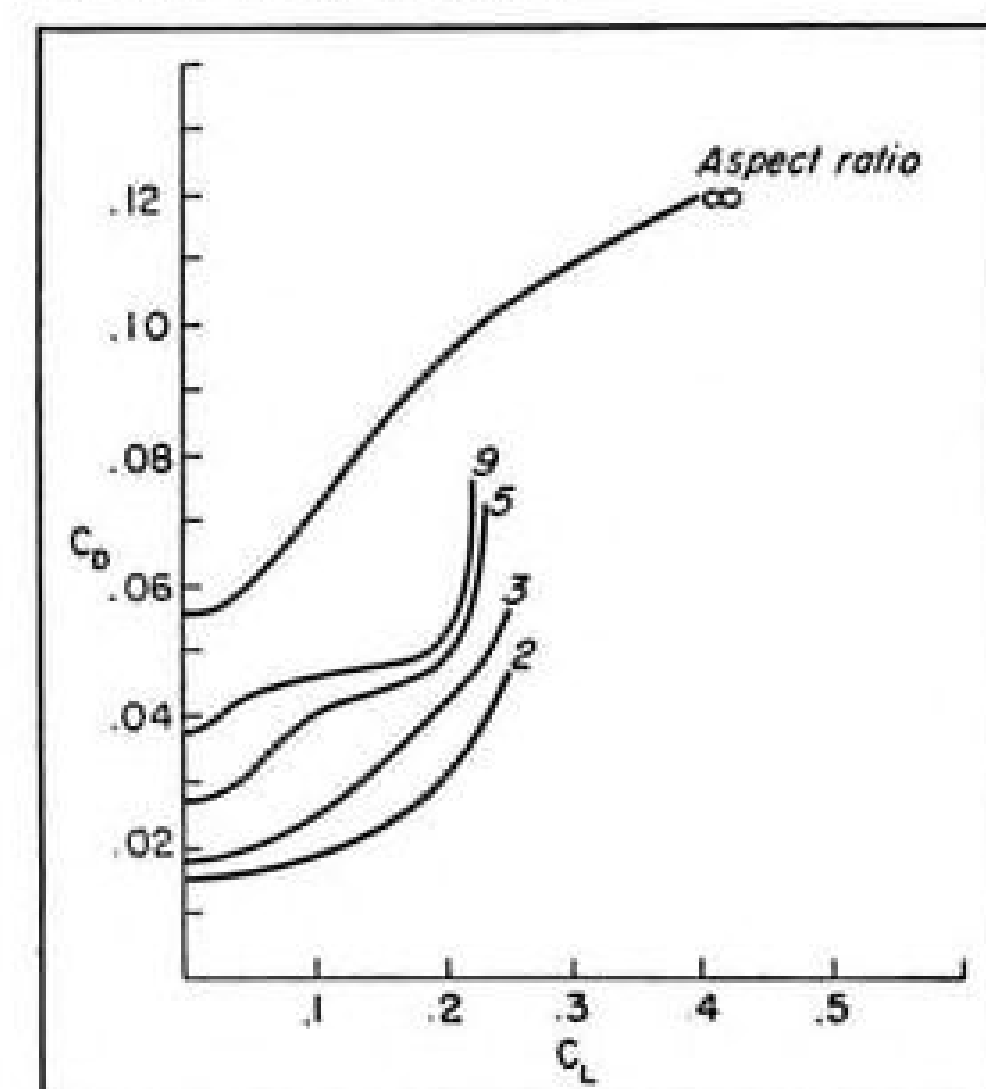
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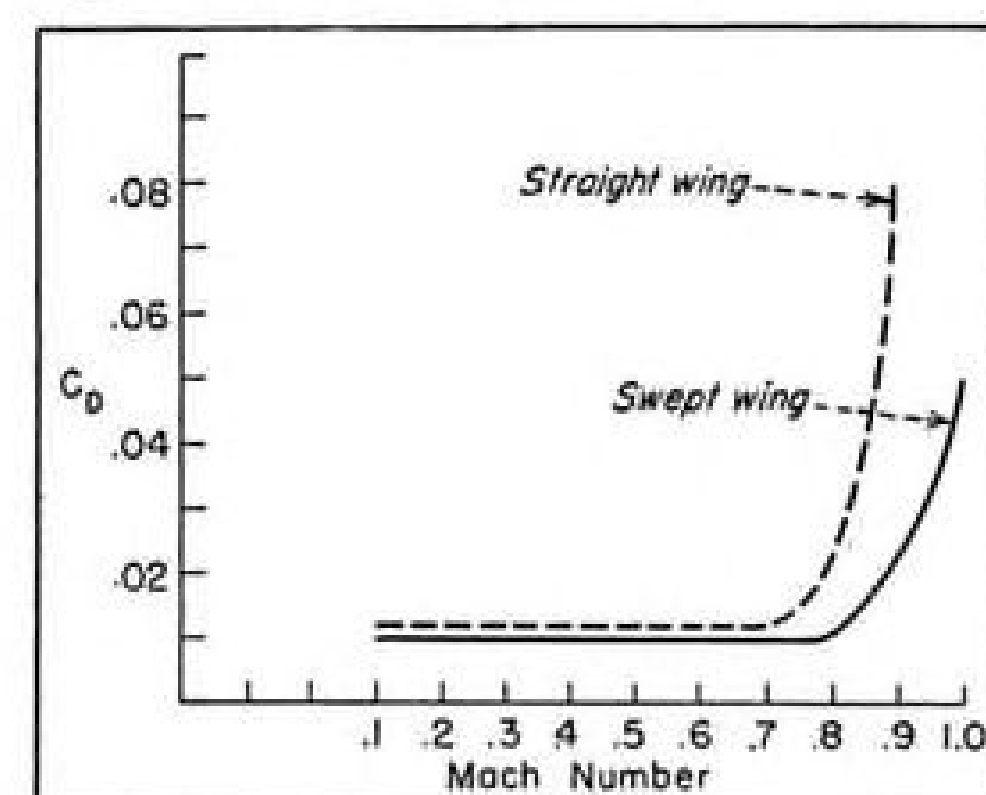
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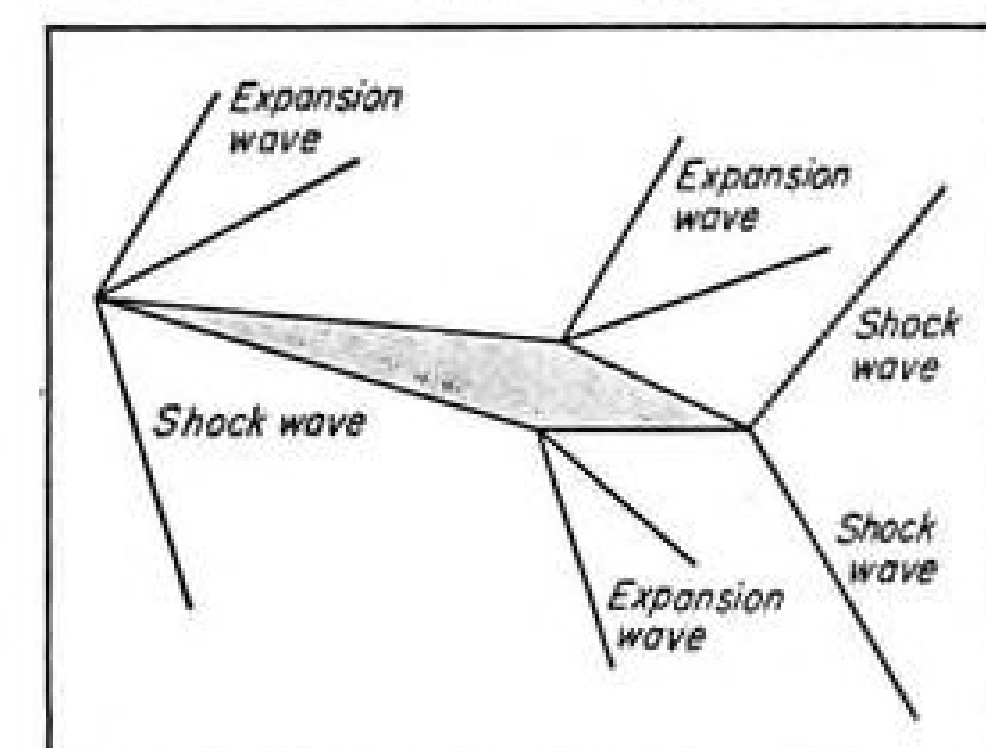
Reduced effect of high Mach numbers on thinner wing sections.



Effect of aspect ratio on lift-drag polar. For a given drag lower aspect ratio produces higher lift in transonic zone.



Drag alleviation of wing sweep. Rapid drag increase is delayed by decrement of about M 0.1 as sonic speed is approached.



Wave pattern of double wedge section at supersonic speed. Lift is produced by two expansion waves on upper surface creating reduced pressure in comparison with only one such wave on lower surface.

Stability in the transonic regime is also improved by sweep through its preservation of a substantially constant lift-curve slope; whereas the straight wing plane experiences a sudden drop followed by a long rise in its lift-curve slope, resulting in instability.

The swept wing, however, demonstrates poor stability and control at slow speeds, such as during takeoff and landing, because of premature tip stalling created by spanwise drift of the boundary layer. It also presents structural problems resulting from the oblique direction of the spar bending loads. In addition, wing bending results in a change in angle of incidence along the span, creating changes in lift distribution.

► **Delta Wing**—It was shown earlier that the Mach angle is a function of the speed of the body. From this it follows that really high speeds, $M = 3, 4$, etc., will require extremely high sweep angles if the wing leading edge is to be kept behind the Mach lines.

A solution offered for the structural and aerodynamic problems of highly swept wings is the Delta wing configuration (after the Greek Δ). In this wing, since the leading edge lies wholly behind the Mach cone, the flow is everywhere subsonic and, therefore, conventional round-nose airfoils may be used.

These airfoils produce high lift and exhibit good stability characteristics. However, the geometry of the Delta wing presents control problems, since the combination elevators and ailerons placed at the trailing edge produce very low moments unless their area is large.

► **Profile Shapes**—For supersonic speed, several radical airfoil shapes have been examined. One of these is the double-wedge or "diamond" profile using only flat surfaces. This shape depends for its lift on an asymmetry of shock and expansion waves on upper and lower surfaces when at an angle to the airstream.

Over the upper surface, there exists an expansion wave at the bow, expansion wave at the intersection of the fore and aft faces, and a shock wave at the trailing edge.

Over the lower surface there is a shock wave at the bow, expansion wave at the intersection of the faces, and expansion wave at the trailing edge. This distribution produces an excess of negative pressure over the upper surface and, therefore, a lift.

The double-wedge section is ideal structurally, and since it inherently produces a sharp leading edge, is ideal aerodynamically.

Also being studied is the biconvex profile, which has the shape of a lens. This configuration exhibits the peculiar characteristic of drag being independent of shape and dependent only on thickness ratio:

$$C_d = \frac{4\alpha^2}{m} + \frac{16}{3m} \left(\frac{t}{c} \right)^2 \quad (10)$$

Other profile shapes include single wedge (straight lower surface), single convex (straight lower surface), and infinite variations in location of maximum thickness point of both types.

Research Problems

► **Wind Tunnel Limitations**—The wind tunnel is proving increasingly unsatisfactory as the standard aerodynamic research tool because of its inherent limitations at near-sonic speed.

It is subject to the same shock wave effects as the atmosphere but in the confined area of the wind tunnel these waves cannot be dissipated as in the atmosphere, but are reflected back from the tunnel walls in a series of lattice shocks that destroy the symmetry of the flow.

The wind tunnel cannot be used for testing at $M = 1$ because of the choking effect of the normal shock, except under conditions in which the tunnel throat is large in comparison with the model, thereby enabling substantial dissipation of the shock waves before the tunnel walls are reached.

As the flow within a tunnel approaches sonic speed, a shock wave is formed across the narrowest area. Unfortunately, this area is that in which the model is placed, its presence creating the narrowest area. Thus, a shock is formed directly across the model, preventing accurate measurement of lift, drag, and moment forces at near-sonic speed.

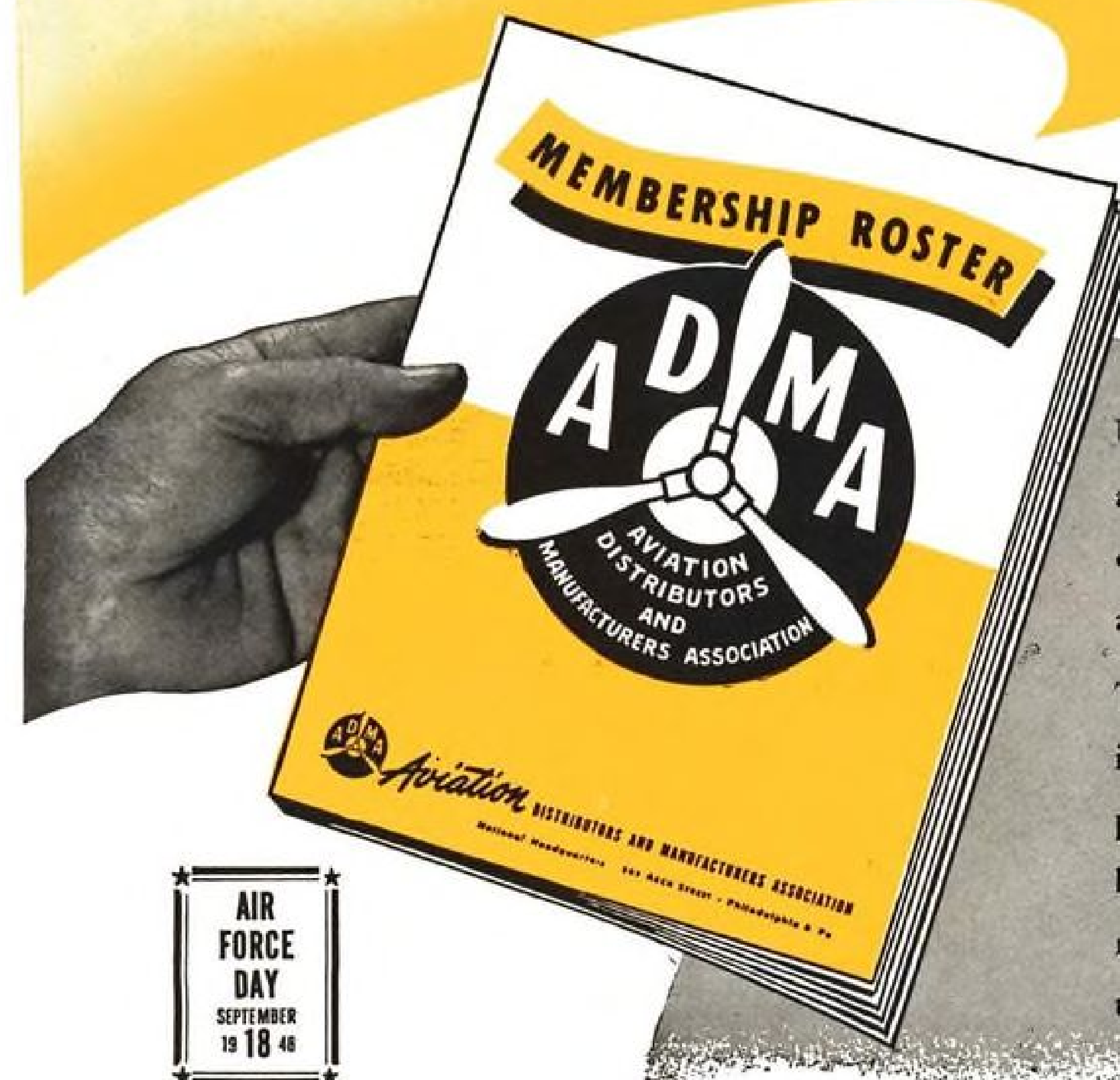
Whereas the subsonic tunnel consists of a convergent-divergent duct in the throat of which the model is placed, the supersonic tunnel is a divergent-convergent duct with the model placed in the maximum area between the two.

Since the normal shock is created across the narrowest part of the tunnel, as a supersonic tunnel is started a shock wave is created across the inlet to the divergent bell. It is then necessary to provide considerable power to force this wave down the tunnel into the downstream convergence. It is this "swallow" of the normal shock that creates the great power demand for supersonic tunnel operation.

The occurrence of shock is accompanied by heat, which must be dissipated. Within the tunnel this is impractical and the heat is reflected back from the tunnel wall to the model, resulting in flow changes around the model. This problem is also solved by the use of a throat area large in relation to the model. It is this joint difficulty of shock and heat reflection that has created the need for extremely large supersonic tunnels, such as those now under construction by the National Ad-

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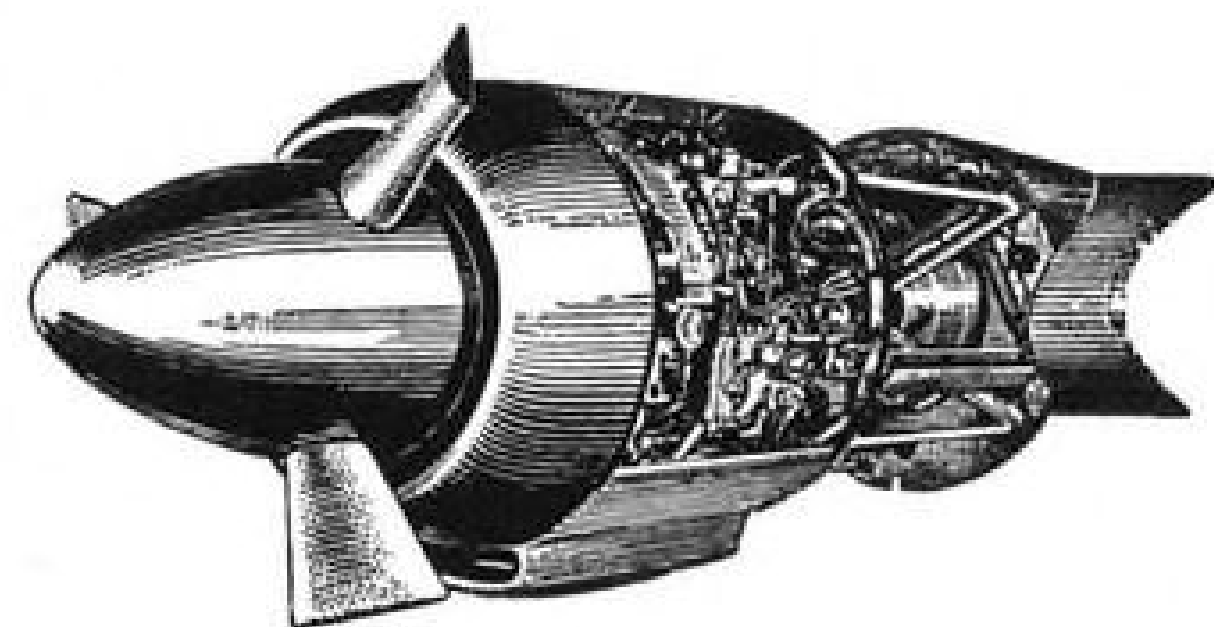
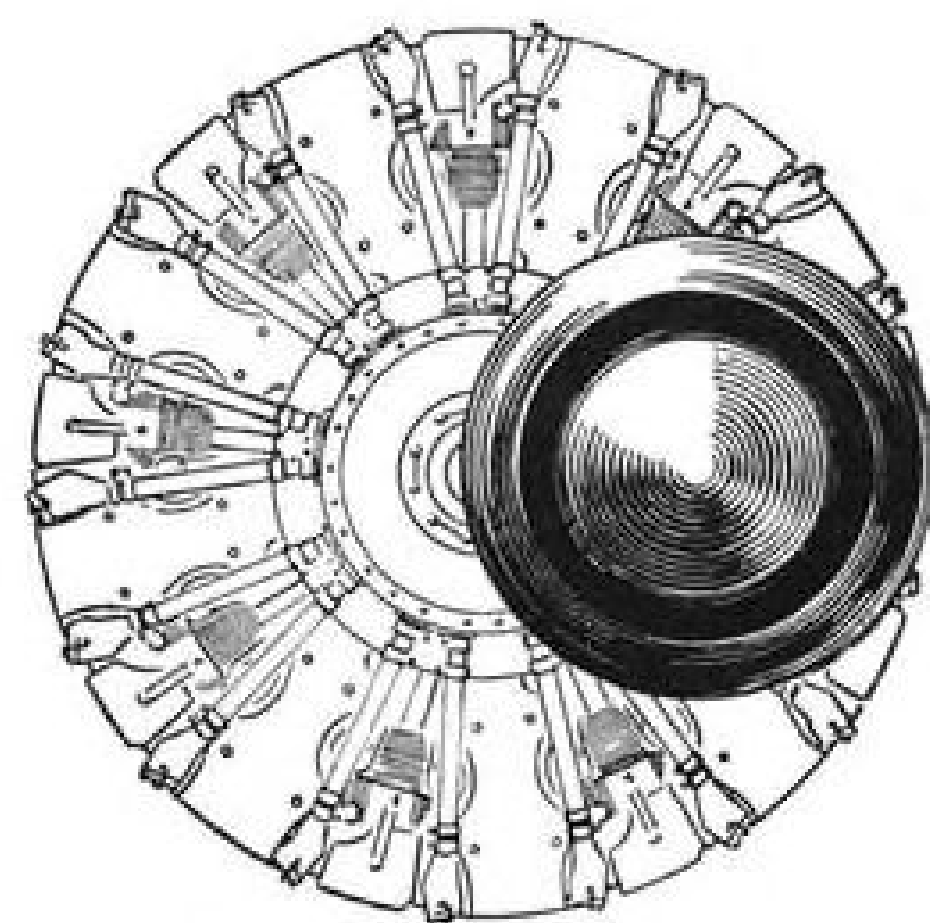
Mamba

No 1

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FRONTAL AREA

The frontal area of the Mamba is less than 30 per cent of that of an equivalent piston engine.



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visory Committee for Aeronautics at its three research labs.

High supersonic speeds also create rapid density changes within the tunnel, requiring special air drying, cooling and, perhaps, heating equipment. ► **Other Methods**—To solve some of these problems in transonic research, several expedients have been employed with considerable success.

The use of small airfoils mounted on rocket bodies has proved highly successful. The airfoils are instrumented, and telemetering equipment transmits data to the ground. Smooth acceleration of the rocket from subsonic to supersonic speed permits recording of data directly through the transonic zone.

This work has created problems peculiar to the rocket missile itself and the accuracy of the data is dependent on a smooth flight.

Optical and radar tracking is used to determine the exact speed of the rocket and, in the case of missiles not equipped with telemeter, to determine the drag of the attached test body.

A similar method, in reverse, is the falling body technique in which a heavily-weighted body is dropped from an altitude of 40,000 ft. and its speed accurately measured by optical and radar equipment. This system also provides a smooth transition from subsonic to supersonic speed.

Both this and the rocket method are expensive, however, because the bodies and installed equipment are expendable.

A third procedure makes use of the increment in airspeed over an airfoil. Here, a test airfoil is attached normal to the surface of a fighter wing at its point of maximum thickness. The fighter is then taken aloft and dived to its terminal velocity. Increment in airspeed over wing permits attainment of sonic speed across the test model.

This method is less satisfactory than the others because of the existence of flow variations over the fighter wing. It provides useful qualitative data, however, for predicting general behavior characteristics of various configurations.

Sweden Orders Firefly

(McGraw-Hill World News)

LONDON—Britain's Fairey Aviation Co. has received a contract from Sweden for a target-towing version of the two-place Firefly naval reconnaissance fighter.

Outfitted with standard Type B Mk. II B windmill-winch, the craft will be used to tow glider and sleeve targets for ground-to-air and air-to-air firing practice. It will also be equipped for changing sleeves in flight.

Stability Chief Approach Problem

Neither pilot proficiency nor ground aids will permit lower operating minimums until stability is assured.

By H. C. Bostwick
and Robert B. Roe*

Scheduled air carriers should not look too optimistically toward next winter in hope that increased use of ILS and GCA will mean sufficiently lower

weather minimums to increase schedule reliability and profit.

The presence of instability along the final low approach path is so commonplace that means for eliminating it must be provided by industry research and development before minimums much lower than those existing today can become operational.

"Instrument landing", a term unfor-

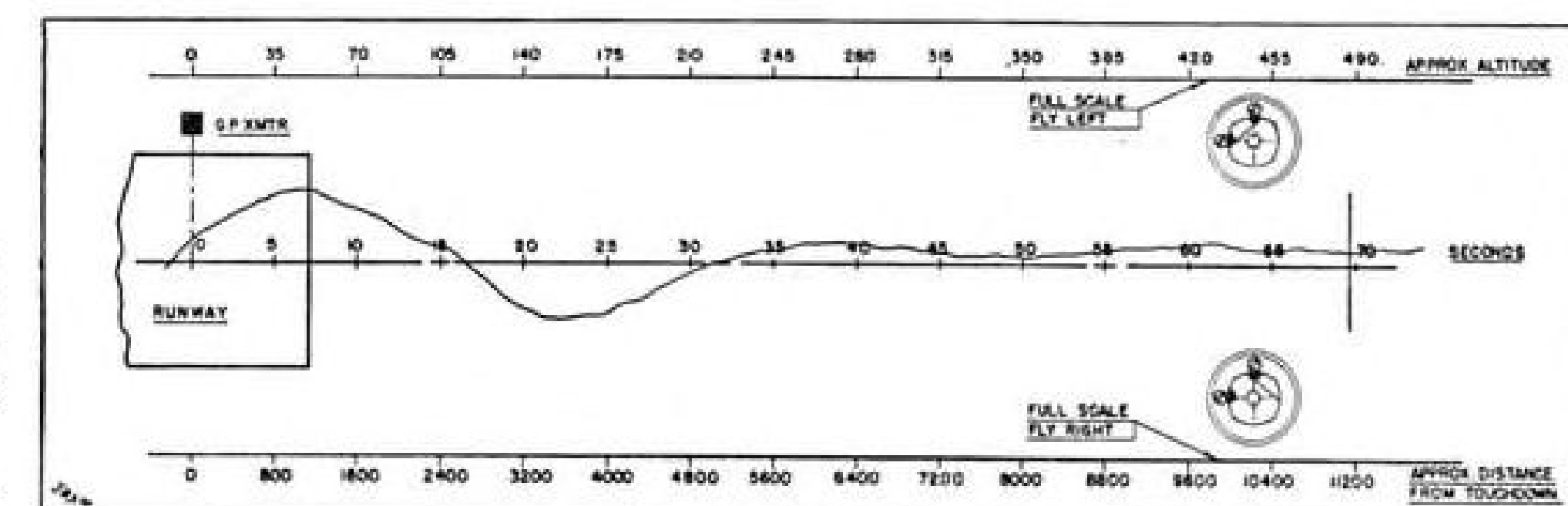
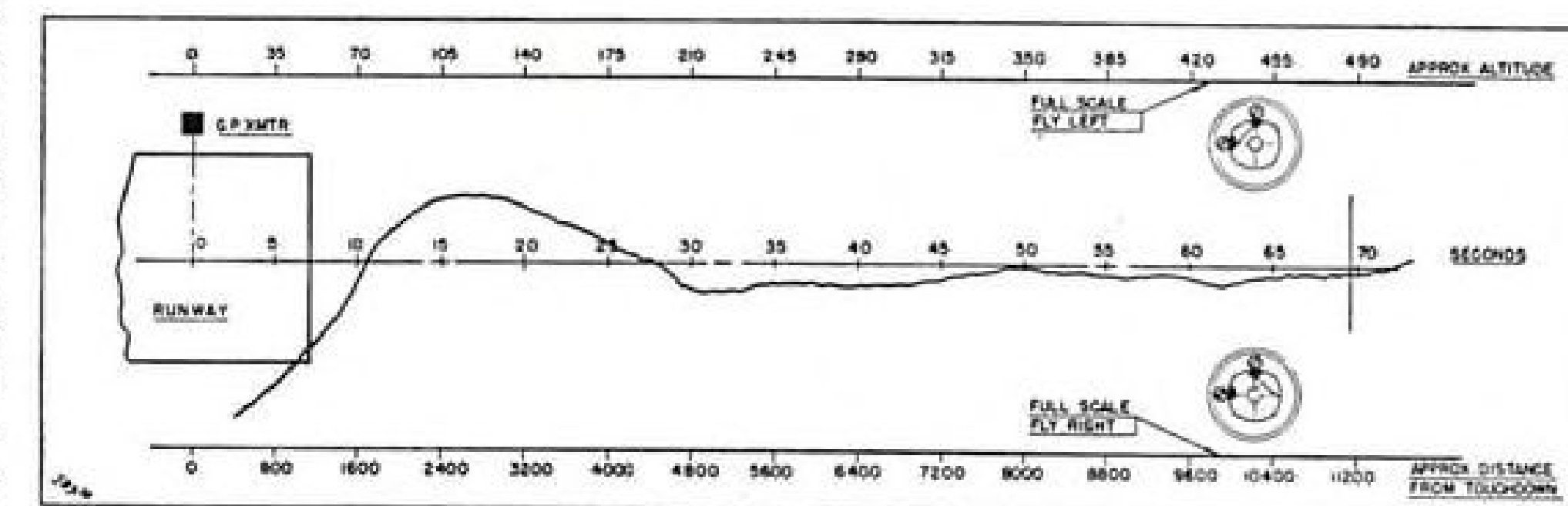
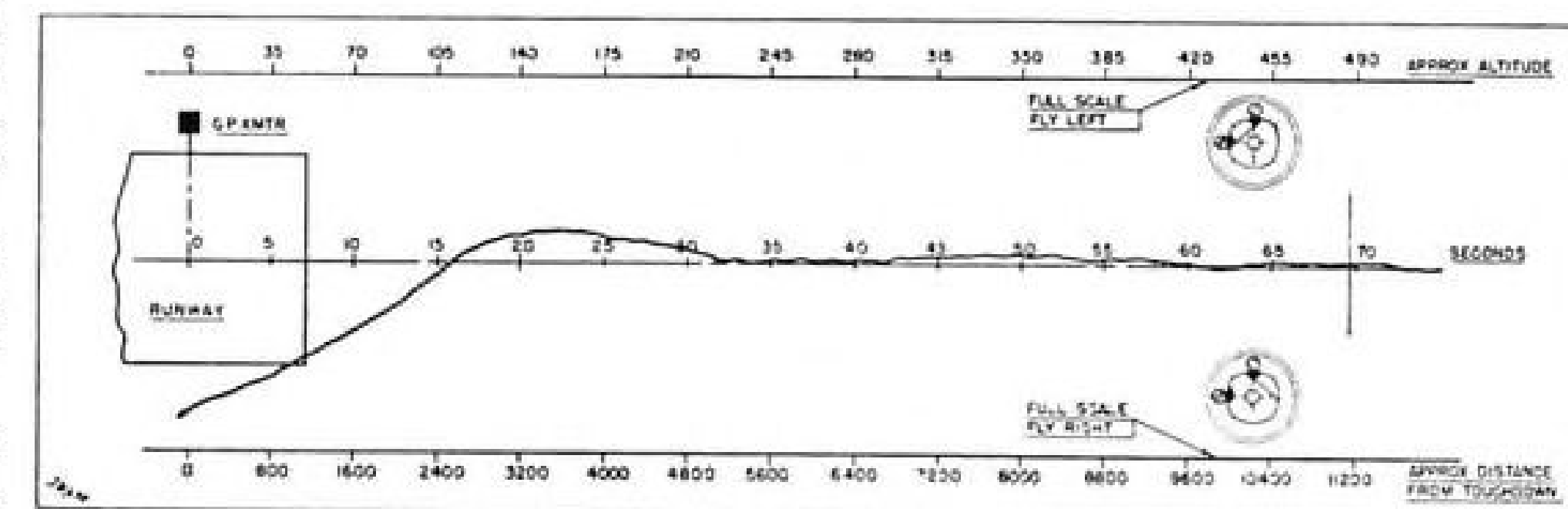
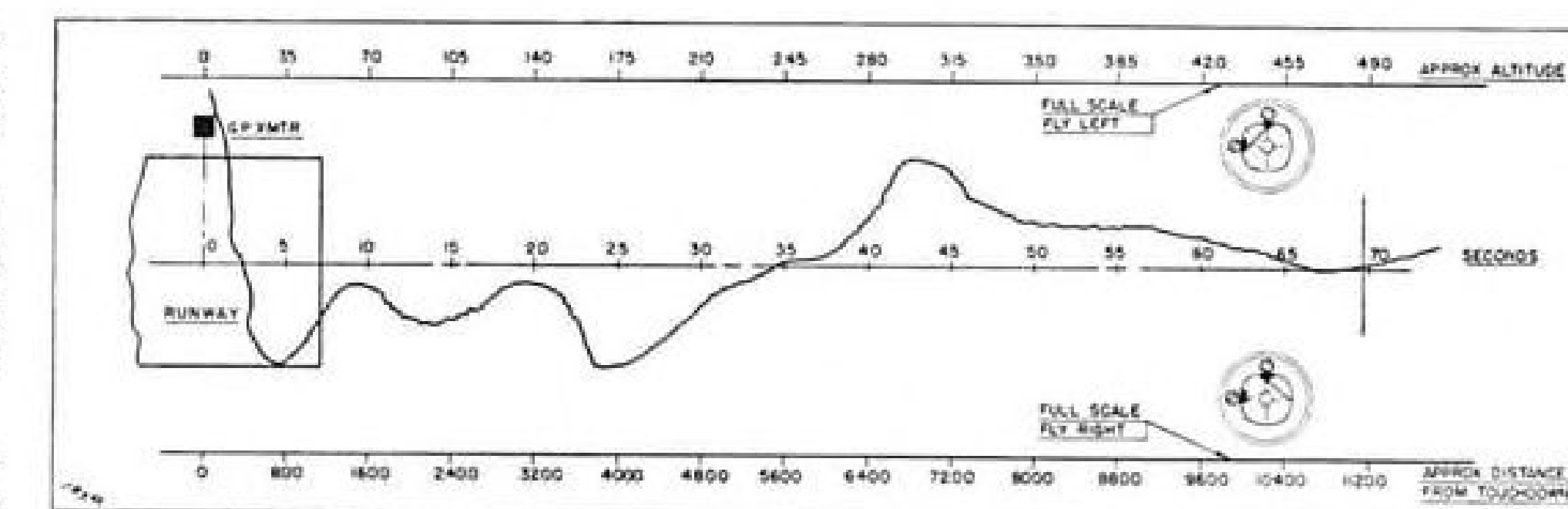
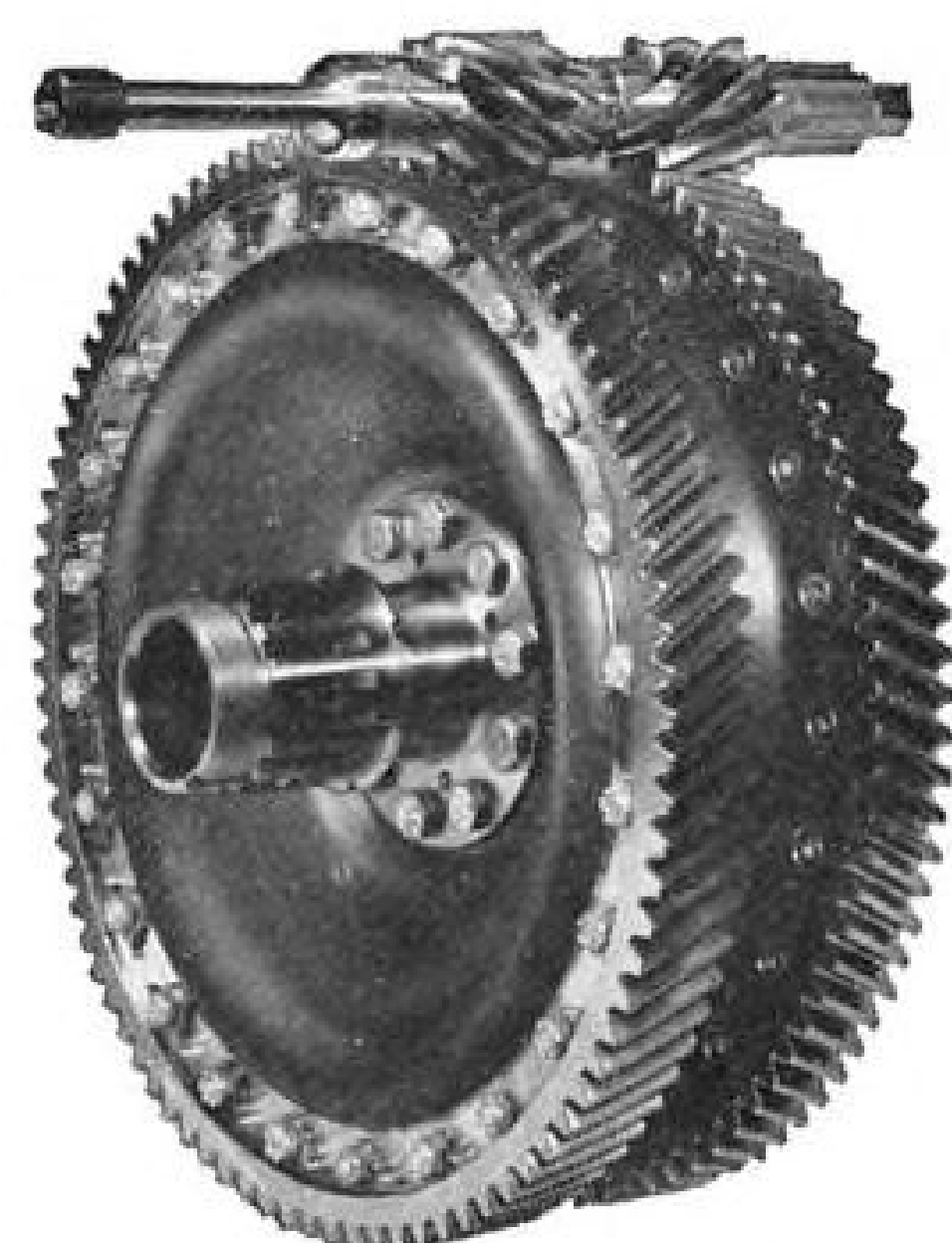


FIGURE 1: Visual proof of how instability can occur in approach, despite pilot proficiency. These are records of approaches made by the same pilot, on the same day, in seemingly smooth air. These approaches could be considered satisfactory for breaking through a ceiling of 150-200 ft., marginal for 100 ft., unsatisfactory for 75 ft.

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A product of the latest and finest engineering design . . . the production of this intricate Herringbone Gear* is a proud example of our years of experience in making precision gears.

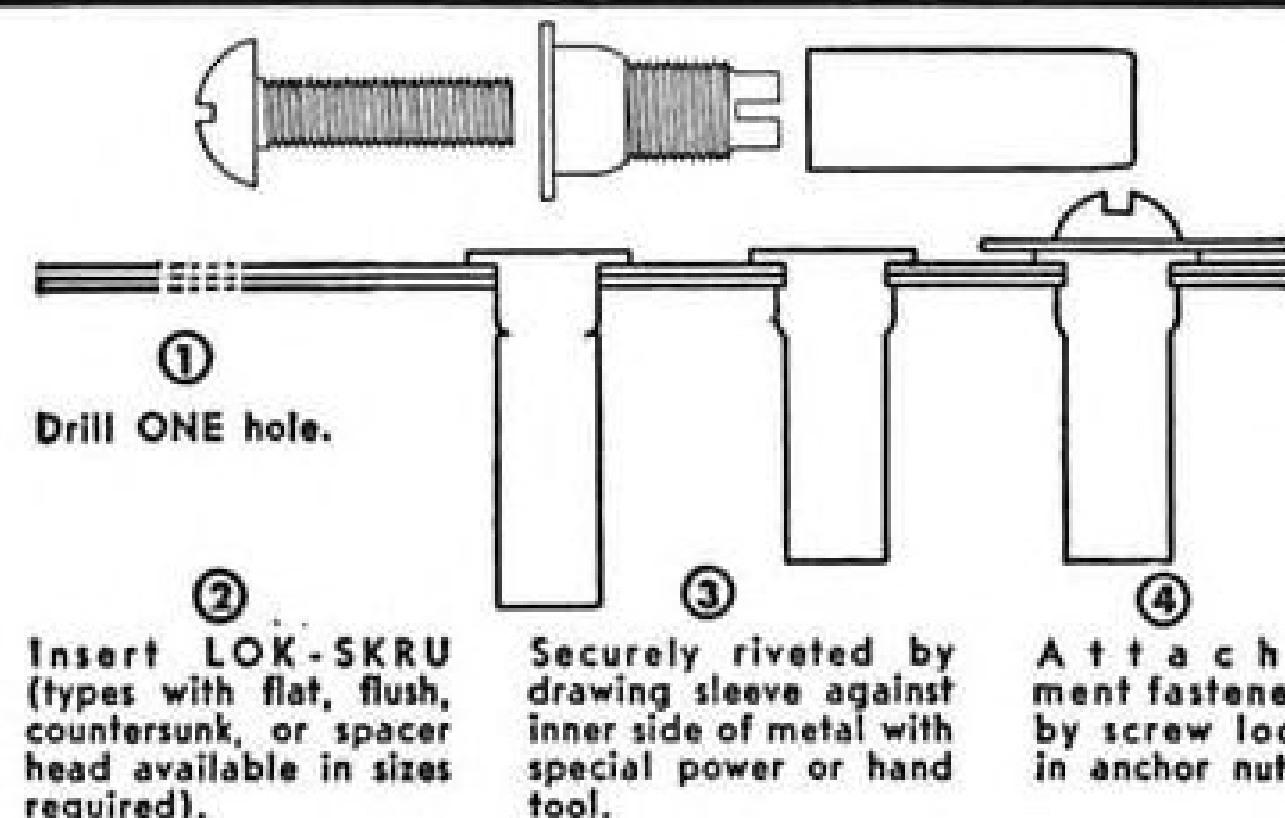
*The thin steel ring gears shown in this helicopter reduction transmission set are over 12" in diameter and are maintained round and true within .001" full indicator reading through carburizing, hardening and tempering. This absolute metallurgical control makes subsequent tooth grinding unnecessary.

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tunately in frequent usage, is in reality a misnomer. To obtain increased schedule reliability, efforts should be directed toward lower weather minimums rather than instrument landings.

Aside from the problems associated with air traffic control and the known deficiencies of present radio systems, new techniques and equipment must be provided if these lower minimums are to be realized.

► **Proficiency No Answer**—This philosophy is unanimously held by an experimental flight group at Sperry Gyroscope. In a continuing program of flight research they have had extensive opportunity to analyze weather at low minimums and are developing techniques of weather flying with existing flight aids.

This group is convinced that "super" low approaches cannot be realized operationally by simply improving manual proficiency in the use of ILS and GCA as they are known today. They believe that minimums below 200 feet can become operational only after technical progress provides the pilot with a stable means of flying the last vital 25 seconds of the descent.

This matter of stability cannot be understood by those who consider ILS as a glorified radio range, for it is in this last 25 seconds of a low approach that instability becomes evident. Clarification of what is meant by stable and unstable conditions is obtained by analysis of the series of events connected with the guidance process in making ILS approaches.

► **Stability**—On ILS the pilot observes his cross-pointer meter to learn his position relative to the proper track. Action follows mental calculation, and the aircraft's attitude and/or heading is changed to conform. This process is repeated continuously, with landing system signals checking the position of the aircraft.

As long as there is time for this chain of action to occur—signal reception, pilot action, aircraft response—the aircraft is successfully guided onto the desired path without hunting. This is stability.

However, observe the plane as it nears the landing area. Here more and more electronic signal (cross-pointer meter indication) is necessary for a given distance off the path. Finally, a condition exists in which the aircraft acts too late due to time lags in the pilot and in slow aircraft response.

As a result, the aircraft may turn toward but never settle on the desired, final track. A periodic hunt thus develops, and once started, these oscillations generally increase in severity. The system has become unstable. (Fig. 1 and 2.)

► **Exceptions**—One should not be misled by the classic low approaches that

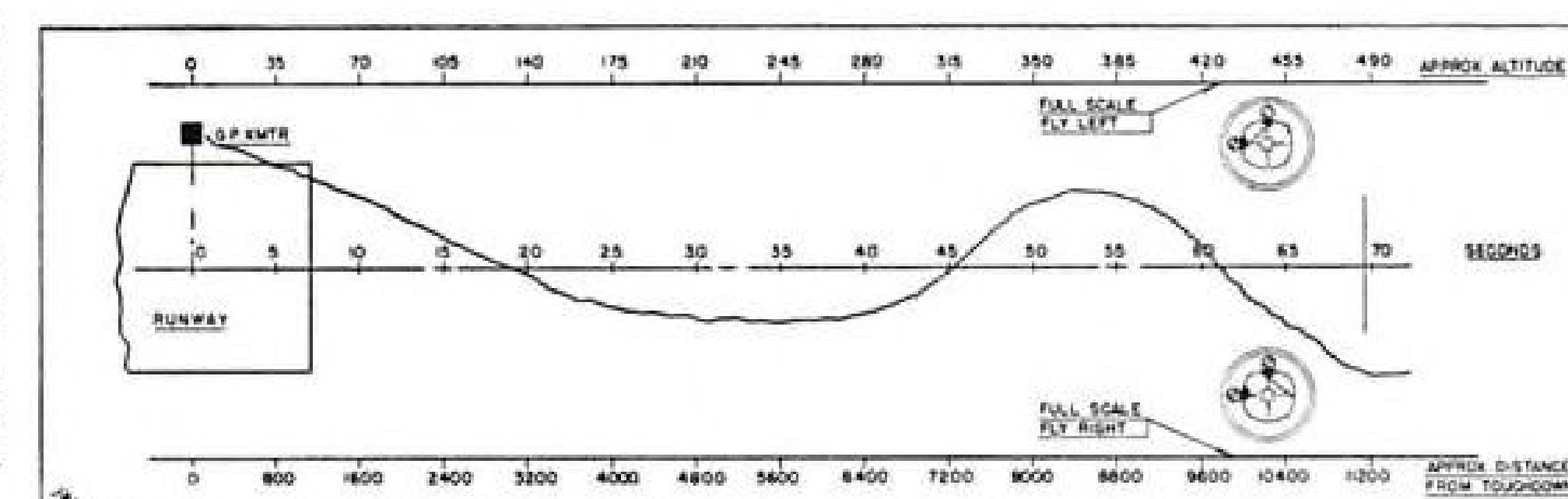


FIGURE 2: This is first localizer record made by expert pilot who had not practiced ILS for about two weeks. Instability became evident more than 60 seconds before touchdown. His subsequent flight records were similar to those of Figure 1.

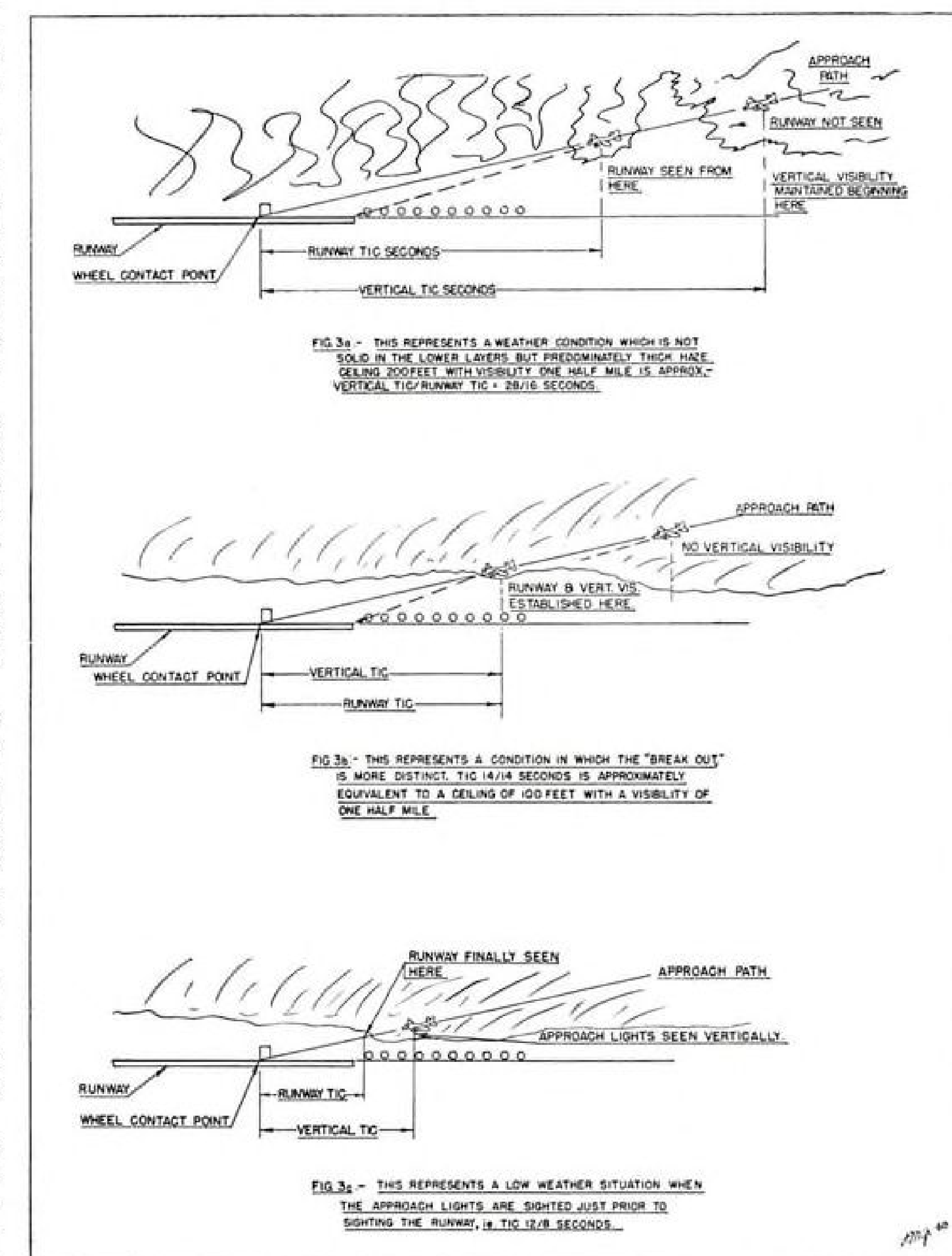


FIGURE 3: "Time Interval to Contact" (TIC). This description of visibility conditions is used by Sperry research pilots as it allows for approach lighting aids and is a more accurate index of actual approach conditions encountered.

are made through weather in an apparently undisturbed, stable manner. All such approaches are potentially unstable, because if disturbed, oscillations in the critical region of approach must occur. That possibility alone forbids such low approaches by the scheduled

air lines at the present time. Time lag between sight and action, traceable to the human element, is the primary cause of instability. Air roughness, anoxia, pilot fatigue, mental strain, practice and experience effect this factor and play an important role in deter-

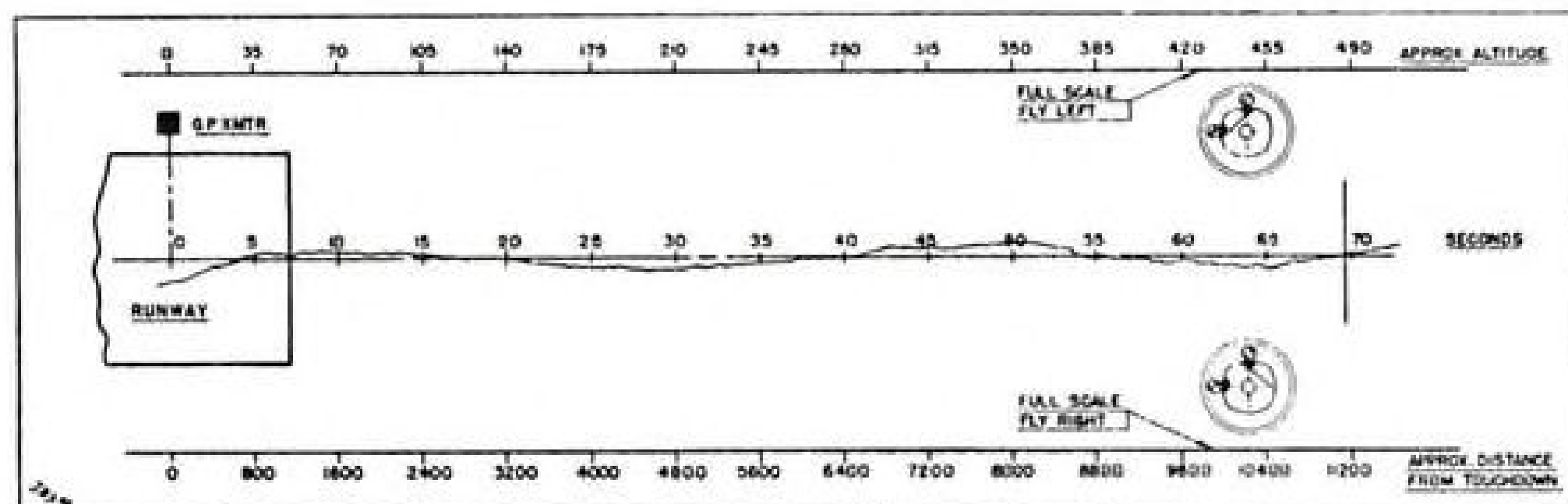


FIGURE 4: Visual proof of how automatic devices counteract instability. This is the localizer record for an automatic ap-

proach. Stability is maintained throughout the entire run, even though moderate turbulence was present.

mining at what time prior to landing instability will become evident. In the case of GCA, additional human delays are incurred at the ground station.

► **Stability Required**—Complete stability is the prime requirement for successfully completing instrument approaches to landing. Therefore, when instability develops on instruments, a go-around for another attempt must be initiated immediately. During the final 45 seconds of an approach, the crew's greatest responsibility is to recognize quickly the inception of instability and to act decisively should it occur.

The fact that instability is commonplace, and is dependent upon factors other than pilot proficiency, must account for the further fact that in completing an approach in smooth air under a 200-foot ceiling with $\frac{1}{4}$ -mile visibility, an expert pilot often must make two or three attempts before completing a landing.

In turbulent air or in variable cross winds, this same expert may be forced to make several more passes. In short, on many low approaches, instability occurs before outside, visual references can be used. This factor will have a controlling effect upon minimums approved for airline use.

► **What Is "Low Weather?"**—While making a careful study of instability and its causes, Sperry pilots have also made an analysis of what might be termed "low weather". In low experimental flying at MacArthur Field they have found that the usual terms "ceiling and visibility" lose their significance when conditions go below 100 feet and $\frac{1}{4}$ mile. Such method of measurement proves too rough for accurate evaluation of the circumstances.

The pilots determined that ceiling and visibility constantly failed to describe what could be expected along the flight path toward touch down. Time, it was discovered, was a far more critical measure of the final approach problem. What was needed was an expression of the time from continuous vertical visibility to touch down, and from runway visibility to touch down.

These time factors were called Time Intervals to Contact, or Vertical TIC

and Runway TIC. Combined into a simple TIC formula, the total problem of "breaking out" and landing could be expressed, for example, as TIC 18/10 seconds, which means that vertical visibility was established 18 seconds prior to wheel contact while the runway was seen only 10 seconds before. Fig. 3.

► **Automatic Approaches**—TIC 10/10 sec. to TIC 8/8 sec. approaches have been flown automatically for two years by Sperry personnel with the same reliability as a VFR operation. Strangely enough, TIC 0/0 sec. has never been observed. This does not mean that TIC 0/0 does not exist, but only that it is a rare occurrence.

With excellent high power approach and runway lights at a given location it is possible that a TIC 0/0 would only occur under very rare and severe conditions; for example, during the hours of bright daylight in a heavy snowstorm when approach light penetration is low, runway lights possibly covered with snow and no color contrasts existing near point of contact. Therefore, in air line operations, TIC 0/0 sec. may seldom be experienced.

It is apparent that all-weather operation by scheduled air carriers depends upon finding means for lowering minimums from the current 200-500 feet down to values near TIC 8/8 sec. Such means must eliminate the go-around resulting from existing instability experienced on manual approaches.

Since air traffic control cannot handle a high percentage of missed approaches in bad weather, minimums can only be lowered to values, which in the most pessimistic of cases, will permit a successful landing. Where instability exists during the instrument portion of the approach, pilot experience alone cannot obtain appreciably lower minimums.

► **Means at Hand**—Technical strides, with emphasis upon automatic means, have been made to solve this problem of instability for the airline operator. A successful, commercially-available means is the automatic approach attachment for automatic pilots. By electronically sensing small departures from the flight

path while on ILS and by rapidly and continuously converting this information into control movement, the critical and variable time lags inherent in manual operation are circumvented.

Furthermore, automatic approach control prevents hunting by precisely anticipating necessary corrections. Instability is thereby forestalled to a point where entirely stable approaches can be accomplished to within 2 to 3 seconds of contact. Fig. 4.

The human pilot, executing manual approaches through weather, has not been forgotten. Improved low approach instrumentation using existing ground facilities is currently under intensive investigation.

If successful, such a development will provide the pilot with a manual means of working towards the same minimums as the automatic systems. Meantime the instability hazard inherent in low approaches blocks the way toward routine manual approaches through 50-200 ft. ceilings by the air lines.

North American Upheld On Plant-Wide Bargaining

North American Aviation has won its National Labor Relations Board fight to block two AFL craft unions from splitting the company-wide bargaining unit through which the company deals with the CIO United Automobile Workers.

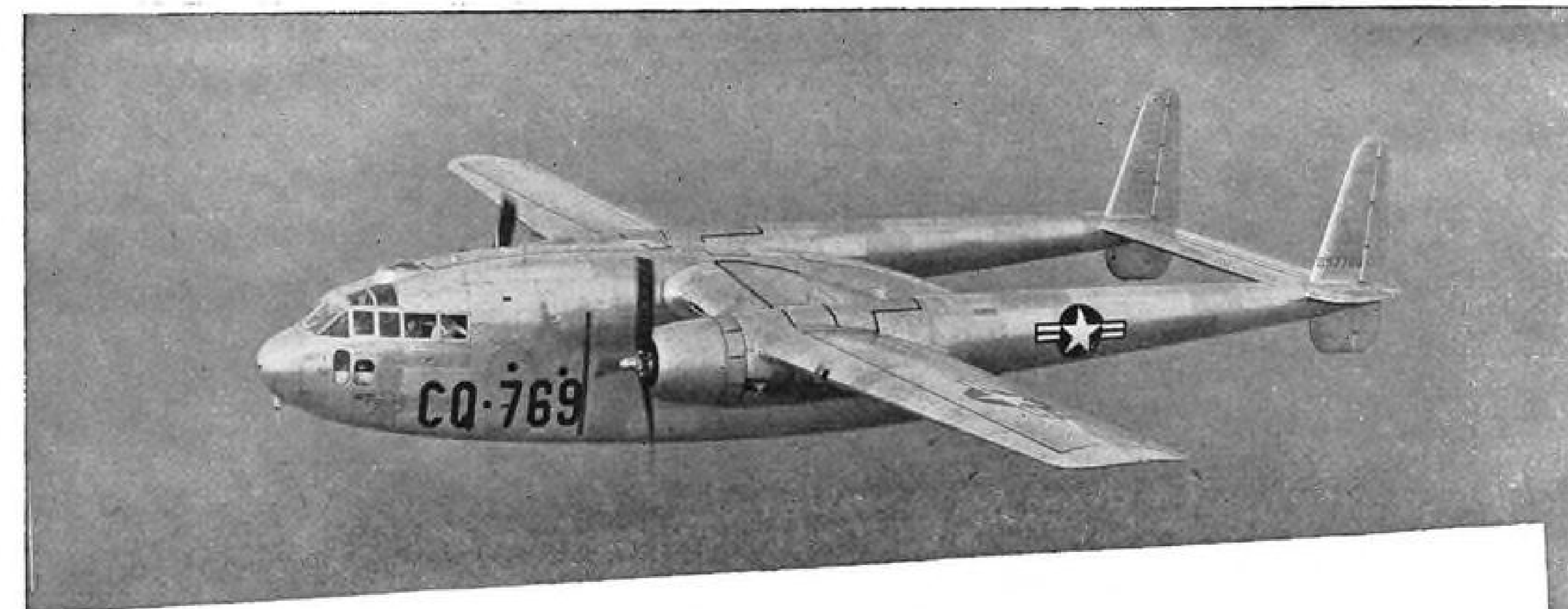
The AFL pattern makers and electricians unions tried to use the advantage given craft unions by the Taft-Hartley law to carve out a small bargaining group of wood and metal pattern makers in the main Inglewood (Calif.) plant and another of maintenance and construction electricians in the new Long Beach B-45 plant.

► **In All Plants**—Since 1941, North American has bargained with the CIO union as to production and maintenance employees in all its plants.

Pattern makers and electricians unions petitioned for separate bargaining rights under a Taft-Hartley rule which prohibits the labor board from declaring a craft union inappropriate simply because a different unit had been established by some prior decision.

► **Company Upheld**—North American opposed the splitting of the bargaining unit and was supported in its position by the CIO union.

These decisions on craft unions are significant clarifications of the Taft-Hartley act principle because of the basis on which they were made. NLRB didn't rely on the history of multi-plant bargaining by North American. Nor did it find, as in some earlier rulings, that the employees involved were not a skilled and identifiable craft group suitable for separate bargaining.



Now! An Even Bigger, Better Flying Boxcar —The Fairchild Packet C-119

Something new in the air.

Out of the tried and proved first plane ever designed specifically for cargo-carrying has come this latest creation of Fairchild engineers—a super Packet.

Like the original C-82 Packet, the C-119 is a product of close cooperation between Fairchild and the Air Force.

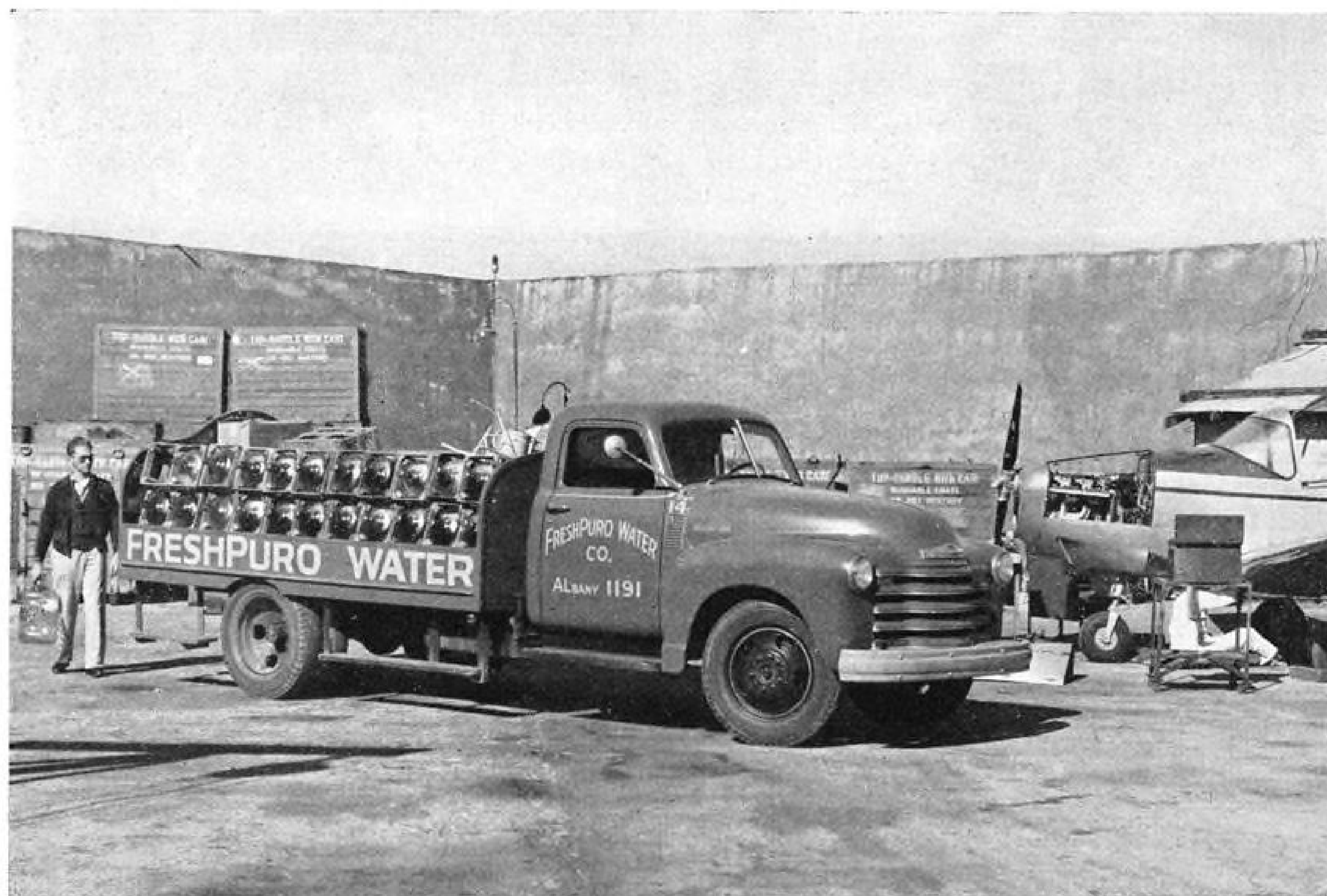
But, with increased payload, speed and climb, the new Packet can transport more men,

more equipment and more supplies than its worthy predecessor. As an ambulance plane it is equipped to carry 36 litter patients and attendants.

This new Flying Boxcar incorporates improvements and modifications proved in thousands of hours of actual service. All in all, it is flying evidence of an air-transportable Army . . . and of Fairchild engineering and research skill.

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CHEVROLET MOTOR DIVISION, General Motors Corporation,
DETROIT 2, MICHIGAN

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*Fresh air heating and ventilating system optional at extra cost.

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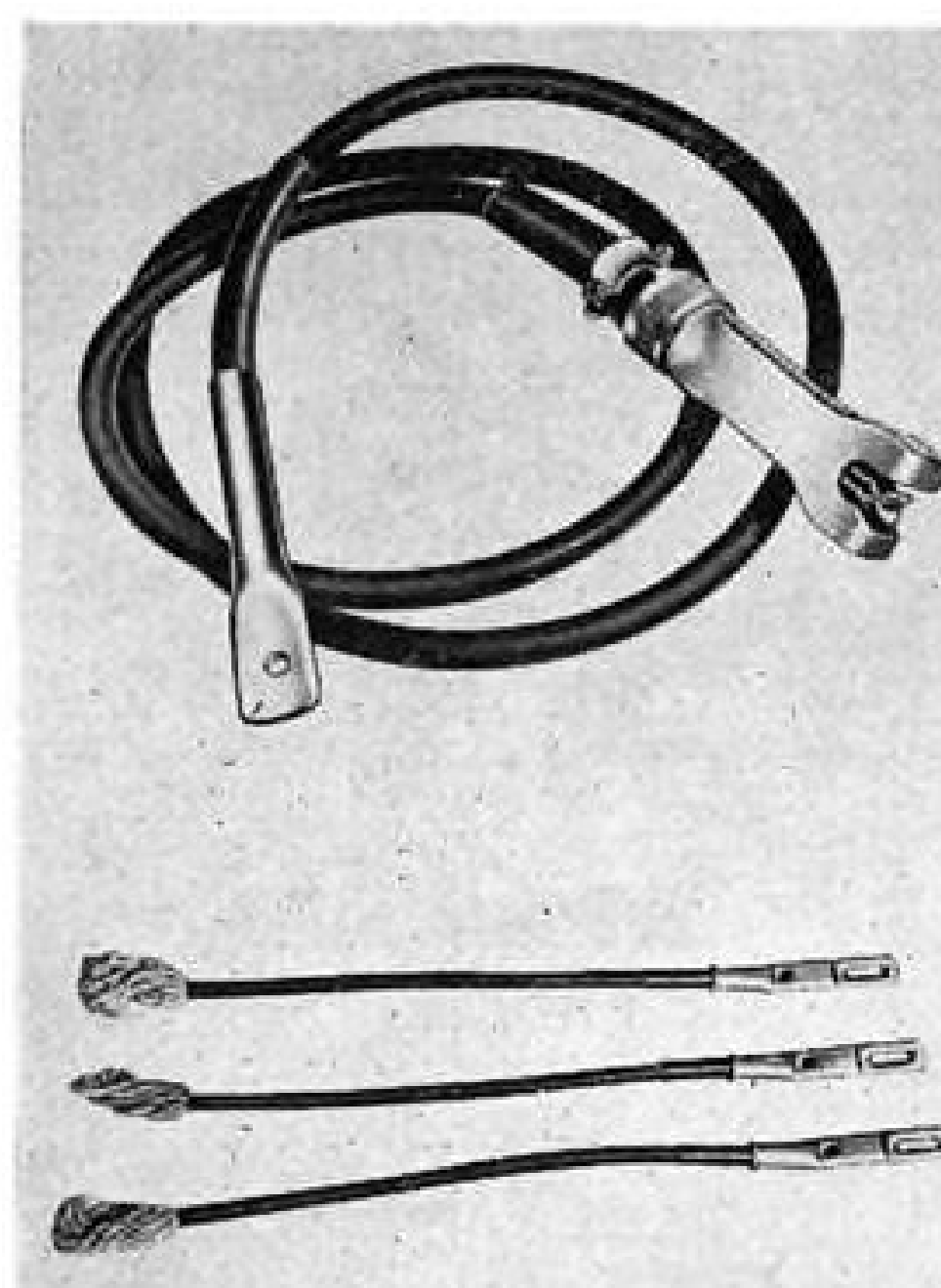
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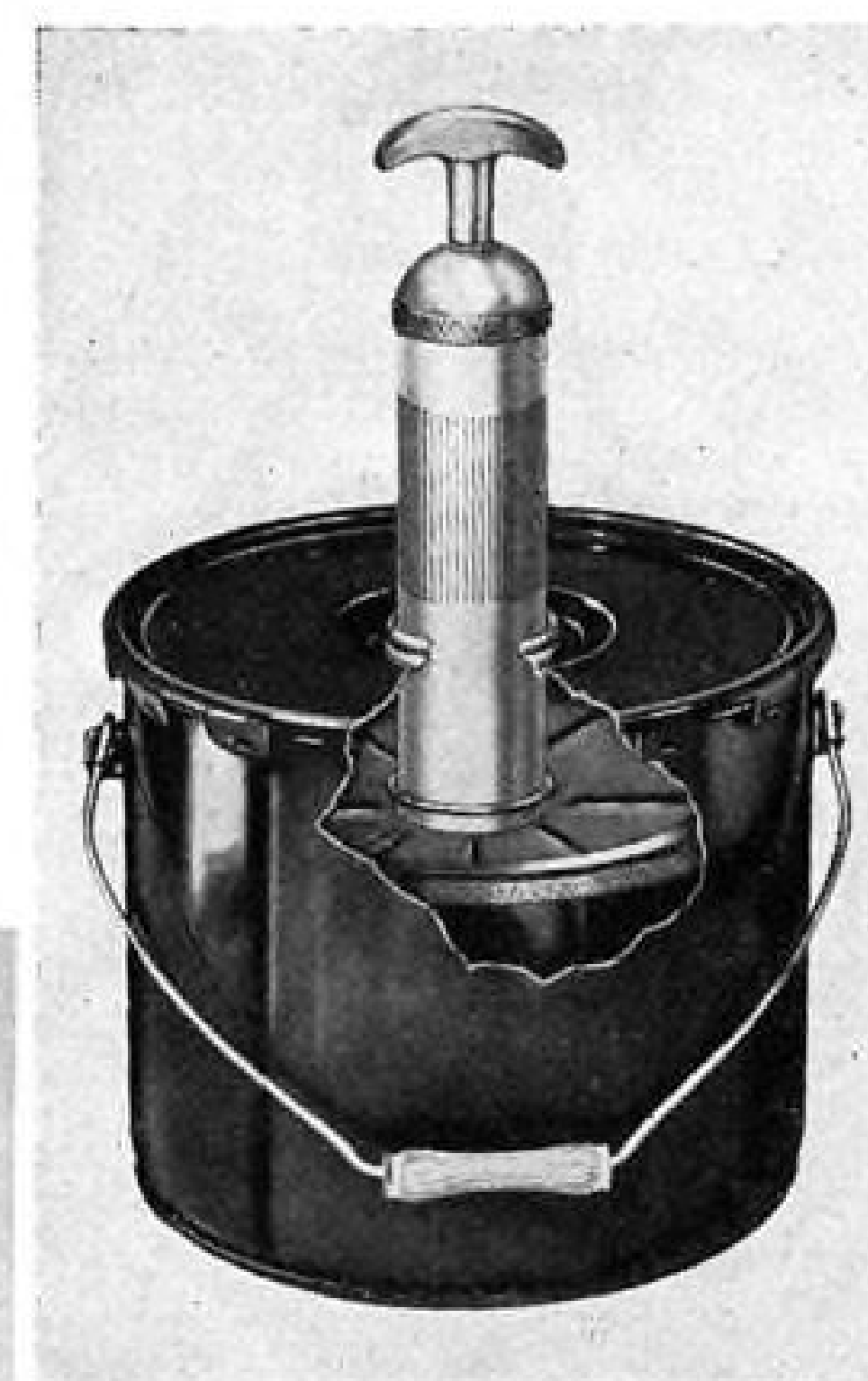
All-purpose cowl, engine, windshield, and prop cover for highwing light aircraft is being distributed by United Aviation Corp., Basking Ridge, N. J. Made of heavy waterproof canvas duck, cover comes in four separate pieces, with snap connectors and tie-down ropes.



Static Discharger

Designed to be of interest to airplane manufacturers and users are static dischargers and gasoline loading ground cables being marketed by Forest Electric Co., 7216 Circle Ave., Forest Park, Ill. Claimed is that dischargers (top) reduce interference caused by snow and ice. Each consists of 13-in. conducting cotton wick, processed with silver impregnation, enclosed in plastic sheath. About 1½ in. of wick extends from open end. Opposite end is enclosed in aluminum tube, end flattened, with two mounting holes. Gasoline loading ground cables (above), supplied in various lengths, comprise cast aluminum

ground connector equipped with phosphor bronze contacts and springs. Cable is No. 6 flexible copper wire with all-weather rubber cover, reinforced at connector end with rubber sheath, and at lug end with stainless steel spring. Grounding lug is copper.



Grease-Gun Filler

For packing grease guns, combination pail and follower plate made by Inland Steel Container Co., 6532 So. Menard Ave., Chicago 38, Ill., is designed to save time and labor in maintenance operations. Gun is inserted through large opening in cover and fits into aperture in follower plate. Slight pressure releases plate and increased pressure quickly and uniformly draws grease into gun barrel. It's claimed there are no air pockets, and grease is kept clean. As plate is depressed, sponge rubber gasket sweeps side of pail clear of grease.

Insulates Antenna

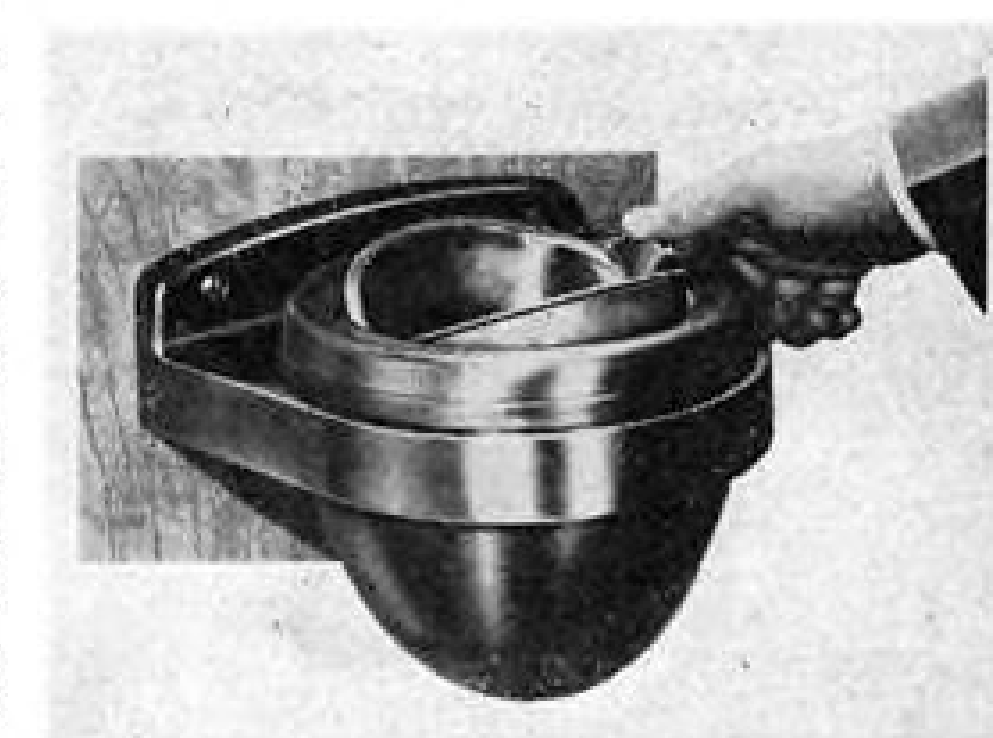
Polythene insulation for use on various parts of airplane antenna system has been developed by E. I. du Pont de Nemours & Co., Wilmington, Del., to reduce static interference and increase safety from static hazards. Represented as tough plastic with unusual dielectric qualities, material is used on tension units, tee splices, strain insulators, and wiring. Features claimed are:

resistance to 200-kv. stress over temperature range of -50 to 130 deg. F., elimination of taping operations, resistance to electrostatic discharge, and reduction of maintenance costs. Material is utilized by Engineering Physics Div., Fredric Flader, Inc., in new antenna system known as "Anstat." Polythene insulation for antenna fittings is molded by Trimold, Inc., Kenmore, N. Y.



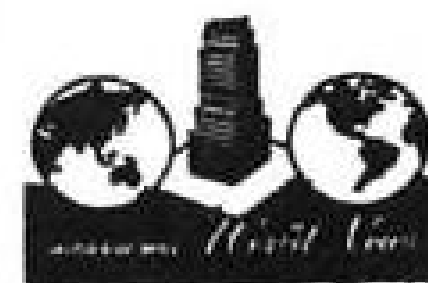
For Aircraft Repair Work

Cherry Rivet kit designed for aircraft repair work, is now available from Air Associates, Inc., Teterboro, N. J. Rivets are of oversize diameter, in accordance with CAA regulations. Complete equipment comprises 400 rivets in two head styles, three diameters, and various lengths; hand gun; stem trimmer; six pulling heads; three oversize hole gauges; material thickness chart; and three high speed twist drills, accommodating oversize rivets. Kit measures 10 x 15 x 4 in.



Jumbo Ash Tray

Airport managers should be interested in "Duk-It" safety tray, new type, large-capacity ash receptacle, designed for public buildings where traffic is heavy. Available in two styles—portable floor-stand type, and wall type (illustrated)—unit is permanently mounted in place. To operate: touch button and 6-in. dia. die-cast metal blades open, and refuse disappears. Inner liner (metal or glass) is removable for emptying. Water may be placed in bowl liner for safety.



Turkish Plans

Turkish State Airlines signs contracts for international airports.

ANKARA (via LONDON)—Turkey is expanding its civil aviation facilities with construction of two large international airports at Istanbul and Ankara. These would be in addition to the present field at Adana.

► **Standards Met**—Contracts, complying with CAA and ICAO standards, have been signed between the Turkish State Airlines and Westinghouse Electric International Corp. and J. G. White Engineering Corp. to construct and equip these two fields. Approximately \$15,200,000 has been appropriated for this program.

The Ankara airport, to be erected at Esenbuga, is about 19 mi. northeast of the Capital. Elevation is 3000 ft. Design loading of the runways will be 200,000 lb. Basic sea level length of about 6400 ft., corrected for altitude, will determine runway length.

► **Pattern**—Terminal building will be patterned along the lines of that at the Washington National Airport, and the hangar will be large enough to house two Constellations or eight DC-3s.

The airport at Yesilkey in Istanbul can be expanded to provide runway lengths and wind coverage for an international airport. Design loading at Istanbul airport will be the same as at Ankara.

Both Ankara and Istanbul will be equipped with high intensity runway lighting.

► **All-Weather Flying**—Turkish State Airlines wants to have all main airports equipped for all-weather flying. Radio ranges will use VHF. Instrument landing systems adopted are SCS 51 type.

► **Communications**—Two international communication stations will be established at Ankara and Istanbul, both of which will have teletype systems, handling foreign and domestic operations. Meteorological stations at each airport are also planned.

Control tower equipment for each airport is in accordance with international regulations. VHF transmitters and receivers will be used to ward off static in the region of the airfields.

► **Operation Step-Up**—Having the fields completed in 1948-49 will enable the airline to step up its operation considerably. It will also be able to use new and heavier type planes.

A law covering the requirements for this program will be presented to Parliament for enactment in the near future.

Pakistan Airlines

KARACHI—The Pakistan government has granted licenses to Orient Airways and Pak Air Ltd.

The permits run for seven to eight years, depending on the amount of capital invested and the speed with which services are started. They call for the replacement of Douglas Dakotas by more modern aircraft during the period July 1, 1949-Jan. 1, 1952. In addition the permits set up plans for the operation of international air services which, however, will probably be some time in coming.

Orient has been operating on a temporary permit for about year, but Pak Air still has to begin major operations.

Australia May Buy Airline

MELBOURNE—The Australian Department of Civil Aviation wants \$6,500,000 to buy the privately held Qantas Empire Airways stock.

In 1946 the Commonwealth became part owner in the airline along with the Pioneer Co., Queensland, and the Northern Territory Aerial Services, Ltd. As \$1,500,000 is all that is required to purchase the stock held by these two concerns, the \$5,000,000 balance is earmarked for expansion of services and equipment.

Actually, since July, 1946, Qantas has been operating as a fully socialized undertaking.



SWEDISH SAAB SAFIR TESTS WING

This Swedish SAAB Safir lightplane was used to test the sweptback wing of the jet SAAB-29 (Aviation Week, July 12). The wing

is designed as a continuous, rigid and smooth 75S shell. Outer part of the wing-tip shows automatic slots which allow satisfactory con-

trol of craft even after stalling angle is reached. The Safir normally has straight-wings.

Add the Boeing B-50 to the growing list of modern aircraft that are capitalizing on the lighter weight, stronger construction and accurate pre-testing of FEATHER-WEIGHT oil coolers.

These modern FEATHER-WEIGHTS get their minimum weight and maximum resistance to extremes of temperature, vibration and shear from patented aluminum-alloy brazing of their thin all-aluminum sections.

How FEATHER-WEIGHTS will perform under actual flying conditions is clearly forecasted by critical tests in Clifford's wind tunnel laboratory, the largest, most modern in the aeronautical heat exchanger industry.

Inquiries concerning FEATHER-WEIGHT all-aluminum oil coolers are invited.

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The Boeing B-50 bomber . . . a faster, more powerful, harder hitting version of the famous B29 Superfortress . . . is reported to be the nucleus of the Air Force's long-range bombardment program.

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ALL-ALUMINUM OIL COOLERS

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New Airline Planned For Indonesia

BATAVIA—As soon as the political dispute between the Dutch and the Indonesians is settled, the world's newest airline may make its bow into the transport arena. Tentatively named FILO (Federated Indonesian Aviation Organization), it will be set up as a private company.

Participating in its capitalization will be the Indonesian Federal Government, various commercial interests, and KLM Royal Dutch Airline. Each subscriber will be limited to a minority interest.

Linking together the 3000-mile stretch of Indonesian islands and connecting the archipelago with Australia and Southeast Asia, FILO will have as a nucleus the present inter-island service that KLM operates separately from its inter-continental lines on contract for the Netherlands Indies Government.

According to officials, negotiations are pretty well advanced. Aviation talks between the Dutch and the Indonesian Republic, however, have apparently made better headway than the political negotiations.

Airlines Take Over

MELBOURNE — Temporary withdrawal of the last passenger ship to link the island state of Tasmania with the mainland will work no hardships either side of Bass Strait.

TAA, ANA and Ansett, the three lines that operate services to Tasmania, have ample spare capacity to take care of the last diehards who preferred sea transport to flying. The three lines can handle 5138 passengers a week, but operate at load factors ranging from 69 to 77 percent.

Australia-Orient Airline

MELBOURNE—Australian National Airways is trying to obtain permission to run regular Skymaster service between Australia and East Asia. This is the first operational project to come out of the recent absorption of Cathay Pacific Airlines by ANA.

The American interest in Cathay Pacific, a Hong Kong-based service, was bought out by ANA and Butterfield and Swire, a British trading company in the Far East. The Hong Kong administration has already signified its intention to license a service to Australia.

New Brazilian Airfield

RIO DE JANEIRO—Construction studies for a large airfield near Paulo Alfonso falls, scene of a projected hydroelectric development in northeast

Brazil, are nearing completion. It is reported that one of the three runways will be made of wood.

The field will be located at the point where the state boundaries of Bahia, Sergipe, Alagoas and Pernambuco converge.

NEW SERVICES

Air France has placed a fleet of Catalina flying boats into operation in the Caribbean area to supplement service of the six-engined Latecoere 631 flying between Biscarosse and Fort-de-France in the French West Indies.

Scandinavian Airlines System has entered into a cargo interline agreement with Flying Tiger Line, Inc., which provides domestic and international carriage of airfreight shipments to and from points in the U. S. to 27 foreign countries on a single waybill.

Qantas Empire Airways has inaugurated flying-boat service between Sydney, Noumea, Port Vila, and Santo, New Hebrides.

Sabena, Belgian Airlines, is providing sleeper accommodations on DC-6 flights between Brussels and Johannesburg, South Africa. . . . The Brussels-Dublin service has been stepped up to two roundtrips weekly.

Scandinavian Airlines System will open two new intercontinental routes in November or December—Stockholm-Shanghai and Stockholm-Johannesburg. DC-6s will be used.

Avioinee Italiane's Milan-Dublin service is scheduled to begin this month. Three-engined Fiats will be used.

Tasman Empire Airways has been permitted to resume Sandringham flying-boat service between Sydney and Auckland. The planes were withdrawn some months ago due to overheating difficulties.

KLM, Royal Dutch Airline, and Capital Airlines have signed an interline passenger agreement which will provide service between any point on Capital's system and Holland, Belgium, Scandinavian and other European countries, as well as Dutch East Indies and West Indies, which are served by KLM.

British European Airways has opened a non-stop service between London (Northolt) and Nice.

Finnish Air Lines is extending its services into Europe again. After flying the Helsinki-Stockholm route since last November, a twice weekly service with DC-3s has now been started to Amsterdam, via Copenhagen.

Great Circle Airfreighters Ltd. has extended its services to Zurich, Switzerland.

Italo-Australian Travel and Transport Co. is scheduling flights between Rome and Sydney. Italian Dakota DC-3s will operate the route every two weeks.

World News Briefs

WELLINGTON—

Plans are afoot to inaugurate before the end of the year a London-Sydney air service via Vancouver and Auckland, New Zealand, according to an announcement made by a Canadair, Ltd., spokesman.

RIO DE JANEIRO—

Aerovias Brasil is talking about buying out the financially embarrassed Navagacao Aerea Brasileira. Things have been so bad for NAB that employees of that line recently appealed to Congress for help in collecting back wages.

TRINIDAD—

The re-established British West Indian Airways Ltd., an associate of British South American Airways Corp., is replacing the Lockheed Lodestars currently in service with five Vickers Vikings.

NEW DELHI—

Royal Indian Air Force strength is being increased. Plans are under way to activate six reciprocal-engine fighter squadrons plus a squadron of jets, a photo-reconnaissance and two observation units. Training, maintenance and administrative sections also are to be expanded.

MELBOURNE—

In the year ended Mar. 31, Australian domestic airlines carried 1,152,310 passengers (equivalent to one-seventh of the population) and flew 492,000,000 passenger miles—an average of 64 mi. per head of population.

MADRID—

Airport radio control and navigation aids may be modeled on the lines of control systems in use at London airport, according to a report from the British Air Attache in Spain. It was also stated that British equipment may be used for the control station to be erected at Villa Cisneros.

BOMBAY—

The Beechcraft agency in India has switched from Ambica Airlines to Indamer Co., Ltd., a related company. Prices on the company's planes, FAF Bombay, are: Bonanza, \$12,000; D-18-S, \$87,900.

KARACHI—

A bilateral air transport agreement between India and Pakistan permits airlines designated by the Government of India to operate on ten specified routes and allows Pakistan lines to service nine routes.

AVIATION WEEK, August 16, 1948

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SALES & SERVICE

Better Service for Plane Owners

"Auto service station" type of facilities installed by Gulf of Pittsburgh seen as new business-getter.

By Alexander McSurely

A relatively simple \$30,000 structure, to be erected near Pittsburgh at the Allegheny County Municipal Airport, promises to be the forerunner of a new era in improved service for the private flyer.

Gulf Oil Corp. has developed plans for the new building, which is designed to provide attractive facilities and comfort for the air traveler who flies his own plane. County commissioners have approved the proposal of Gulf's aviation department to erect the super service station for private planes, believed to be the first of its type in this country. ▶ **Porcelain Structure**—Expected to cost from \$25,000 to \$30,000, the building will be approximately 70 by 30 ft., con-

structed of porcelain on masonry. Its facilities will include a lounge and chart room, with large map table and other navigational facilities to ease the task of cross-country course plotting by private pilots. There will be telephones and modern rest rooms, including a separate lounge room for women pilots and passengers.

The station service attendants are to be instructed to provide complete and courteous service to the individual plane owners, and are to have no other duties to prevent their giving full time to this task. This will include courtesy services such as windshield cleaning, free air, sweeping out cabin or cockpit floors.

▶ **Service Island**—On the ramp area will be a service island, designed for small airplanes, equipped with modern airport

cabinet-type fuel pumps providing two grades of aviation fuel, 80 and 91 octane ratings. Fueling service will be available on a 24-hour basis.

The island will be arranged so that small aircraft may taxi up to it, much as automobiles drive up to a service station pump for refueling. Airport tenders will be available to provide fuel and oil for larger airplanes parked at any point on the airport.

The projected Allegheny County service building is designed for specifications exceeding by a considerable margin minimum requirements set up by the county commissioners for retail service of petroleum products, the Gulf aviation department points out.

The airport service station could well mark the beginning of a parallel to the service facilities provided for touring motorists on every important highway.

▶ **See New Market**—Pioneer motorists used to have to put up with the type of service so many personal plane pilots complain about today. Facilities for ordinary fuel servicing of automobiles were few. But the oil companies saw a potential market as the automobile traffic began to grow and introduced merchandising and service into the fuel and oil business.

There was a considerable let-down during World War II due to the manpower shortage, and automobile service station customer relations have never yet climbed back to their prewar level.

But many a private flyer would take the worst treatment he gets in an automobile service station in preference to the lack of service he still encounters at too many airports.

Lack of actual minimum lounge and restroom space, and convenient servicing equipment at many airports is an underlying cause for much of this continuing customer discontent.

▶ **Future Trend**—If Gulf Oil aviation department's experimental airport service station points toward future mass construction of similar stations at airports across the country devoted to the small planes and their flyers, much of the sting and the discomfort of private flying may be on the way out.

Even if the weather problem is not solved for private flyers for years to come, it will not be so tedious for the pilot to wait out a storm on the ground in pleasant surroundings such as this type of service station will afford.

Fixed base operators and private flyers will watch to see how long the alert merchandising and sales departments of competing oil companies let Gulf carry this ball by itself before competitive aviation service stations of comparable facilities become available. But however slowly this comes about, the Gulf project promises to bring new private flyer business into Allegheny County Airport.



AIRPLANE SHOW FOR NEW YORK

Lightplane distributors are giving the forthcoming New York Airplane Show the nod. Slated for Feb. 19-27, 1949, the exhibit is going to be held in conjunction with the National Sportsmen's Show at Grand Central Palace. Members of the Advisory Committee are (left to right) George R. Galipeau, Van Dusen Aircraft Supplies; Chairman Al Bennett, County Airport Corp.; Sydney Nesbitt, Atlantic Aviation Corp.; and Don R. Clark, U. S. Aviation Underwriters. The exhibit, which will occupy the entire third floor of the Palace, will feature

20 planes and 50 booths of aircraft equipment and supplies. Last show of this kind was the Eastern Light Airplane Exhibition in the 1941 National Sportsmen's Show when attendance passed the 225,000 mark. According to Chairman Bennett, the exhibit gives dealers and manufacturers a chance to "get a showing of their own at a moderate expense and with the advantage of wider public acceptance." Exhibit cost: \$450 per plane (\$750 for two shown by the same firm). Booth: \$150 for a space measuring 10 x 10 ft.

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AVIATION WEEK, August 16, 1948

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International Division: Kenosha, Wisconsin, U. S. A.

BRIEFING FOR DEALERS & DISTRIBUTORS

NAVION PRICE JUMP—Close on the heels of the last Beech Bonanza price increase comes a corresponding jump for the Ryan Navion, the Bonanza's principal competitor in the four-place retractable-gear business plane class. Price of the 1948 Ryan Navion effective Aug. 2 was hoisted to \$9985 flyaway San Diego from a former price of \$8990.

Earl D. Prudden, Ryan Aeronautical Co. vice president, said rising cost of raw and finished materials and increased labor rates in new contracts signed following a six-week strike brought about the higher price. As a result of the strike Ryan delivered only 19 Navions in July. The Navion, when first placed on the market by North American Aviation, was priced at \$6100.

The new Navion price preserves the differential of about \$1000 between it and the Bonanza (now tagged at \$10,975). The difference, percentage-wise, is narrowing steadily as prices of both planes are increased. Prudden points out that business users of the Navion will find the price increase a minor factor in their seat mile cost figures on the airplane if they use it regularly.

JAKE MILLER TO RYAN—Along with the Navion price jump comes announcement that J. W. (Jake) Miller, former Piper domestic sales manager, has been appointed Ryan factory representative for Navion sales. In his new job, Miller will work with Navion dealers and distributors on improving retail sales programs, and have charge of selecting additional distributors in territories not yet assigned.

The manufacturer is seeking to establish a "complete, fully integrated nation-wide network of sales and service centers." In his ten years with Piper, Miller participated in the early "grasshopper" liaison plane demonstrations which sold the army on converting commercial lightplanes to liaison use, and later directed Piper's radar and controlled missile program. He was a key man in Piper's postwar sales program until he left the company recently.

EARLY BIRD FLIGHT—On Aug. 19 George Scragg of Cleveland, president of the Early Birds, will fly his Cessna over the same route Glen Curtiss flew in 1910 from Euclid Beach to Cedar Point. He will be accompanied by Al Engle, of Cleveland, an early Curtiss mechanic. Scragg was an employe of Curtiss at Hammondsport, N. Y., at the time of the 1910 flight.

The plane will take off from Cleveland's lakefront airstrip and swing over Euclid Beach to begin the flight. At Cedar Point a bronze plaque will be placed to commemorate the Curtiss flight, believed the first in that section of Ohio. Cook Cleland, racing pilot and fixed base operator at Cleveland, will bring a plane load of other Early Bird flyers to the Cedar Point ceremony in his Convair Catalina amphibian.

THROTTLING FLIGHT TRAINING IN VIRGINIA — A case report on how the Veterans Administration regional office is throttling GI flight training in Virginia is supplied by an AVIATION WEEK correspondent. Since the new law went into effect July 1 no veteran has been able to "justify" his claim to the regional office that flight training will be of benefit to him in his business or vocation.

In one case turned down by VA, a graduate mechanical engineer was refused permission to learn to fly to start operation of a flight school, and was referred to the advisement and guidance section of the regional office for a final decision. The regional office is ruling that in a school of higher learning a veteran will not be permitted to take flight training unless this is required for his degree, or unless he provides justification.

Asked about the hypothetical case of a salesman who had his company certify that it would buy an airplane for his business travel if he would take a flight course under the GI bill, the regional office said that such a case would be turned down unless he could show that the same company had previously made profitable use of a plane and flying salesman.

—ALEXANDER MCSURELY

Door Control

Although its rudder was torn completely off and the vertical fin and prop were damaged in a collision with a power line, a Cessna 140 flew some 90 miles over the Cascade mountains to an airfield near Seattle, Wash.

Grover C. Greimes, of Seattle, the pilot, had descended to an altitude of about 75 ft. to avoid head winds and was "blinded by the sun" when he hit the high-tension line, near Yakima. With the rudder gone, the ship went into a series of flat, skidding turns, the torque pulling it around to the left. Greimes opened the left-hand door to look back to see what was wrong and the turning stopped. Taking that as his cue, Greimes guided the plane by opening and closing the doors on alternate sides, aided by his passenger.

Greimes flew low over the Yakima airport, dropping a note saying his rudder was gone and he was continuing to Seattle. The CAA assumed he would land at Boeing Field, Seattle, and notified authorities there, who called an ambulance, Coast Guard search and rescue vehicles and other emergency machines.

But Greimes landed at a small private airstrip east of the city. When asked why he hadn't landed at Yakima, he replied "If I was going to crash, I wanted to be close to home."

Portland Airport Safe

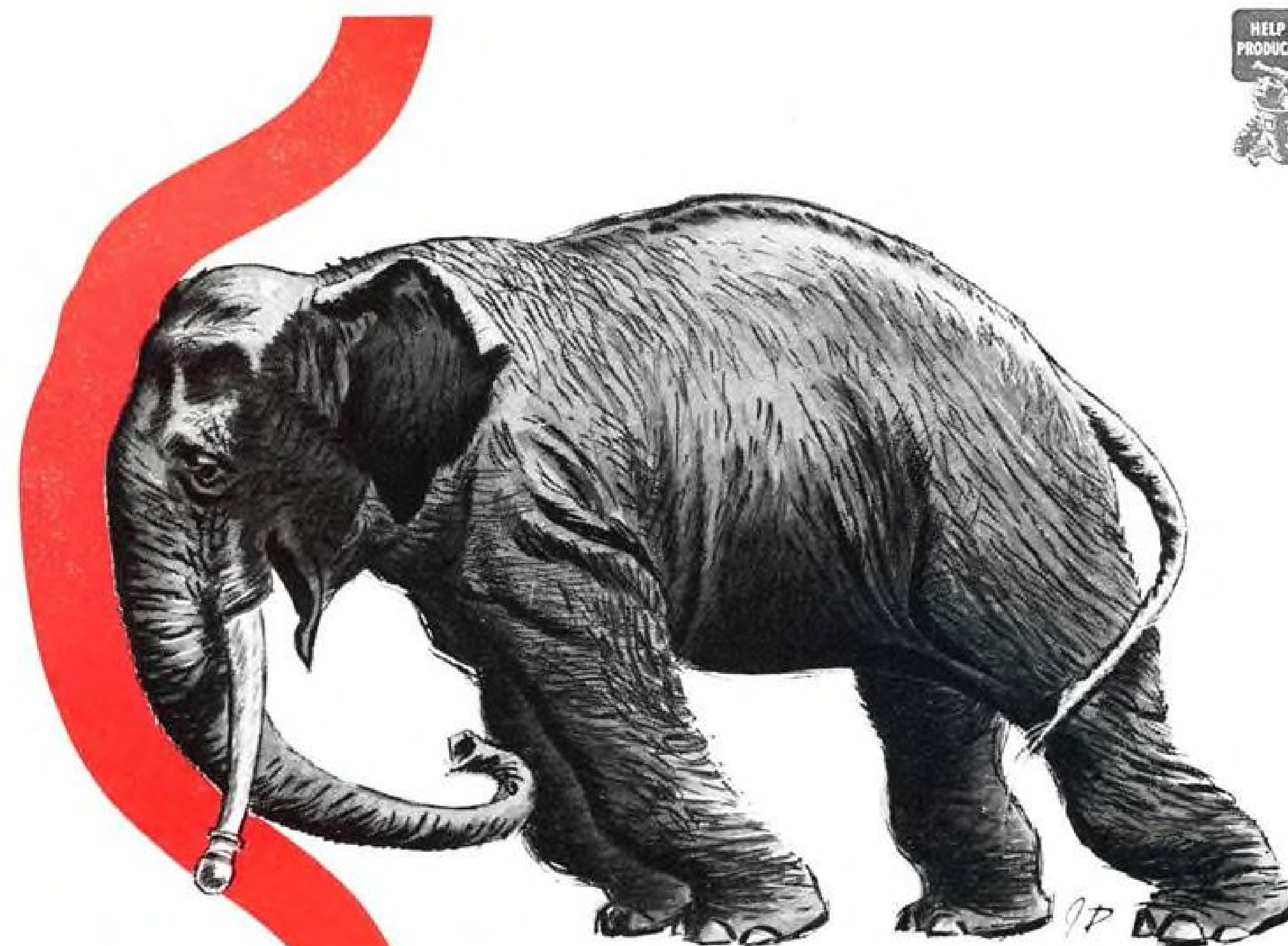
Engineers report no serious damage to runways at the Portland airport by the Columbia river flood. Fears that the runways might have been undermined were dispelled after a thorough examination. Water came in on the airfield without much current and receded in the same manner, leaving scum and mud over the surface but otherwise causing little damage.

Damage to the terminal buildings also was less than had been expected. All four airlines using the airport, United Air Lines, Northwest Airlines, Western Airlines and West Coast Air Lines, expect to be back to the field Sept. 1. Oregon National Guard already has returned its planes and equipment.

Training Conference

A national conference of state approval agencies under the GI Bill of Rights is scheduled Sept. 20-22 at the Continental Hotel, Kansas City. Attending will be representatives of the various state departments of education charged with certifying schools to the Veterans Administration for enrollment of veterans for training.

It is expected that the critical situation in curtailment of flight training for veterans, by regional offices of VA will be a major subject of consideration.



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Flight Indicator Survey

When the air is turbulent, when the G-load is suddenly raised or when the air speed is suddenly decreased by an over-taking gust from behind—that's when most stalls occur.

So said detailed reports sent in by pilots responding to a Survey by Safe Flight Instrument Corp., White Plains, N. Y., manufacturers of the Safe Flight Indicator, stall warning device.

Conducted among 500 registered users of the SFI, the survey showed that 96 percent of those who answered the questionnaire felt the stall instrumentation on their aircraft had added considerably to their confidence and flying pleasure. Warning of an unexpected stall was reported by 60 percent. Over 75 percent felt that the SFI had improved their own instinctive stall perception ability.

More than 30 pilots submitted reports of their near-stalls. They included accounts such as the one from a 500-hour pilot who tried to climb his amphibian at normal attitude after takeoff warning but got stall warning to drop his nose. Later he discovered the No. 5 hull compartment had six inches of water in it.

Accident Analysis Class

Formation of a course in aircraft accident investigation for state aviation officials has been announced by the Flight Safety Foundation, the non-profit safety research group headed by Jerome F. Lederer.

The course, covering six-ten days, will include investigation and analysis of accidents and detailed studies of the safety lessons learned from the conclusions reached about the accidents.

Interest has been shown in the course by various manufacturers and airlines, including Capital, American and KLM. The British Embassy has also indicated interest in the course.

Lecturing staff will include CAB Safety Bureau personnel, George Tryon of the National Fire Protection Association; Edward E. Slattery, jr., CAB, Dr. L. A. Sheppard, formerly of the Office of Flying Safety, representatives of the National Association of State Aviation Officials, aircraft engine and propeller manufacturers and airlines.

The course will require about 20 hours of classroom and 15 hours of field work.

Sales and Service Chief

Lloyd H. Bender, formerly head of service operations for the Swift 125 all-metal two-place personal plane at Texas Engineering Manufacturing Co., Dallas, has been named to head both sales and

service for the plane. He succeeds Leonard Larson, who resigned as assistant sales manager.

After two years with Curtiss Airplane Motor Co. at Buffalo, he served 14 years with Consolidated Aircraft Corp. Later he was plant manager for the Guiberson Corp. aircraft heater division, Dallas. He was production manager and factory superintendent of Globe Aircraft Corp., original manufacturer of the Swift, and transferred to TEMCO when that company purchased the airplane from the bankrupt Globe organization.

Bender said there would be no immediate changes in the national sales organization for the Swift 125.

Airport Law Conference

State aviation officials from nine mid-west states have been invited to attend a reciprocal airport law conference to be held in St. Louis Aug. 30-31 under sponsorship of the Aviation Council of Metropolitan St. Louis. The conference will seek to develop solutions for problems created by artificial legal barriers affecting construction and control of airports across state borders.

St. Louis currently is projecting a second major metropolitan area airport across the Mississippi River in Illinois which will be involved in such problems, and they are expected to become more common among other cities. In addition to state aviation representatives invited from Missouri, Illinois,

Kentucky, Tennessee, Arkansas, Oklahoma, Kansas, Nebraska and Iowa, observers from CAA and other interested organizations are expected to attend the St. Louis conference.

Lightplane Arresting Gear Improved and Cost Cut

Improved model of All American Aviation's emergency arresting gear for short landings for lightplanes uses a stainless steel ribbon which is pulled through small friction brake shoes.

Like the previous arresting gear, the new model drives a spike into the ground by an explosive when the airplane is coming in for a landing. The steel ribbon, attached to the spike, slows the airplane down to a complete stop in a fraction of the distance required for normal landing.

Tests with a Piper Cub using the new arresting gear have stopped the plane in less than 100 ft. when it was landing at 70 mph., the manufacturer reports. In the previous model an elastic tape, "Unolyn," had been used, which had to be replaced after every operation. The steel ribbon can be used for several emergency landings before a replacement is necessary.

The arresting gear is being investigated for civilian and military potential use and the new model can be made available at a considerable reduction in the original model's cost.



ECUADOR PLANE SHIPMENT

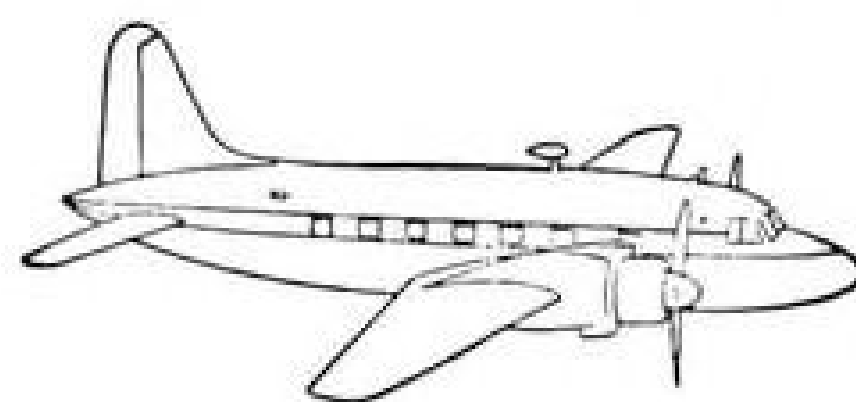
Cessna Aircraft Company recently started air shipment of its personal planes to South America with a Model 140 two-placer transported via Braniff International Airways direct from Wichita to Guayaquil, Ecuador. Model 140 was delivered to the Cessna distributor in Ecuador 24 hr. out of the Wichita plant for only a few dol-

lars more than the steamship cost, although the water shipment would have required several weeks. Plane was the fifth postwar Cessna purchased by the Aero Club del Ecuador. The manufacturer plans to ship additional planes by air to South America soon. Photo shows crew loading Cessna into Braniff DC-4 cargo plane.



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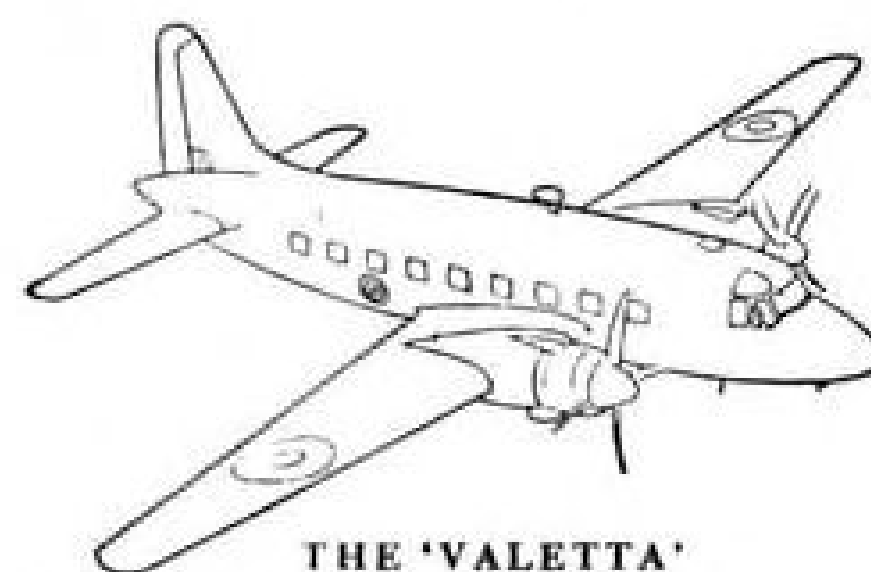
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FINANCIAL

Equipment Interchange Analyzed

Board attitude points to move as likely next step in revamping of scheduled airline route system.

Equipment interchange arrangements promise to assume greater significance in re-shaping the nation's airline route structure. The era of widespread expansion appears to be at an end, temporarily at least. The industry is now in the process of attempting to consolidate its position by developing more fully its existing potentialities.

Equipment interchange agreements, mergers and route transfers are the major devices likely to be utilized.

The interchange proposal appears to have the greatest flexibility and the one likely to accomplish the more immediate results.

► **CAB Interested**—The Civil Aeronautics Board has indicated a strong interest in the interchange arrangement device.

This is evident in the recent decision originating a proceeding to determine whether there is a public need for interchange or other through services between (1) Mid-Continent and Eastern at St. Louis; or between (2) Mid-Continent, Chicago & Southern and Eastern or Delta at Memphis; and between (3) Braniff and Eastern or Delta at Memphis. This action was an outgrowth of CAB's decision reaffirming its previous award of a Kansas City, Mo.-Memphis, Tenn., route to Chicago & Southern.

► **Extension Offset?**—The interchange possibilities were examined presumably as an offset to the extensions sought by Delta and Mid-Continent to Memphis as well as by Braniff's application for a route from Kansas City to Atlanta.

The new proceeding will now examine the question of providing any necessary single-plane service to through passengers from Mid-Continent's system through the St. Louis gateway to points served by Eastern. Furthermore, examination will be given the possibility of linking through service from C & S and Mid-Continent points to those served in the southeast by Delta or Eastern. At the same time, consideration will be given the possibility of arranging one-plane service between points on Braniff's Denver-Memphis route and Delta or Eastern's cities south-east of Memphis.

► **Complications Foreseen**—Ambitious

as these possibilities may be, the difficulties involved were noted in the dissenting opinion taking exception to the interchange proposals. The new wrinkle of three carriers necessary to effect proper interchange of traffic may make such arrangement "needlessly complicated."

The important fact remains that the basic policy of the Board appears opposed to widespread expansion of route mileage in the industry.

From 1940 to 1947, domestic air routes multiplied from about 45,000 to more than 110,000 miles. Much of this expansion was projected to meet estimated growth of air travel. Many a new route award was won by a small carrier with the allegation that with more mileage more economical operations would ensue, thus relieving the pressure for support through U. S. mail payments. It was also maintained that one-carrier service would be provided between various points affording greater convenience to the traveling public. There was no official opposition to these optimistic projections and CAB sanctioned many of these new route extensions creating highly competitive sectors throughout the country.

► **Competition Breakdown**—According to a compilation prepared by the Air Transport Association, 91 percent of all air traffic is subject to two-carrier competition, 59 percent moves over routes with three-carrier competition and 13 percent moves over routes with four-carrier competition.

The failure of passenger traffic to reach anticipated volumes revealed the vulnerability of many of these new route awards. Of greater importance, previous ailments—instead of being cured—were compounded. The record shows that there is no economic cure in simply making big lines out of little ones without regard to a general pattern.

Mergers and outright route re-alignments are more direct and far more constructive in reshaping the airline map. However, such processes are very controversial and have many complexities requiring considerable time to adjust.

The interchange device, while not without controversy, has greater facility making for immediate action.

► **First Interchange**—United and Western were the first to interchange equipment under an agreement filed almost ten years ago with the Civil Aeronautics Authority, predecessor to the Board. Provision was made for through sleeper plane service at Salt Lake City, obviating an inconvenient change of equipment at that point for passengers traveling between Los Angeles and points east of Salt Lake City.

About a year ago, the CAB gave the interchange idea real impetus by approving the single plane service operated by Pan American Airways and Pan American Grace (Panagra) from Miami to South American points. The plane is operated by Pan American north of the Canal Zone and by its associate south of that point. This gives through passenger service without changing planes, and amicably settled Panagra's previous determined drive for a direct entry into Miami.

► **Cincinnati Cited**—Similarly, the equipment interchange arrangement approved for TWA and Delta at Cincinnati early this year avoided creating new route mileage. One plane service is possible on TWA's system from Detroit, Toledo and Dayton to Atlanta, Miami and other points on Delta's routes.

Now before the Board is another interchange proposal which will enable National and Capital to provide through service over key segments of the two systems.

There are many other possible combinations through interchange which can provide through service between major centers now without this convenience.

Equipment interchange, however, is not always very simple. The curtailment of individual airline aspirations for expansion frequently is a most difficult stumbling block.

► **Equipment Problem**—Differing types of equipment and parts operated by the nation's airlines complicate through service by one plane over the systems of two carriers.

One reason interchange was so readily feasible by the railroads at the turn of the century was the high degree of standardization reached by the industry in motive power, rolling equipment and ground facilities. This standardization unquestionably was responsible for the lack of technological progress attained by the railroads up until only a few years ago.

Standardization among the airlines also promises to place technological advancement in the background for the time being. However, sacrifice of immediate technological progress would be a small price to pay if the interchange device, thus given impetus, will bring profitable stability to air carriers.

—Selig Altschul

AIR TRANSPORT

New Probe Set for Nonskeds

Board decides to take another look at its exemption order and at activities of large irregular carriers.

By Charles Adams

Apparently convinced that its police arm cannot control the more than 100 "irregular" carriers using large-type transport planes, the Civil Aeronautics Board has launched a general investigation which may bring a decision to put strong brakes on the free-wheeling non-scheduled air transport industry.

The Board announced that hearings will be held "in the near future" on the new probe into activities and practices of the large irregular lines. At the same time, CAB's staff was directed to re-examine the nonscheduled exemption (Section 292.1 of the Economic Regulations) in the light of experience gained since the section was revised in May, 1947.

► **Industry Frozen**—Meanwhile, CAB said it would not issue letters of registration for large irregular air carrier operators on any application filed after Aug. 6. This action froze at 109 the number of companies authorized to use Lockheed Lodestar or larger equipment in nonscheduled air transportation.

The present group of large irregular carriers holding letters of registration appears sufficient to satisfy the demand

for nonscheduled service, CAB declared. It added that further operations of this type should be authorized only after full consideration of the facts in each case.

► **Action Weighed**—Purpose of the investigation into the activities of large irregular air carriers is to determine whether civil or criminal proceedings should be brought on behalf of CAB for violations of the Civil Aeronautics Act and the Board's regulations. CAB said the probe would include an examination into the practices whereby a number of large irregular airlines appear to be acting in concert, frequently with the assistance of ticket and travel agencies, to furnish regular service. "This practice, together with apparent tariff violations and excessive frequency and regularity of operations, is the primary cause for our action," CAB declared.

Referring to its directive to the staff to re-examine Section 292.1 of the Economic Regulations, the Board said it would try to determine whether operations contemplated by that section for large irregular air carriers are useful to the public and economically feasible. "An important announcement concerning this regulation can be expected in

the near future," CAB concluded.

► **Carriers Comment**—In many respects, CAB's latest crackdown was less far-reaching than had been feared by the irregular operators.

There had been considerable speculation that the Board might order wholesale suspension of nonscheduled lines pending completion of the current investigation into their activities and the re-examination of Section 292.1.

The Air Coach Association, representing three major transcontinental irregular operators—Standard Air Lines, Viking Airlines and Airline Transport Carriers—said it was "delighted that the Board had decided to explore the issues behind present restrictive regulations preventing the American public from enjoying low cost air travel. We hope that in the course of this investigation the Board will give us the opportunity to show that air transportation, like rail transportation, needs coach as well as first-class accommodations."

In its private bout with CAB, Standard Air Lines was doing very well last week. On Aug. 5, the Board suspended Standard's letter of registration pending a final decision on whether the carrier had violated the Civil Aeronautics Act. But the next day SAL obtained a court order restraining CAB from enforcing its ruling for 10 days.

► **Violations Listed**—CAB found that Standard had operated between Los Angeles and New York with greater frequency than permitted by the nonscheduled exemption, that it advertised a regular service to the public, and that it violated tariff regulations. "Standard has in no way indicated that any adjustments in its operations and traffic soliciting practices have been or will be made to conform with the nonscheduled exemption," the Board declared. "On the contrary, Standard appears to have increased the frequency of its transcontinental operations since institution of the proceeding against it."

Continuation of Standard's activities, CAB explained, seriously impairs proper discharge of our duties under the Civil Aeronautics Act, contributes to unsound economic conditions in air transportation, and constitutes unfair competition with operations of certificated air carriers and those irregular lines operating within the scope of the nonscheduled exemption. The certificated airlines had urged CAB to suspend Standard's letter of registration immediately, arguing that if permitted to operate pending a final Board decision the company would be able to take advantage of the remainder of the high-traffic summer season, to the disadvantage of other carriers.

Standard won its restraining order on the ground that CAB's move for immediate suspension would cause "immediate and irreparable damage," since the company would have to disband its



RUSSIA'S NEWEST TWIN-ENGINE TRANSPORT

New view of the Ilyushin 18, Russia's post-war replacement of the DC-3 type. While details released are meager, it has been stated that the 27-passenger plane covers the 4300-mi. Moscow-Khabarovsk run

"within 28 hours." It is this plane, a number of which have been produced, that will be the backbone of Russia's civil air fleet on some 500 routes that link the capitals of the 16 USSR republics.

AVIATION WEEK, August 16, 1948

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organization and dispose of its planes. The carrier's attorneys said they will now ask the District of Columbia Court of Appeals for a stay against CAB's suspension order.

► **Transocean Order**—Coincident with its action against Standard, CAB ordered Transocean Air Lines, Oakland, Calif., to cease and desist from representing to the public that it operates regular service between designated points. TAL last January had been told to show cause why its letter of registration should not be suspended or revoked for "knowing and willful violation of the Civil Aeronautics Act" (AVIATION WEEK, Jan. 19).

CAB at that time claimed Transocean had advertised a regular and frequent cargo service from New York to London and Brussels and said the company also had engaged in common carrier foreign transportation of persons—particularly between California and Okinawa and between Guam and Okinawa—after Sept. 10, 1947, when such operations became illegal. The Board's latest order prohibits TAL from engaging in any foreign air transportation of persons within the meaning of the Civil Aeronautics Act.

Transocean consented to the order limiting the advertising of its trans-Atlantic cargo operations. But the carrier denied it has solicited passengers from the general public for travel outside the U. S., contending all its foreign passenger flights since Sept. 10, 1947, have been on a charter basis. CAB will hold further hearings on whether TAL's foreign passenger flights have been entirely legitimate private contract operations or included illegal common carrier services.

Hawaii Route Survey

Northwest Airlines plans to make the first survey flight over its newly certificated route from the Pacific Northwest to Hawaii this fall, but no date has been set for inauguration of regular service, according to Croil Hunter, NWA president and general manager.

When scheduled operations begin, they will be conducted with DC-4s similar to those now used on Northwest's route to Alaska and the Far East. Boeing Stratocruisers are slated to replace the DC-4s next year. NWA hopes to receive its first Stratocruiser in January and to have its entire fleet of ten by late next summer.

EAL Adds to Cargo Fleet

Eastern Air Lines plans to triple the capacity of its cargo plane fleet by mid-September through addition of four C-54s. EAL now utilizes one cargo C-54 and two C-47s.

NWA Seeks New Mail Pay Rate

Carrier protests its inclusion in "Big Five" by CAB in recent awards, claiming it is still a "need" line.

Unless it can squeeze out of the fast company into which it was pushed by the Civil Aeronautics Board last spring, Northwest Airlines foresees a lean financial future for its domestic operations.

The carrier has informed CAB that a grave error was made last April when the Board lumped Northwest with the former "big four"—American Airlines, Eastern Air Lines, TWA and United Air Lines—for mail pay purposes. NWA vigorously challenged CAB's finding that it is comparable in size and traffic potential to the four industry giants.

► **Rates Compared**—Prior to the April order, the "big four" had a 45 cents-a-ton-mile mail rate, and Northwest received 60 cents a ton mile. But now NWA is getting around 70.9 cents a ton mile, only slightly above Eastern's estimated 68.38 cents, American's 62.62

cents, TWA's 61.45 cents and United's 59.7 cents.

Becoming a transcontinental carrier in 1945 did not, Northwest emphasized, make it comparable to the "big four." The company admitted that in some of the studies used by CAB in making its decision NWA ranks fifth among domestic airlines. But it said that in most instances the fourth-ranking carrier is more than twice as large as Northwest.

For mail rate purposes, NWA believes it should be considered with operators more nearly its own size, such as Delta, Capital and Braniff, rather than lines "many times its size," like the "big four." Northwest officials assert their company is still in a "need" class, not a service rate class.

► **Comparative Size**—To illustrate CAB's "error" in placing it in the same class as the "big four," Northwest cited these figures on relative size: domestic revenue ton miles flown, 1947—American 157,145,000; United 139,931,000; Eastern 100,627,000; TWA 97,185,000; Northwest 37,980,000; Capital 31,983,000; Delta 21,920,000 and Braniff 21,273,000. Domestic route miles in operation January, 1948—United 7007; American 6587; Eastern 5715; TWA 5024; Northwest 3508; Capital 3501; Braniff 3222 and Delta 2985.

Operating revenue year ended Dec. 31, 1947—American \$78,129,000; United \$66,272,000; Eastern \$51,386,000; TWA \$49,290,000; Northwest \$19,731,000; Capital \$19,226,000; Braniff \$11,078,000 and Delta \$11,117,000. Revenue passenger miles flown in twelve months ended January, 1948 (in thousands)—American 1,367,627; United 1,187,883; Eastern 905,047; TWA 838,160; Northwest 344,937; Capital 288,496; Delta 200,310 and Braniff 199,457.

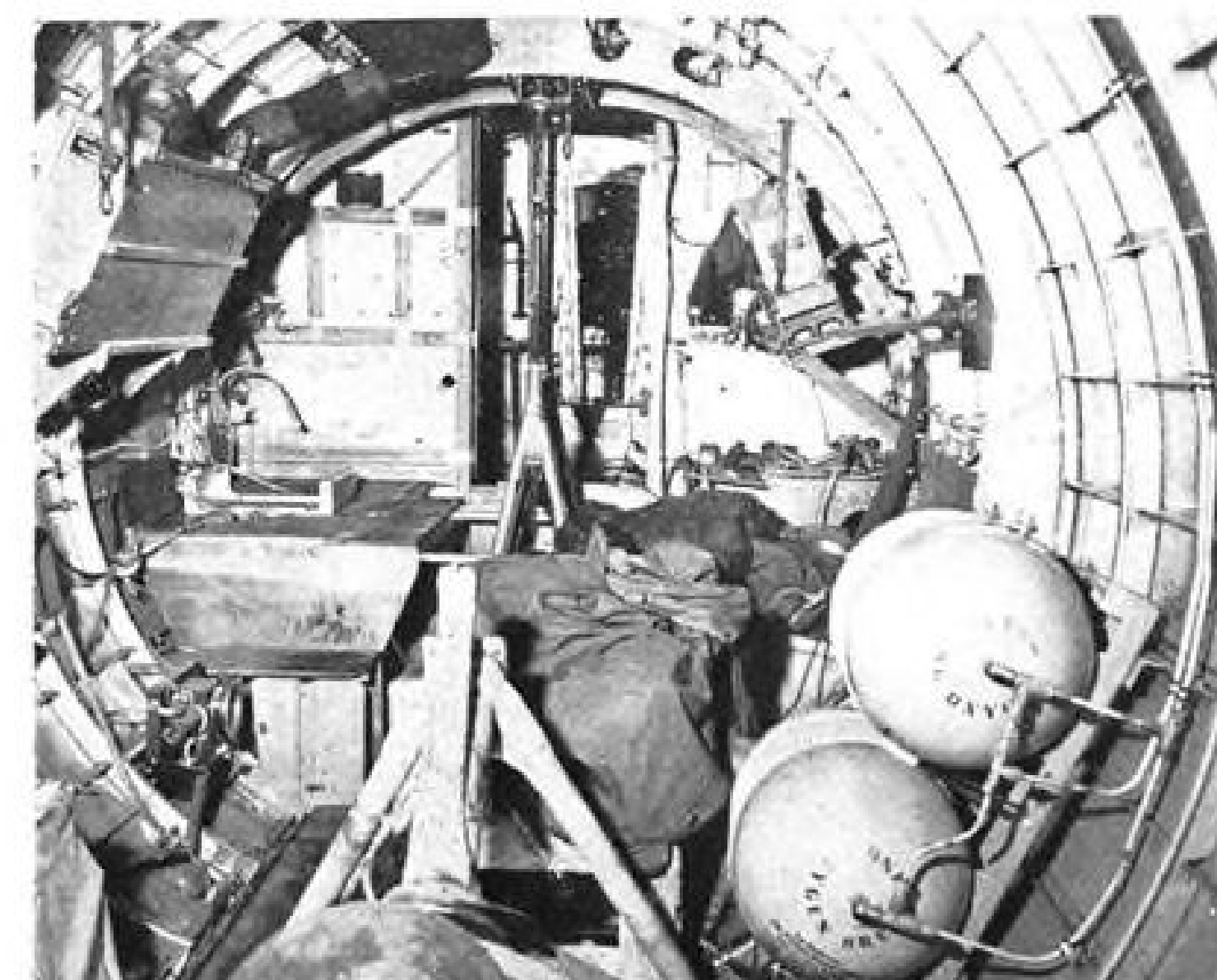
► **Forecasts Clash**—Under the "big five" mail rate, CAB forecast that Northwest would earn \$2,331,000 net profit on domestic operations in a future year. But NWA indicates that a net operating loss of close to \$1,800,000 is more likely for 1948 under the big five mail rate formula, adding that \$1.56 a ton mile mail pay is needed to break even. Instead of the 70.9 cents offered Northwest, it will need \$2.87 a ton mile mail pay to earn a 10 percent profit on domestic services.

"CAB's forecast of operations is based on some year in the indefinite future and disregards realities facing NWA at present and in the immediate future,"



PEACE PACT

Broad smiles were much in evidence when G. T. Baker, National Airlines president (left), and Harvey W. Brown, president of the International Association of Machinists, recently signed an agreement under which office and mechanical workers on strike since last January returned to work early this month. While National settled its dispute with the IAM in accordance with recommendations made by a Presidential emergency board, the carrier's difficulties with the Air Line Pilots Association continued. Baker has refused to take back the striking pilots as suggested by the emergency board; and David L. Behncke, ALPA president, said his union will now press to a conclusion a request that CAB revoke National's certificate for violating the Railway Labor Act.



COLONEL McCORMICK LIKES TO FLY IN STYLE

The Chicago Tribune has taken delivery of this converted B-17 (upper left) for use as an executive transport. Completely restyled by AiResearch Aviation Service Co., Los Angeles, the plane was flown to Chi-

cago by Capt. Howard West, American Airlines pilot (upper right), shown in the observation nose of the craft with Peggy Gray, AiResearch secretary. Before conversion to its executive status, the B-17 main cabin

was a mass of regulation military gear (lower left). AiResearch modifications of same area (lower right) include reclining chairs, executive desk, secretary's desk, snack bar and dressing room.

the carrier declared. "This is extremely dangerous because of the critical financial position which NWA occupies today. It is vital to NWA that its financial position be substantially improved to enable it to preserve its capital structure and to meet its obligations and public responsibilities."

Northwest also objected to CAB's finding that the carrier's 60 cents-a-ton-mile mail rate, in effect prior to Jan. 1, 1948, should not be raised retroactively. The company said it needed \$2,875,770 in additional mail pay merely to break even for the period from Nov. 1, 1946, through Dec. 31, 1947.

► **Cash Position**—Lack of retroactive mail pay increases, plus the inadequate rate set for the period beginning Jan. 1, 1948, will put Northwest in a poor cash position to meet future obligations for flight and ground equipment and facilities, company officials indicated.

NWA owed Boeing Airplane Co. \$18,750,000 for planes and parts through June, 1949, of which only \$4,-

123,000 was paid by June 17, 1948. It also owed Glenn L. Martin Co. \$10,815,000 for planes and parts, of which \$7,650,000 was paid by June 17, 1948. An unpaid balance of \$1,396,000 on ground facilities and equipment made total obligations of \$19,188,000 for which Northwest needs cash through next June.

Feeder in the Black

Piedmont Aviation, which made its first flight as a certificated feederline on Feb. 20, already has pushed into the black.

Net operating profit of \$12,171 was shown for June, according to president T. H. Davis. Operating costs were cut from \$1.86 per plane mile during the first month of service to 87 cents in June. Traffic reached a new peak in June as the feeder handled 4046 revenue passengers, 17,239 lb. of mail, 17,660 lb. of express and 11,968 lb. of freight.

New Orient Service

The Canadian government has reversed its policy of giving the Dominion-owned Trans-Canada Air Lines a monopoly on international operations from Canada.

Canadian Pacific Air Lines has been granted authority to fly from Vancouver to Sydney, Australia, via Honolulu, Canton Island and the Fiji Islands; and from Vancouver to Hong Kong via Kodiak, Shemya Island, Tokyo and Shanghai. A branch service from Fiji would connect New Zealand with the through Sydney-Vancouver operation. The Hong Kong run may eventually be extended to India.

Under Canadian government policy laid down in 1944, only TCA was to be given international routes from the Dominion. Now, it is explained, TCA is fully occupied with its trans-Atlantic and Bermuda services.

Canadian Pacific said its new venture is a natural development of the com-



DESIGNER TAYLOR explains to Herbert Toomey and Robert Rathburn of CAA.

Compressed Air Operates Exits

Modification of present emergency exit systems on aircraft so that they are automatically operational regardless of passenger presence of mind is proposed by Vernon Taylor.

Taylor, a Colonial Airlines maintenance employe, proposes that the system be operated from a central release in the flight compartment, utilizing compressed air or carbon dioxide which would literally blast the exit doors out in the event of an emergency landing.

The system would incorporate the compressed air supply being fed to the emergency hatches with a selector valve and emergency bottle release assigned

positions within the pilot's reach.

Before take-off, the selector valve, operated either by the captain or co-pilot, would be turned to the 'on' position, directing the air supply to the hatches. After the ship is airborne, the pilot would then turn the selector valve to the 'off' position to prevent the hatches from opening in the event air supply was inadvertently released to the emergency system.

Before landing, the procedure would be repeated with selector valve on, enabling the emergency hatches to open in the event of crash landing.

CAA is investigating the system.

pany's long connection with Dominion-Orient trade, pioneered by CP steamships over 60 years ago. The Canadian Pacific surface fleet suffered very heavy losses during the war, and the company believes the high cost of steamship replacement makes it imperative to take to the air to hold this trade.

No date has been set for the new trans-Pacific service from Vancouver, although it may be started next summer. Canadair DC-4M "North Star" transports will be purchased for the operation.

WAL-Arizona Deal

Western Air Lines and Arizona Airways have asked CAB approval of an agreement whereby WAL would transfer to the new feederline its route segment from San Diego, Calif., to Yuma, Ariz., via the city of El Centro, Calif.

The two carriers agreed that the deal would relieve Western of an impractical operation while strengthening Arizona Airways' system. WAL, which has been making three trips a week over the San Diego-Yuma link, had sought an extension from Yuma to Phoenix, Ariz., in order to justify more frequent service. But this application was denied by CAB, and in its place Arizona Airways was given a route from Phoenix to Yuma.

By eliminating uneconomical operations of both companies terminating at Yuma and combining the two links into one through route from San Diego to Phoenix via Yuma and El Centro, all cities on the run will be able to receive twice-daily roundtrip service, the carriers informed CAB. WAL would furnish facilities and services to Arizona Airways at San Diego under the agreement.

Port Authority-Teterboro Deal Still Brewing

Negotiations between the Port of New York Authority and Teterboro Airport's manager-owner Fred Wehran probably will be concluded by the end of this month, with the Port Authority purchasing the New Jersey airfreight terminal for an outright sum reputedly near \$5,000,000.

Wehran told AVIATION WEEK that the negotiations were "going very well" and that there was every reason to believe they would be favorably concluded "within the month."

Should negotiations bog down however, Wehran said he would not consider selling the terminal to any airline, but would develop it himself so that "anything from a Cub to an airliner that wanted to land there would be able to do so."

Pay Raise for Hostesses Hits New High in TWA

Wage scales for hostesses and pursers have hit a new peak under an agreement signed recently by TWA and the Air Line Stewards and Stewardesses Association.

New scale for hostesses flying domestically ranges from a \$180 monthly starting wage to \$255 during the seventh year of service. This compares with the old scale of \$170 to \$235 for the sixth year of service and for periods of time thereafter.

TWA's hostesses on international flights have a new scale of \$190 to \$280 over a seven-year period, while flight pursers will earn \$250 as a starting wage and be advanced to \$350 a month in 4½ years. Average pay increase for the approximately 600 employes covered by the new pact is 7 percent.

Accident Report

The pilot's failure to follow a dogleg in the airway probably caused the crash of a chartered Northwest Airlines DC-4 on Mt. Sanford Alaska, last Mar. 12.

A CAB accident investigation report disclosed that the plane, flying at 11,000 ft., was 23 miles southeast of the airway's center line when it hit Mt. Sanford, which towers to 16,208 ft. The airway from Anchorage, Alaska, to Edmonton, Canada, is deflected to the north to provide a safe lateral clearance of the peak.

The report said clouds or the aurora borealis—or both—probably prevented the crew from seeing the mountain. All 30 persons aboard the plane, bound from Shanghai to New York, were killed in the mishap.

Fuel Taxes

Airlines hold line, with only two changes in state levies since Jan. 1.

The airlines are more than holding the line in a never-ending struggle against imposition of new fuel taxes by revenue-hungry individual state legislatures.

On Aug. 1, the nationwide tax picture was much the same as on Jan. 1, with 29 states and the District of Columbia granting the carriers full relief from fuel levies either through exemptions or through refunds. But the number of states providing partial relief increased from eleven to twelve in the seven-month period, with a corresponding drop from nine to eight in the number of states offering no fuel tax relief to the airlines.

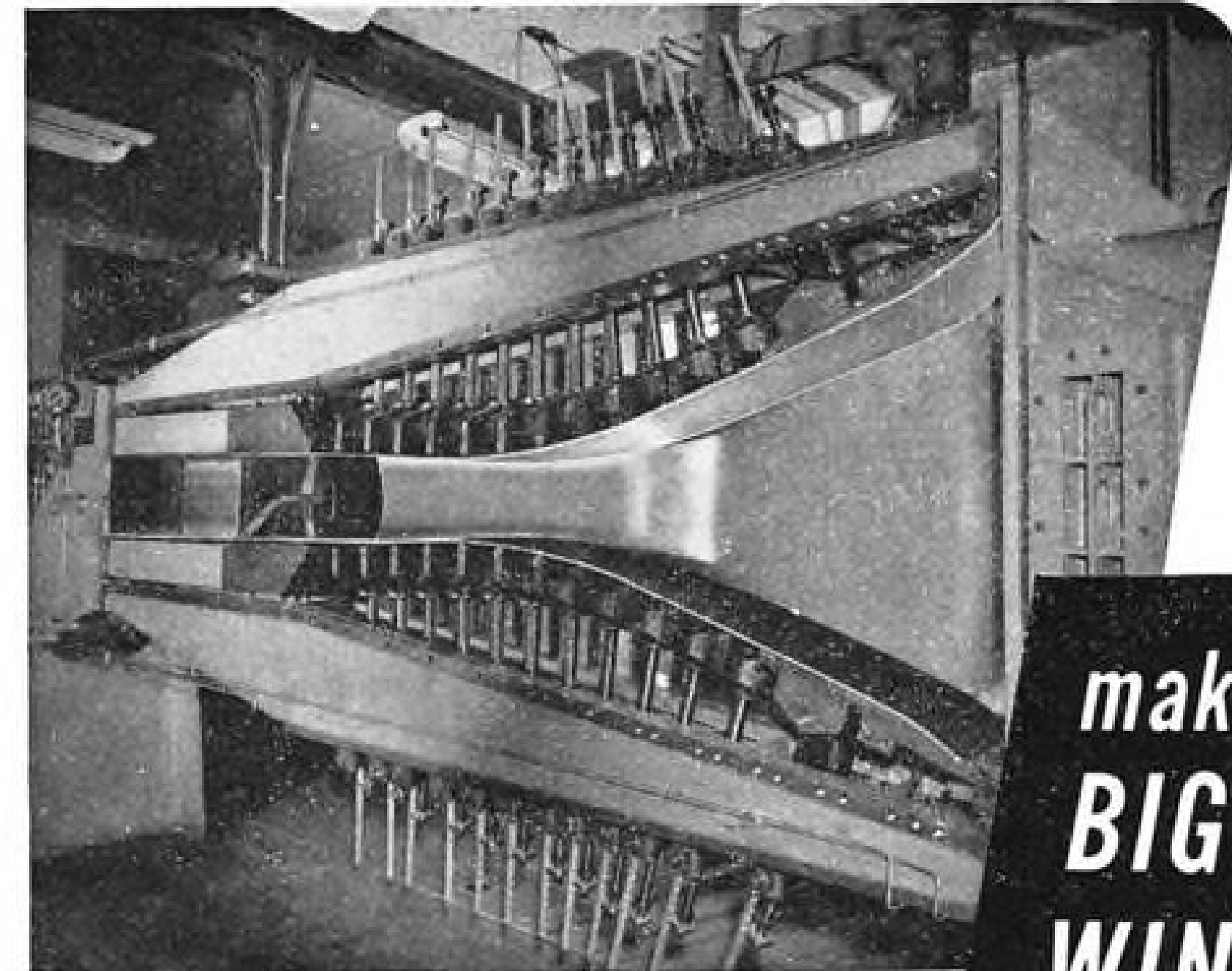
► **Two States Act**—In the two changes thus far in 1948, the Rhode Island legislature decided to refund in full its 4 cents a gallon aviation fuel tax. Louisiana, which last year provided full tax exemption, has turned in the opposite direction and now offers only partial relief.

Since there is no assurance that existing exemptions and refunds will not be rescinded at any time a state legislature is in session, maintenance of the status quo is in many respects a victory for the airlines. The Air Transport Association believes the current trend definitely is pointed in the direction of further relief.

Importance of state fuel levies to the airlines was described in detail this month by William T. Raymond, ATA's director of governmental affairs, at the annual meeting of the Pacific Region North American Gasoline Tax Conference in Seattle. He said that if all 48 states imposed aviation fuel taxes, the resulting burden would threaten the foundation of the air transport industry.

► **Threat Described**—In 1947, the certificated domestic carriers consumed about 271,452,000 gal. of gasoline. A 4 cents per gallon state tax on this quantity of fuel would have cost the airlines almost \$11,000,000, or more than ten times their present fuel tax bill, and would have made their 1947 deficit more than \$33,000,000 instead of \$22,000,000.

Raymond declared the airline industry opposes state or local taxation of aviation fuel because it is not a benefit tax, nor is it related to ability to pay or to other valid factors. Under the benefit theory, persons who benefit most from the use of a facility pay the largest part of the cost, and revenues derived from the taxing source are used



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to maintain and improve the facilities provided.

► **Federal Responsibility**—Motor fuel tax revenue, Raymond pointed out, is used largely to construct and maintain highways and public thoroughfares, thereby benefiting the user in direct proportion to his tax contribution. "But the responsibility for construction, maintenance and operation of airways has been assumed by the Federal Government without contribution by the individual states. Until the Federal government ceases to assume this responsibility, a state tax on aviation fuel cannot be justified on the benefit theory of taxation."

The ATA representative said the

most equitable way of financing the cost of airport operations—the method recommended by the President's Air Policy Commission and CAB—is not a state or local aviation fuel tax but the use of landing fees, rentals and service charges. These charges, Raymond declared, can be made equal, or at least proportionate, to the value of the benefit rendered or the service received.

ICAO Outlines Needs In the North Pacific

Recommendations for additional airfields, radio navigational aids and weather observation stations along the

North Pacific air traffic route from Seattle, Wash., to the Orient were adopted at a North Pacific regional meeting of the International Civil Aviation Organization in Seattle.

► **Recommendations**—Activation of dozens of weather stations in Siberia and the central North Pacific; construction of huge, new civilian airports, especially in the Aleutian Islands; more powerful and improved radio ranges and installation of improved instrument landing systems at 24 major fields along the route were included in the recommendations, prepared by technical experts from 14 Pacific rim nations.

The weather stations would include vessels 500 miles west of Victoria, B. C., 600 miles south of Kodiak, Alaska, 1000 miles south of Dutch Harbor, Alaska, 600 miles southwest of Attu, and in other locations.

► **Larger Airfields Needed**—The need for new airfields in the region, the Aerodromes & Ground Aids Committee stated, is heightened by the fact that the Boeing Stratocruiser will be in operation over the route in about a year. Civil airfields to serve the largest transport types are not now available at Anchorage and Fairbanks in Alaska, in the Aleutians, the Kurile Islands, Korea and part of Japan, China and the Philippines, the committee said.

The plan calls for installation of the VHF omni-directional range stations at 24 airfields, with priority given to Seattle, Annette Island off Ketchikan, Alaska, Anchorage, Vancouver and Victoria, B. C. A similar priority setup was recommended for esquisignal instrument landing systems, installation of which was recommended for Seattle, Victoria, Vancouver, Annette, Anchorage and 18 other stations along the route to Manila.

Installation of a test low-frequency loran station in the Gulf of Alaska area was recommended "at the earliest possible date."

► **Delegates**—Australia, Canada, the Netherlands, New Zealand, United Kingdom, China, Siam, Philippines and the United States had voting delegations at the 17-day meeting while Russia, Poland, Chile, the Dominican Republic and El Salvador sent observers. Recommendations made by the conference must be implemented by the individual nations involved.

An important part of the plan is the proposal to fill in two huge "blank spots" which now exist in weather reporting facilities in the North Pacific—the untraveled sea lanes south of the Aleutians and the vast expanse of Northeastern Siberia. The weather observation ships would take care of the Aleutians, but weather reporting stations would be necessary in Siberia. The Russian attitude makes installation of these latter unlikely.



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New United Stock Sale To Bring About \$2 Million

After the withdrawal of its financing program, originally scheduled in June, United Air Lines has succeeded in effecting an offering of 184,801 additional shares of its common stock. Sale began on Aug. 3, 1948.

The current sale is one-half the size of the previously planned sale, which was postponed because of the carrier's Mt. Carmel accident.

The current proceeds should aggregate slightly less than \$2 million. Reduction in the size of the offering is attributed by United's president W. A. Patterson to "altered market conditions."

The current financing is being done through the issuance of "rights" to stockholders. Common stockholders of record as of Aug. 3 may subscribe to one additional share at \$10.75 a share for each ten shares presently held. Unsubscribed shares will be offered to employees. This minimizes the risk to the underwriters, headed by the company's bankers, Harriman, Ripley and Co.

The "rights" of United are due to expire in the middle of August.

The prime purpose of United's financing at this present time is to bolster its working capital funds so as to have adequate margin to comply with the terms of its current bank loans and debentures (AVIATION WEEK, June 21).

Contract Carrier Converts Five C-46s

Skyways International Trading & Transport Co. has completed NC licensing of five Curtiss C-46Fs at its maintenance and conversion base at Miami International Airport.

The planes are among the approximately 100 C-46s which the Air Force has leased or may soon lease for \$300 a month to some 27 certificated and uncertificated airlines. Three of the aircraft licensed by Skyways International are for its own account and will be used in connection with the company's contract and nonscheduled services to South America, the Middle East, Far East, South Africa and Australia.

► **Other Work**—Skyway International has delivered one modified C-46F to Trans Caribbean Air Cargo Lines, New York City, and one to All American Airways, Miami. Three more C-46Fs are to be converted and licensed by Skyways International for its own use, and the company is working on an additional plane each for Trans Caribbean and All American airways.

A contract also has been signed to convert and license one C-46F for Economy Airways, New York City. First

five C-46s converted by Skyways International were licensed for passenger and cargo service with a gross weight of 45,000 lb.

► **Leases Listed**—Latest reports on the Air Force's C-46 leasing program shows the following rentals: Pan American Airways twelve planes; Slick Airways, San Antonio, ten; Skyways International Trading & Transport Co., six; Alaska Airlines six; U. S. Airlines, St. Petersburg, Fla., five; Nationwide Air Transport Service, Miami Springs, Fla., three; Miami Airlines, Miami, three; Air Transport Associates, Seattle, three; National Airlines three; Aviation Corp. of Seattle, three; All American Airways, three; Trans Caribbean Air Cargo Lines, two; Continental Charters, Miami, two; The Condor Line, Miami, two; Freight Air, Inc., Miami Springs, Fla., two; and Economy Airways, one.

Leases are pending with Globe Freight Airline, Hartford, Conn., three planes; Seattle Air Charter two; Stratofreight, Inc., Pittsfield, Mass., two; American Air Transport and Flight School, Inc., Miami Springs, two; Roscoe Turner Aeronautical Corp., Indianapolis, one; Transocean Air Lines, Oakland, Calif., six; Northern Airlines, Seattle, six; Nats Air Transportation Service, Oakland, five; and Eagle Air Freight, Burbank, Calif., five.

Canadian Traffic Up But Income Drops

Canada's scheduled airlines made a better showing traffic-wise last year than in 1946, but like their U. S. counterparts the Dominion's two largest carriers reported sizeable deficits.

Four major Canadian airlines—Canadian Pacific, Trans-Canada, Maritime Central and Central Northern—handled 573,164 revenue passengers in scheduled service last year, an increase of nearly 10 percent over 1946. (The figures do not include TCA's overseas operations.) By comparison, the 16 U. S. domestic certificated trunklines flew 12,278,000 revenue passengers in 1947, up 3.2 percent over 1946.

► **Traffic Reports**—Trans-Canada, the Dominion's largest carrier, handled 426,562 revenue passengers on scheduled flights in 1947 against 337,142 in 1946. Scheduled revenue passengers on Canadian Pacific Air Lines dropped to 116,094 in 1947 from 155,524 in 1946, and on Maritime Central from 30,441 in 1946 to 24,947 in 1947. Central Northern carried 5561 scheduled revenue passengers in 1947, with no 1946 comparison available.

Revenue passenger load factor for scheduled Canadian carriers last year was 60.9 percent against 74 percent in 1946. Overall revenue passenger load



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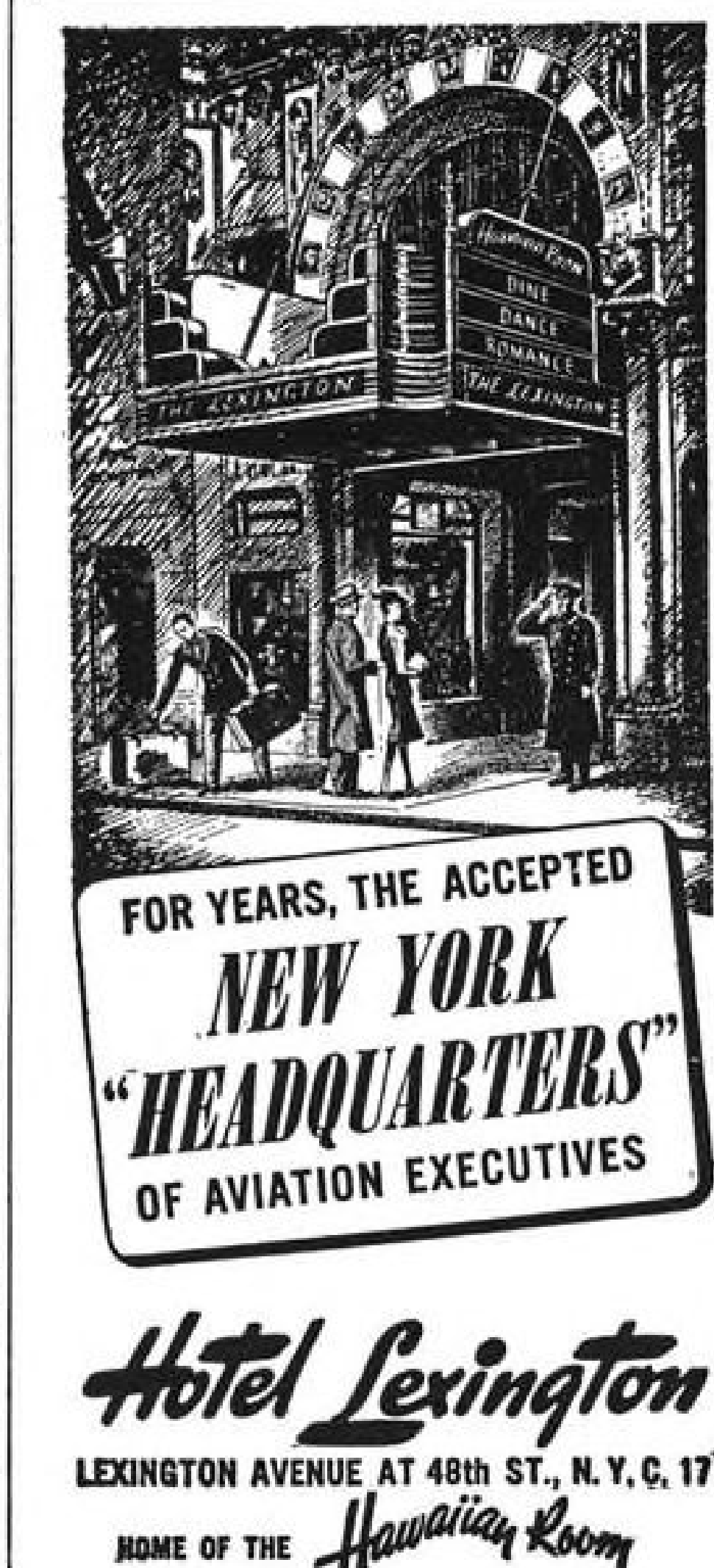
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factor on U. S. domestic trunklines in 1947 was 65.7 percent.

TCA's operating deficit rose from \$1,133,134 in 1946 to \$1,561,334 in 1947. Canadian Pacific's \$339,585 operating profit in 1946 turned into a \$640,540 operating deficit last year, while Maritime Central's operating profit dropped from \$20,488 in 1946 to \$14,063 in 1947. Central Northern earned \$49,302 last year, and other smaller Canadian carriers reported a combined operating loss during the year 1947 of \$299,717.

► **Air Mail Gains**—Cargo ton miles flown by the four major Canadian carriers on scheduled flights increased from 1,169,567 in 1946 to 1,658,585 in 1947. Aided by the Post Office's experimental flights with first class letters, scheduled mail ton miles rose from 1,480,821 in 1946 to 1,574,424 in 1947.

Total employes on all Canadian air carriers increased from 5413 in 1946 to 5606 in 1947, although the two largest lines, TCA and Canadian Pacific, cut personnel. Total payroll for all companies rose from \$12,034,973 in 1946 to \$13,163,998 last year. Trans-Canada Air Lines accounted for well over half of the Canadian air transport industry's entire personnel complement and payroll.

SHORTLINES

► **Arizona Airways**—Has received CAB authorization to suspend service temporarily at Casa Grande and Superior, Ariz., because of inadequate airports.

► **Braniff**—Reports cargo volume increased 325 percent from 126,745 ton miles in the first six months of 1947 to 358,645 ton miles in the same period this year.

► **Capital**—Company policy on passenger fare increases is to "stand pat" until it determines what effect the latest hike by other carriers has on traffic. . . . Capital showed an operating profit of \$11,159 but a net loss of \$40,265 during June. While June passenger revenue was slightly below May, passenger income for the six months ended June 30 totaled \$7,253,000, up \$778,000 over the comparable period last year. Total operating revenue in first-half 1948 rose \$870,000 over 1947, while operating expenses dropped by \$155,275. . . . Capital has asked CAB for a certificate to operate from New York and Norfolk to San Juan, Puerto Rico.

► **Chicago & Southern**—Has set Sept. 9 as its goal for opening service between Memphis and Kansas City with two

roundtrips daily. Route was first awarded C&S in September, 1947, suspended in November, and re-awarded late last month.

► **Colonial**—Has been told by CAB to show cause why it should not be ordered to institute service to Poughkeepsie, N. Y.

► **Pioneer**—On Aug. 1 celebrated the third anniversary of its inauguration of feeder service. Company now has nine DC-3s, two C-47 cargo planes and 444 employes. Route mileage during the three-year period increased from 683 to 2200, and cities served rose from six to 24.

► **Pan American**—A CAB examiner has urged approval of PAA's application for acquisition of all property of Uraba, Medellin and Central Airways and for transfer of UMCA's certificate to Pan American. Another Board examiner has recommended that PAA's Latin American routes be consolidated with appropriate restrictions and that its Miami-Merida, Mexico, link be extended to Mexico City. . . . Passenger loads on PAA's DC-4 run from New York to Buenos Aires are now being limited to 44 persons.

► **Panagra**—Has instituted a weekly DC-4 all-cargo flight between Balboa, Canal Zone, and Buenos Aires.

► **Slick Airways**—Has transferred its Chicago operations from the Municipal Airport to Douglas Airport.

► **Southwest**—Has increased the seat capacity of all its DC-3s from 21 to 24. . . . Company is emphasizing cooperative promotional and educational efforts designed to increase connecting trunk and feeder travel.

CAB SCHEDULE

Aug. 16—Prehearing conference on proposed suspension of Continental Charters' letter of registration. (Docket 3288.)

Aug. 17—Hearing on service to Pecos, Tex. (Docket 3322, et al.)

Aug. 19—Prehearing conference on need for directional airfreight rates, postponed from Aug. 9. (Docket 1795, et al.)

Aug. 19—Hearing on amendment of China National Aviation Corp.'s foreign air carrier permit. (Docket 3402.)

Aug. 20—Prehearing conference on CAB's investigation of Hughes Tool Co.'s acquisition of further control of TWA postponed from Aug. 16. (Docket 2796.)

Aug. 30—Hearing in Capital Airlines mail rate case. (Docket 484.)

Sept. 2—Oral argument in TACA, S. A., foreign air carrier permit renewal and amendment case. (Docket 3016.)

Sept. 13—Oral argument in airfreight case. (Docket 810, et al.)

Sept. 27—Hearing on CAB's investigation of free and reduced rate transportation postponed from Sept. 13. (Docket 2737, et al.)

Oct. 4—Hearing on route consolidation applications of American, Eastern and TWA. (Docket 2581, et al.)

PICTURE CREDITS

McGraw-Hill World News, 34; NACA, 15; Sovfoto, 46; Wide World, 12.

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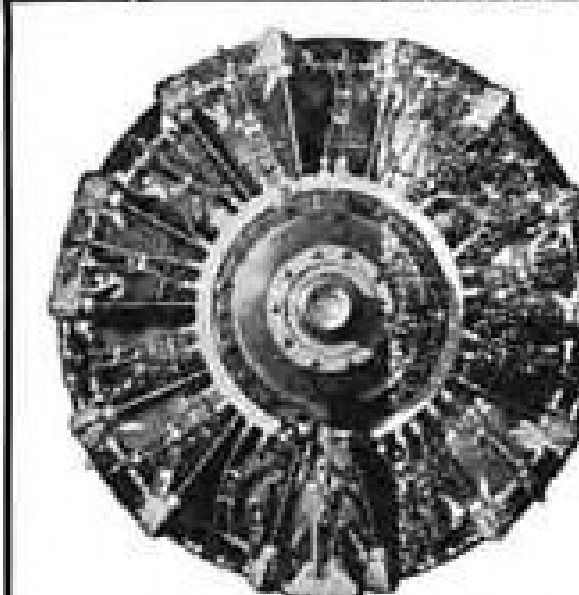
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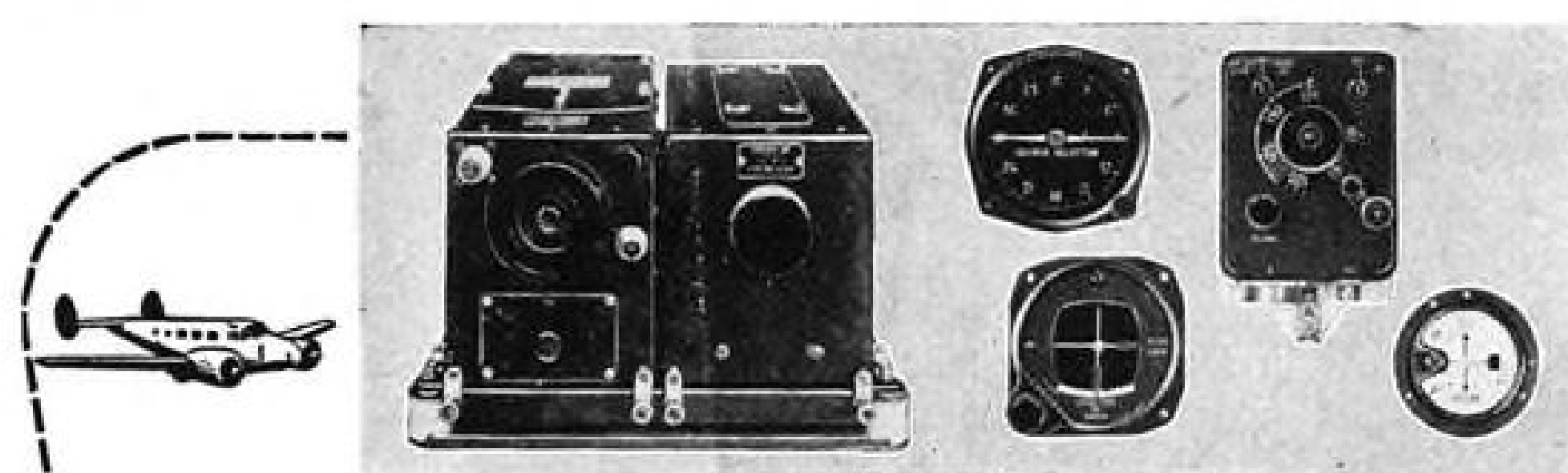
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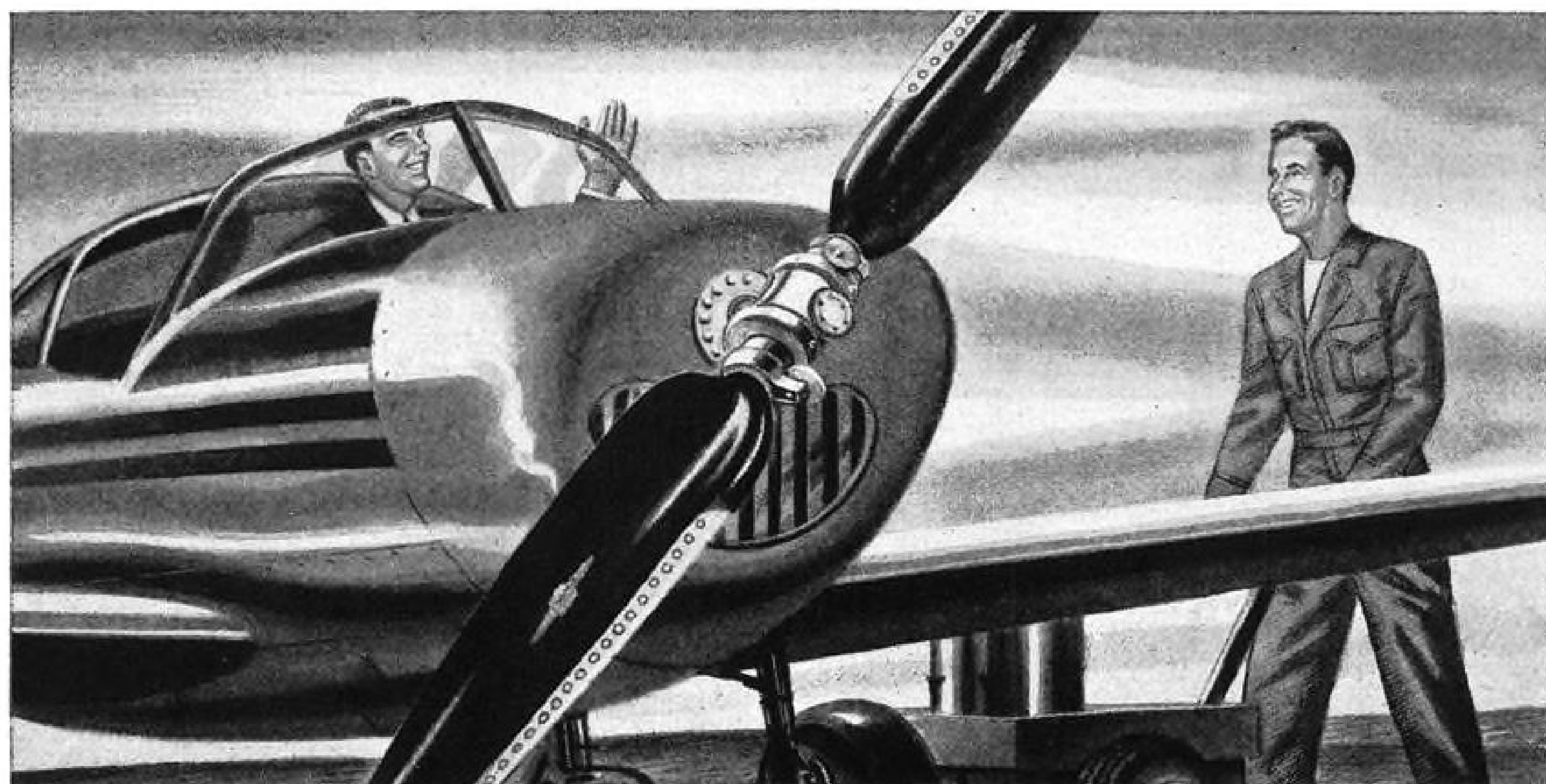
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EDITORIAL

Step Toward Socialization?

Creation of an inter-agency arm of the Air Coordinating Committee to study a proposed program for subsidizing commercial transport prototype development is an encouraging move.

Senator Brewster and Representative Hinshaw, spark plugs of the new group, deserve commendation for making certain that Congress, when it is ready to consider legislation, will have specific recommendations on the subject from the government departments involved. Aviation has nothing to lose and everything to gain from a compilation of facts and requirements. But caution is necessary before any such plan is approved.

While Mr. Hinshaw expressed some criticism of the aircraft industry's cooled enthusiasm for such a program, it is no more than fair to point out that millions of dollars in orders have been assured the industry since those dark, bleak days when the manufacturers were filing their statements with the President's Air Policy Commission. It is also essential to remember that for every new subsidy there is a further dependency on the government. Aviation cannot perpetually expect more millions without some sacrifices. It is a healthy sign that some officials in the industry are asking serious questions about the wisdom of further subsidies. It is no secret that manufacturers have been disturbed about the tendency toward a socialized aircraft industry. As cost and complexity of aircraft have increased, government has sought to dictate more and more to the manufacturer, to the point where a few company executives have wondered how much longer the manufacturer would have any design of development responsibilities left to him.

With assurance of a start on a 70-Group Air Force, some industry circles began a more searching examination of the proposal that the U. S. finance development of commercial transport prototypes.

In military circles there is still strong doubt that any fleet of transports built to serve both the services and commercial airlines would be of much use to either. And the airlines are on record in the past with similar feelings, despite their current tendency to grasp at this newest gift at the taxpayer's expense.

So far there is little evidence that the previous development procedure for the largest and costliest transports can be improved. This has involved awards of contracts by the services for military prototypes so that the government underwrites the original design, construction and development. This assures the services of aircraft meeting their specialized needs. The manufacturers and their customers then have financed commercial versions.

In the light of experience elsewhere, it is difficult to understand any very strong sentiment for a military aircraft pool which would be available to the airlines, or for any

further control by government of what kind and how many commercial transports there shall be.

We need look no further than Great Britain to see the sad result of government prescribing the commercial transports industry will build. There, the Ministry of Supply lets the contracts, and often without considering even the most vital needs of civil aviation.

The results have been an epidemic of pride and prejudice, trial and error, contradictions and confusion, all adding up to stark failure. There is the Tudor mess (in which BOAC has turned down these transports for north-Atlantic operation, after the Ministry of Supply designed them specifically for that run) and the rejection of the Wayfarers by British European Airways after the Ministry of Supply had proclaimed the Wayfarer as ideal for BEA's services.

So that to this date, Britain has not produced one acceptable long-range transport competitive with those of the United States.

It is to be hoped that our own aircraft industry will not overlook the advantages of investing its own capital in developing commercial aircraft. Douglas deserves commendation for going ahead with plans for the DC-6 Airfreighter with its own funds. That is the way the Douglas Company built its world-wide reputation in transports; not with government subsidy. It is to be hoped that Curtiss-Wright will study the Douglas example and consent to risk a little of its sixty million dollars in cash, rather than await federal underwriting of the cost of the CW-32, which many air transport people says shows excellent possibilities.

It is true that most manufacturers do not have the means to develop revolutionary types such as the jets, and that the airlines do not have the funds to buy them if they were developed today.

But the government could and should realize the importance to the national welfare of developing high speed military transports and start work at once on a program to develop them. History and such craft as the Boeing Stratocruiser, especially, show that service transports can be adapted to civil needs and procedure can be met within the framework of existing authority. No legislation is needed. New legislation of the kind suggested would offer livelihood to one or two companies in exchange for further steps toward enslavement of a two or three billion dollar industry.

It is time that aviation get out of its habit of thinking the government owes it a living. If the opposition to the transport development bill is indicative of a changing attitude, it is cause for rejoicing. This country can kiss its worldwide aircraft manufacturing leadership goodbye the day it permits the industry to become a mail order business.

ROBERT H. WOOD



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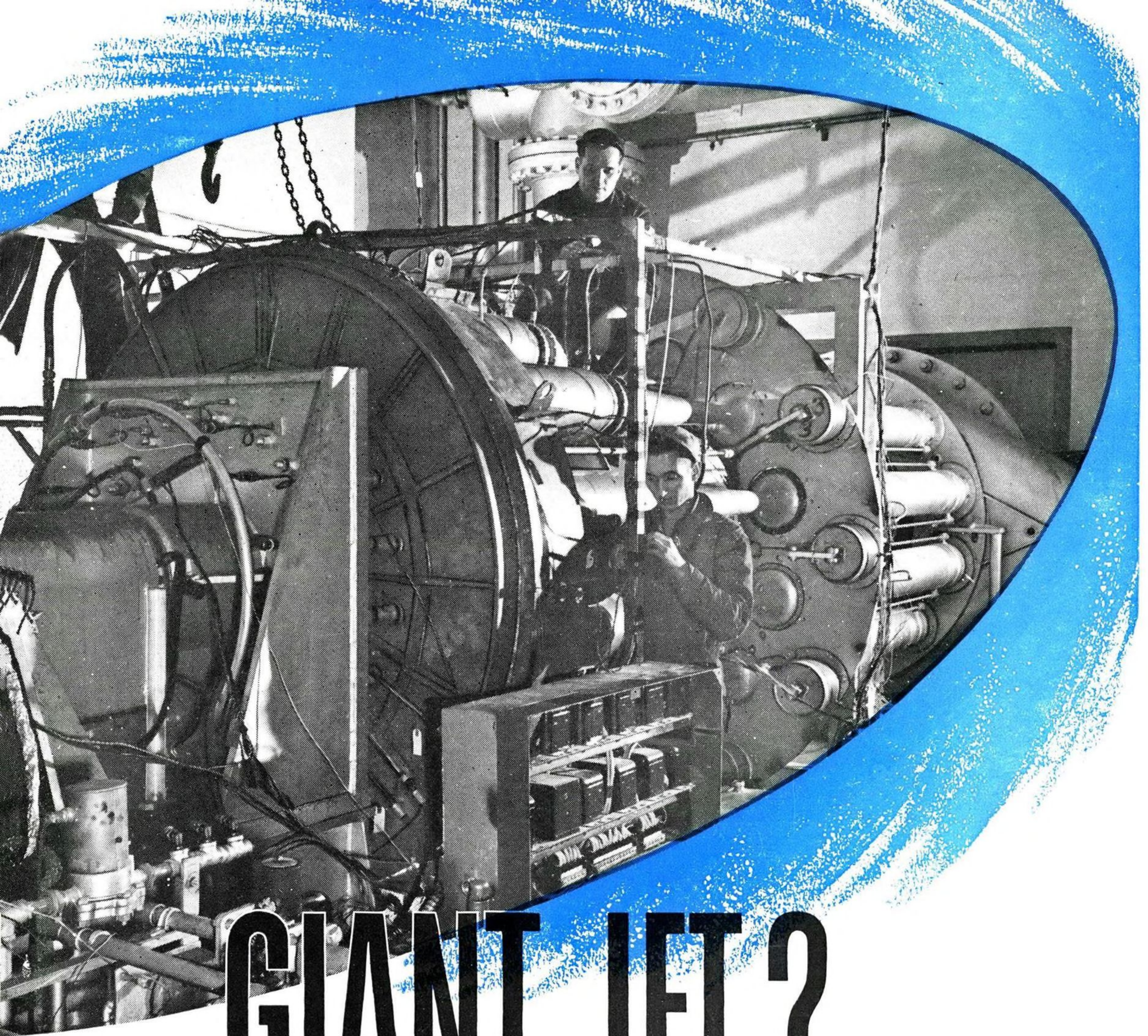
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