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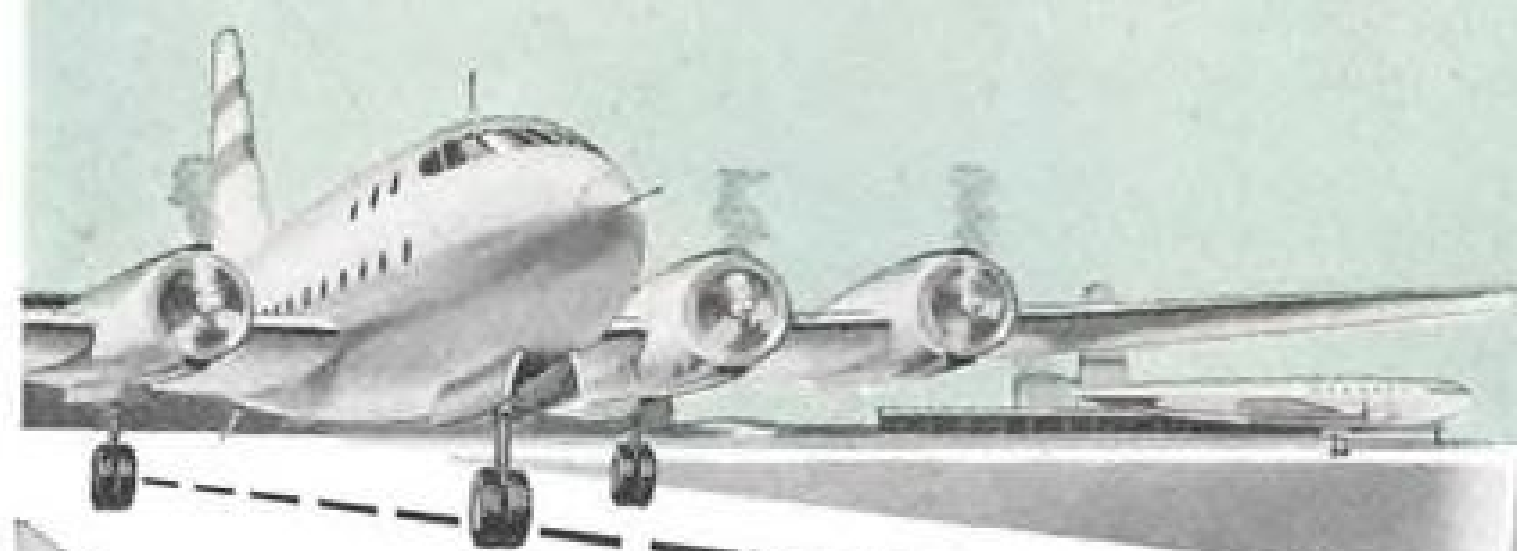
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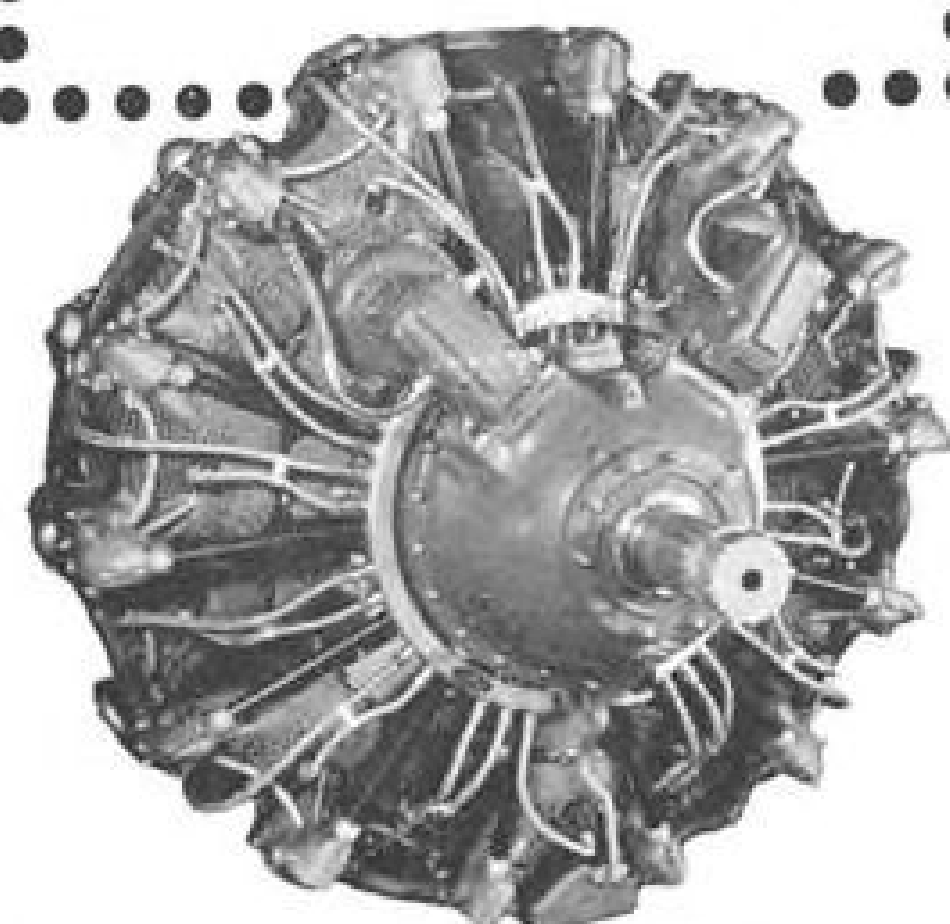
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Aviation Week

Volume 51

October 3, 1949

Number 14

Headline News

D-558-II Hits Supersonic Speed.....10
High-Altitude Gains Disclosed.....11
House to Query Strategy and Buying...11
XB-51 Shows Unusual Design.....12
Swivelling Landing Gear.....13
Air Force Negotiated Contracts.....14

Aeronautical Engineering

Design Report on Avro Jetliner.....15
How Models Cut F-90 Development
Costs21
Plastics Studies Advanced at NBS.....22
Camera Probes British Plane Details...26

Production

Midyear Position Promising.....32

Aviation Sales & Service

Private Pilots35

Financial

Manufacturers' Profits Fluctuating.....36

Air Transport

British Offer Turboprop DC-3.....38
Devaluation41
Putnam Says Go Slow on Coach.....42
Air Coach on Southern Routes.....43
Nonsked Violators44

Editorials

Stop the Gobble-Gabble.....50
Publicity for Contracts.....50

Departments

Who's Where7
Industry Observer7
Aviation Calendar8
News Digest9
New Aviation Products30
Production Briefing32
AF Bid Awards33
Shortlines44
CAB Schedule45
What's New48

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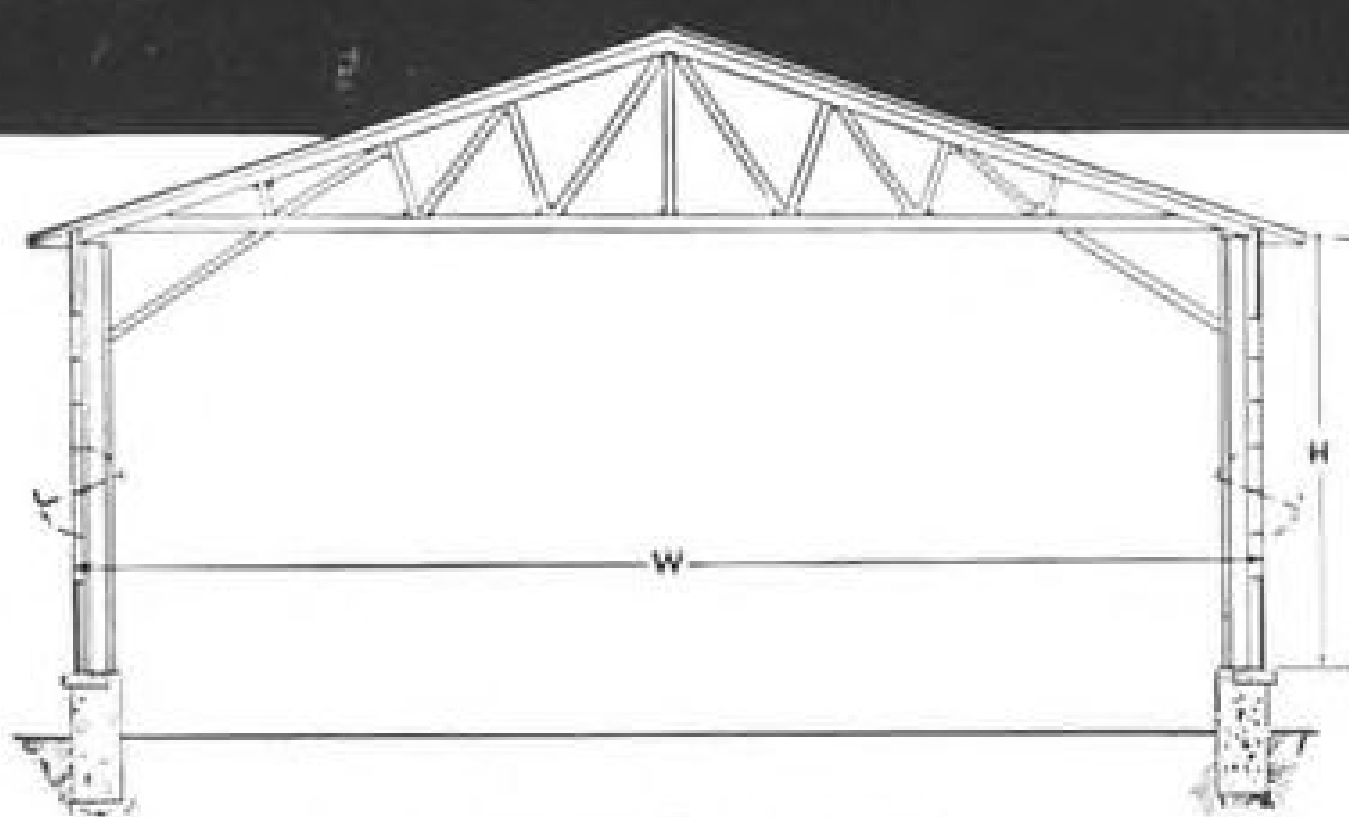
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WHO'S WHERE

Fairchild Restaffing

Fairchild Engine & Airplane Corp. is restaffing its managerial ranks, following wholesale dismissals and resignations after the recent change in management. Willard L. Landers has been appointed assistant general manager of the aircraft division, Floyd S. Bennett is the new comptroller of the division, and George A. Hatcher the director of customer relations for the corporation.

Both Landers and Bennett have been with Fairchild's aircraft division. Landers has been works manager since 1945, and Bennett first went to the division's accounting department in 1940. He now becomes also assistant secretary and assistant comptroller of the corporation.

Hatcher until recently was domestic sales manager of Douglas Aircraft Co., which he joined when released from the Air Force in 1946.

Shortly after taking over his new job, Landers announced appointment of O. A. Berthiaume as his successor in the post of works manager in charge of production of the C-119. Berthiaume has been with Fairchild's aircraft division since 1947 and previous to that was with North American and TEMCO.

Changes

Abe Silverstein has been named chief of research at the Lewis Flight Propulsion Laboratory of the National Advisory Committee for Aeronautics. He has been chief of the wind tunnel and flight research division at the lab. He takes over the job of Addison M. Rothrock, transferred to NACA's Washington headquarters.

W. F. Goulding, vice president of Curtiss-Wright's export division, and R. W. Young, vice president-engineering of Wright Aeronautical, have resigned.

Joseph J. Mehl, former assistant secretary and assistant comptroller of Fairchild, has been retained for a temporary assignment by Alvin P. Adams and Associates, aviation consultants. . . . Weldon E. (Dusty) Rhoades has been named coordinator of Stratocruiser flight operations for United Air Lines. UAL expects its first Stratocruiser next month.

Eastern Air Lines has made a number of changes: Andrew G. Diddel, formerly traffic and sales manager in Detroit, has been brought to the New York headquarters to assist the general sales manager. William L. Griffith, employment manager, now is superintendent of passenger service. Richard W. Gilbert is air cargo sales manager. Herbert C. Dobbs will head a new division devoted to sales activities in Latin America.

New Directors

Glenn L. Martin Co.: Harvey J. Gunder-son, a director of the Reconstruction Finance Corp.; Chester F. Hockley, president of the Davison Chemical Corp.; Daniel A. Evatt, vice president-finance of the Martin company.

INDUSTRY OBSERVER

(This week's column is devoted to the observations of AVIATION WEEK editors who have been touring British aircraft and engine plants for an on-the-spot appraisal of British progress in these fields.)

► New figures on the most powerful single-seat fighter in the world—the Gloster Meteor powered by two 7500-lb. thrust Rolls-Royce Avon engines—give it a rate of climb to 40,000 ft. in less than five minutes. This is just about double the present rate of climb for the North American F-86A, the latest USAF jet fighter in service.

► Although there is still considerable controversy regarding the future of the propeller in aviation, both of Britain's principal propeller manufacturers (Rotol Ltd., joint subsidiary of Bristol and Rolls-Royce; and de Havilland Propellers Ltd.) are investing in considerable propeller research and development facilities. De Havilland is building research and test facilities at its Hatfield plant aimed at handling propellers for gas turbines delivering up to 10,000 hp.

► Conical fairings between the tail pipes of the de Havilland Comet turbo-jet airliner, that puzzled so many foreign observers at the SBAC Farnborough show, are merely temporary fittings to plug the holes that will eventually be filled by two de Havilland Sprite rockets for take-off boost. The Sprite is a 925 lb. liquid-fueled rocket developing 5000 lb. thrust for 12 seconds and can be controlled by the pilot from the Comet's cockpit.

► Vickers-Armstrongs Ltd. Viking transport design has turned out to be a big money-maker after a shaky start when the transport was hastily put together using fabric-covered Wellington bomber wings and Warwick bomber tails. Now an all-metal job, 167 Vikings are in airline service and Vickers is building 400 military versions for the RAF (Valetta) and another hundred aircrew trainer version (Varsity). RAF will use the Valetta to replace its DC-3 transport fleet.

► De Havilland will shortly announce production orders for both its Venom (DH-112) and its night fighter version of the Vampire (DH-113). Although designed primarily as a fighter-bomber, the Venom has proved unusually successful as a maneuverable fighter at altitudes above 42,000 ft. This is due partly to the low wing loading (42 ft.) and the easy-breathing, high altitude qualities of the 5000-lb. Ghost turbojet that powers the Venom. The company has recently acquired a new assembly plant at Chester to handle its expanded production of the Vampire series taken over from English Electric and the Chipmunk, Canadian-designed primary trainer ordered by the RAF.

► Vickers-Armstrongs Supermarine jet naval fighter (the Attacker) uses a pair of spoilers located on the wings just forward of the flaps as a decelerating device during approach for landing. Use of the spoilers permits pilots to maintain higher thrust output from the Nene turbojet during approaches making a pickup to full power easier in case of carrier wave-offs.

► A. V. Roe Co. Ltd. will build a small quantity of Tudor IX turbojet-powered airliners for the British Ministry of Supply. The Tudor IX will be powered by four Nene turbojets in twin-nacelles, as mounted in the Tudor VIII research plane, but will feature a tricycle, tandem wheel landing gear. Ministry of Supply plans to use the Tudor IXs in its expanding program of research into operational problems and economics of turbojet transports. Vickers-Armstrongs Ltd. has completed the airframe of its Tay-powered Viscount and is awaiting engine delivery from Rolls-Royce.

► British have only recently renewed their interest in afterburners after making initial efforts along that line in 1944. The experimental afterburner installation on the Gloster Meteor and de Havilland Vampire began flying only during the past year. British officials claim they have been getting as high as 67 percent additional thrust from these afterburners in test runs, and 50 percent in flight tests.

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AVIATION CALENDAR

- Oct. 3-8—Twentieth anniversary meeting, Ninety-Nines, Waldorf-Astoria, New York.
- Oct. 4—Annual convention, Flight Engineers International Assn., Hotel Lexington, New York City.
- Oct. 4—Committee on Aviation and Airport Fire Protection of National Fire Protection Assn. meeting, Wings Club, Hotel Biltmore, New York City, 10 am.
- Oct. 5-8—SAE national aeronautic meeting and aircraft engineering display, Biltmore Hotel, Los Angeles.
- Oct. 7-8—American Air Mail Society, exhibition and convention, Edgewater Beach Hotel, Chicago.
- Oct. 8—"Cradle of American Aviation Day," opening Nassau County Golden Anniversary Industrial Exposition, Roosevelt Field, L. I., N. Y.
- Oct. 12-15—Air Reserve Assn. convention, Long Beach, Calif.
- Oct. 13-15—1949 conference on airport management and operations, sponsored by University of Oklahoma and Southern Flight magazine, Norman, Okla.
- Oct. 13-15—Eighth Annual Convention, Air Line Dispatchers Assn., Congress Hotel, Chicago.
- Oct. 17—Fall meeting, New York State Aviation Council, Hotel Syracuse, Syracuse, N. Y.
- Oct. 17—36th NASC steering committee meeting, Dayton, O.
- Oct. 17-18—Fall meeting, American Society for Testing Materials' Committee D-4 on adhesives, ASTM headquarters, 1916 Race Street, Philadelphia, Pa. Non-members invited.
- Oct. 17-21—Fall general meeting, American Institute of Electrical Engineers, Netherland Plaza Hotel, Cincinnati.
- Oct. 18-19—6th NAS council meeting, Wright-Patterson AFB, Dayton, O.
- Oct. 23-25—CAA Regional Administrators Conference, Oklahoma City.
- Oct. 26-27—CAA Nonscheduled Flying Advisory Committee meeting, Oklahoma City.
- Oct. 30—Third annual San Francisco Air Fair, sponsored by Junior Chamber of Commerce, San Francisco Airport.
- Oct. 30-Nov. 2—Annual convention, National Assn. of State Aviation Officials, New Orleans.
- Nov. 9-11—Seventh annual meeting Aviation Distributors and Manufacturers Assn., French Lick Springs Hotel, French Lick, Ind.
- Nov. 30-Dec. 2—Annual meeting, Society for Experimental Stress Analysis, Hotel New Yorker, New York.
- Jan. 13-15, 1950—All-American Air Maneuvers, Miami.
- Mar. 6-9, 1950—47th annual meeting, American Road Builders' Assn., Netherlands Plaza Hotel, Cincinnati.

PICTURE CREDITS

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LOVE FIELD DALLAS

NEWS DIGEST

DOMESTIC

Wright Aeronautical Corp. last week received order from Douglas Aircraft Co. for Cyclone 9HE2 engines to power initial three Super DC-3s for Capital Airlines. Deliveries will begin in January.

Convair will apply for new CAA type certificate on Convair-Liner, permitting increase in gross weight from 40,500 to 41,200 lb. and landing weight from 38,600 to 39,800 lb. as soon as tests are conducted on modified Liner. On short hauls the 700-lb. increase in gross would allow boost of 1112 lb. in payload from current 8150 lb. For longer haul, payload increase would be 612 lb.

Douglas Aircraft Co. is planning to bring out DC-6B, passenger version of DC-6A freighter. Both A and B versions exceed regular DC-6's length by 5 ft. DC-6B will carry more than 100 passengers, cruise at 300 mph., have range up to 2500 mi., and will be pressurized.

Boeing Airplane Co. delivered its 28th Stratocruiser. Craft was 7th of an order of 10 for Northwest Airlines. Pan American Airways has received 16 (of 20), American Overseas Airlines 4 (of 8). British Overseas Airways Corp. has ordered 10; United Air Lines, 7.

Personal aircraft shipments during August, reported to Aircraft Industries Assn., totaled 260, bringing total for first eight months in '49 to 2631, valued at \$10,999,000. August shipments were from nine companies and included 177 four-placers, 73 two-placers, and 10 single-seaters, representing value of \$1,051,000 at manufacturers' net billing price. Shipments of nine companies in July totaled 290, valued at \$1,147,000.

Convair's T-29, first of 36 ordered by Air Force, made successful initial flight. Craft is navigation-trainer version of Convair-Liner.

Lightplane altitude record of 26,200 ft. was claimed by 27-year-old Mrs. Mildred Zimmerman of Reading, Pa. Official record is 21,900 ft.

Lockheed Aircraft Service, Inc. acquired all stock of Willis-Rose Corp., maintenance operator at New York International Airport (Idlewild), currently servicing craft for Seaboard and Western, KLM Royal Dutch Airlines, Swissair, El Al (National Airline of Israel), and Arabian-American Oil Co. Idlewild installation will be coordinated with LAS overhaul bases at MacArthur Airport, Sayville, N. Y. and Burbank, Calif.

Zero Reader, Sperry Gyroscope Co.'s

navigational and landing device, is planned for installation on all Eastern Air Lines planes by first of next year.

Beech Aircraft Corp. has agreed tentatively to Smithsonian Institution request for Waikiki Beech Bonanza in which Bill Odom set a new nonstop record for lightplanes.

Defense Secretary Louis Johnson, who spent a day on a Navy aircraft carrier, said he was impressed, but that there is still "not a chance" he will reverse order stopping work on super-carrier.

Maurice Roddy, age 50, one of the first aviation writers died in a Chicago hospital. He was president of the Aviation Writers Assn. in 1944-45.

1948 Manly Memorial Medal will be awarded to Andrew Kalitinsky of Fairchild Engine & Airplane Corp.'s NEPA division, on Oct. 7, by Society of Automotive Engineers at its National Aeronautic Meeting, Los Angeles.

Vice Adm. H. B. Sallada, commander of air force, Pacific Fleet, has retired. He was graduated from Annapolis in 1917 and learned to fly in 1921.

New York helicopter service applications will be heard by a CAB examiner on Nov. 14. Seven companies have requested routes, but some may withdraw from the long-delayed proceeding.

National Aeronautic Assn. board of directors is sounding out aviation opinion on support for a national aviation meeting tentatively planned for Dec. 15-17 in Washington as the 1949 successor to previous national aviation clinics.

INTERNATIONAL

Trans-Canada Airlines has started family fare rates from midnight Sunday to midnight Wednesday of each week over all domestic and Canada-U.S. routes.

Italian airlines are to be merged into a single company known as "Societa Aerea Italiana," with capitalization of 5 billion lire. KLM holds 30 percent interest.

Quebec Airways DC-3 crash last month which killed 23 was caused by explosion of a time bomb in the baggage compartment, according to Royal Canadian Mounted Police. Officials allege a Quebec jeweler had the bomb placed aboard in order to murder his wife. It was the second such instance in six months, an airline plane in the Philippines being blasted last May by a time bomb allegedly placed aboard at the instigation of a wife in a successful attempt to kill her husband.



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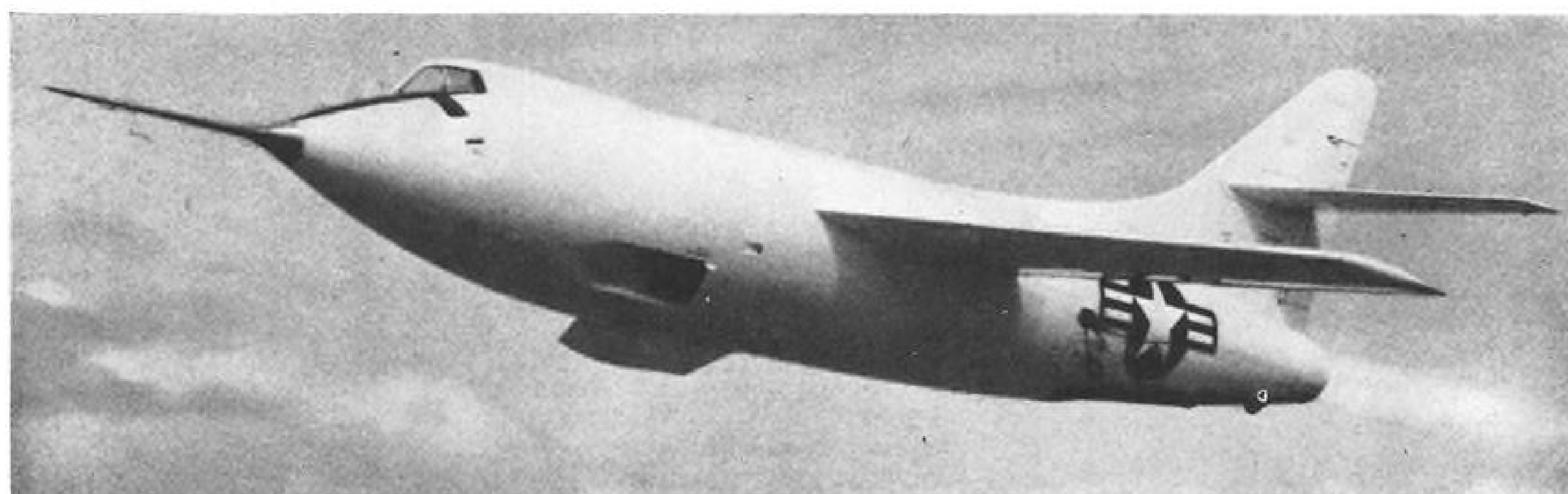


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GENERAL ELECTRIC



Douglas Skyrocket Hits Supersonic Speed

Navy again has fastest plane as D-558-II proves capable of easily passing Mach 1.

By Robert McLarren

Douglas D-558-II Skyrocket has attained the speed of sound in level flight.

The glistening white Navy research aircraft reached Mach 1.03 at an altitude of 26,000 ft. (approximately 710 mph.) in a mid-July test flight at Muroc Air Force Base, Calif. Veteran Douglas test pilot Gene May was at the controls.

Unlike the Air Force's Bell X-1, which literally blasted its way through increasing drag to achieve supersonic speed, the Skyrocket performance was obtained in a smooth, normal flight, well within the plane's aerodynamic capabilities.

► **Fastest in World**—Thus, the Navy-Air Force competition becomes keener, with the Navy finding itself with the fastest airplane in the world. Before this, the Air Force had it.

The Skyrocket has a design capability of 1820 mph. at 75,000 ft. Such performance, if attained, not only would establish a speed record, but also an altitude record. (Maximum design speed of X-1 is 1000 mph. at 60,000 ft.)

The North American F-86 Sabre has gone 710 mph. in level flight at sea level (AVIATION WEEK, Sept. 12), but at this low altitude such speed is about 50 mph. below that of sound. The F-86 also is intended for supersonic flight above 40,000 ft., but not to the limits for which the Skyrocket is designed.

► **Not First Time**—The July flight was not the first supersonic performance of the Skyrocket. It has frequently reached supersonic speed in shallow dives, but this was its first level-flight breach of the sonic barrier. The flight itself was largely the result of enthusiasm on the part of test pilot May, since contract specification requires a demonstration of the airplane by Douglas Aircraft Co. personnel only up to Mach 0.95.

The successful supersonic flight was somewhat belated, and came after a series of powerplant difficulties had plagued the craft. Major problem in early test flights was created by the craft's extremely short endurance, which has fallen much below expectations.

► **Short of Fuel**—Its Westinghouse J-34 turbojet engine is provided with a fuel supply of 250 gal. of ordinary aviation gasoline, sufficient for an endurance of only about 30 min. The Reaction Motors four-barrelled rocket engine, while of identical design to that used in the historic Bell X-1, is provided with only 3000 lb. of propellant, little more than a third the amount carried by the X-1.

For this reason, actual altitude time of the Skyrocket is only 12 min., of which less than 1 min. is available on full rocket power. Total rocket time can be extended to about 3½ min. by firing the chambers in sequence.

► **JATO Use**—It was to decrease the amount of fuel used for takeoff, as well as to reduce pilot risks, that two JATO bottles were tested on the Skyrocket last February and have been used

intermittently ever since. This 2000 lb. extra thrust gets the airplane off much quicker, thereby saving turbojet fuel and lessening pilot risk.

Contracted for as a part of the national piloted aircraft research program, the Skyrocket was completed in November, 1947, and made its first test flight in February, 1948. Early test flights were made by chief test pilot John Martin on the turbojet engine alone to establish basic stability and control characteristics of the airplane.

Rocket engine was not installed until last fall and it was the added weight of the rocket fuel that created interest in the use of JATO. Both engines were not successfully operated simultaneously in flight until last May and shortly thereafter the first supersonic performance was attained.

► **Easy**—So far the plane has proved capable only of slightly supersonic speed. But featuring a combination of both wing sweep and low aspect ratio planform, the Skyrocket can attain supersonic speeds while flying well within its critical Mach number of 1.15.

For this reason, achievement of supersonic speed is easy, for the Skyrocket, while the straight-thin wing of the Bell X-1 is well into drag divergence during its supersonic flights.

The Skyrocket is bigger and heavier than the X-1, although it is still a small airplane. It weighs more than eight tons fully loaded, yet has a wing span of only 25 ft., which is comparable to some Goodyear Trophy Race entries at the recent National Air Races.

► **Straight Wing Considered**—It features flush air inlets for the turbojet engine, aft-fuselage speed brakes, "air dams" and a negative dihedral angle—

the latter designed to improve its low-speed stability characteristics. Navy and Douglas engineers have seriously considered changes in this angle, including its removal to create a "straight-wing" airplane because of the additional drag of the angle at high speed.

Wing of the Skyrocket is swept back 35 deg. at the quarter-chord point and the stabilizer has a sweep angle of 40 deg. to insure maintenance of longitudinal control at speeds well above that at which the wing suffers shock stall. Stabilizer is electrically controllable from the cockpit through a large angle to accommodate large trim changes through the transonic zone.

► **Phase II Soon**—Following this supersonic performance of the airplane, Gene May has turned the piloting job over to other Douglas test pilots to complete the few remaining trials required for fulfillment of Phase I test flight requirements, expected shortly. Phase II tests will be conducted by the Navy and National Advisory Committee for Aeronautics.

Only one of the three Skyrockets now flying is equipped with a rocket engine, the other two being tested for stability and control on turbojet power alone. But three are scheduled to fly under rocket power.

NACA Discloses High-Altitude Gains

CLEVELAND—New research progress toward the solution of high-altitude problems of turbojet, ramjet and rocket powerplants was disclosed at the 1949 inspection of the National Advisory Committee for Aeronautics' Lewis Flight Propulsion Laboratory.

More than 1000 representatives of government and aviation industry heard reports that it is now possible to get satisfactory operation—including starting of these engines at simulated altitudes as high as 70,000 ft. and at speeds as high as 2½ times that of sound.

► **High Starting**—Key to high-altitude starting of turbojet engines is high spark energy, cross-fire tubes of ample diameter and use of the new JP-3 jet fuel. Rocket starting at these altitudes is facilitated by fast-acting ignition system, which prevents propellant accumulation in chamber leading to an explosion.

Replacement of critical materials in the gas turbine is made possible by use of ceramals and a new intermetallic chemical combination: molybdenum-disilicide. Both are ceramic-base metal alloys which preserve high thermal shock-resistance of the metal with high temperature resistance of the ceramic material.

► **Propellant**—A new rocket propellant, diborane-oxygen, has been tested by the

Exclusives

Five major exclusive stories, including the one on this and the facing page, appear in this issue of AVIATION WEEK. Here is the list and where you will find them:

- **Skyrocket's supersonic flight**, a detailed account of how fast the Douglas D-558-II, speediest plane in the world, has flown in its early tests, an analysis by AVIATION WEEK's engineering writer, Robert McLarren, pages 10-11.
- **The Martin XB-51**, pictures with details and design background on this new and unusual three-jet fighter-bomber, pages 12-13.
- **The Avro C-102**, Canadian jet

transport, first detailed story on construction and performance of the plane since it has flown, an on-the-spot report by Technical Editor Irving Stone, pages 15-18.

• **First photographic details** of new British planes, a two-page picture report from London by Bob Hotz, News Editor, and Fred Brewster, AVIATION WEEK's London (McGraw-Hill World News) correspondent, pages 26-27.

• **Turboprop DC-3**, first details of British plans to compete with the Super DC-3 with a turboprop-powered conversion, another illustrated story from London, pages 38-41.

Lewis laboratory resulting in the generation of 6800 deg. F., believed to be the highest temperature ever recorded in the United States. Most promising rocket fuel yet developed—but not yet tested—is hydrogen-fluorine, which produces more than twice the specific impulse of currently-used alcohol-liquid oxygen propellant.

Important progress in theoretical methods has been made by the laboratory in the past year. Design methods are now available through the use of which substantial weight savings can be made in gas turbine design without any impairment in safety or performance.

Theoretical gains have also been made in heat transfer calculations which facilitate the study of cooling requirements of jet and rocket engines and thereby permit more efficient design.

House to Query Strategy and Buying

House Armed Services Committee this week will resume its investigation into military strategy and procurement, with these key items on the agenda:

- Identify the source of charges contained in the once-anonymous document which fomented the investigation. Cedric Worth, suspended special assistant to Navy Undersecretary Don A. Kimball, has already identified himself as author.
- Determine whether the Air Force is overemphasizing strategic bombing at the expense of air-ground support.
- Examine the decision to cancel the Navy's plan for a \$189 million super-carrier.
- Examine the roles and missions of USAF, Navy and Marine Corps.
- Examine Joint Chiefs of Staff pro-

cedure of having two of the services pass on weapons to be used by a third.

► **Naval Inquiry Dropped**—Meanwhile, Navy Department's Court of Inquiry which is seeking to determine who in the Navy, if anybody, helped Worth prepare the memorandum, has been recessed.

Whether it will continue now depends on the House committee's decision on releasing information contained in a special intelligence report, reputed to name persons who actively and knowingly assisted in preparation of the document which was critical of Air Force emphasis on the B-36 and procurement of the aircraft.

Previously, the court had asked Secretary for Air W. Stuart Symington to appear and elaborate on a statement he made before the House committee to the effect that "a series of individuals formed themselves into a group" to prepare the memorandum.

But the court's request was thwarted by Symington, who said his testimony would be doing "indirectly what the chairman (of the House committee) has instructed that I not do directly." Later, Secretary of the Navy Francis P. Matthews told the court to stop trying to have Symington appear as a witness.

In earlier testimony, Cedric Worth told the Navy court he had prepared the memorandum originally for manufacturer Glenn L. Martin who wanted something to show Maryland Senator Millard B. Tydings. Commander Tom Davies later acknowledged he had arranged the meeting between Worth and Martin, but claimed that was the extent of his active participation. Careful questioning by Davies' counsel brought out the fact that Worth "was superior to Davies" in the Navy Department, and from time to time Davies was required to furnish information to Worth as requested.



Three-Jet XB-51 Shows Unusual Design

Martin fighter-bomber has variable incidence wing, high tailplane.

Most unconventional jet aircraft design yet produced in the U. S. is the new three-jet XB-51 ground cooperation fighter-bomber announced by Glenn L. Martin Co.

A variable-incidence wing on the XB-51 and the uncommon position of two of its three General Electric J-47 turbojet powerplants, mounted on pylons extending from the fuselage, together with the sweepback of wing and tail surfaces, gives the whole craft a radically different appearance.

Placement of the stabilizer at the top of the tailfin, and the tandem main landing gear which retracts into the fuselage adds to the strangeness of the design. (No. 3 engine is mounted more conventionally for a jet in the tail of the plane.)

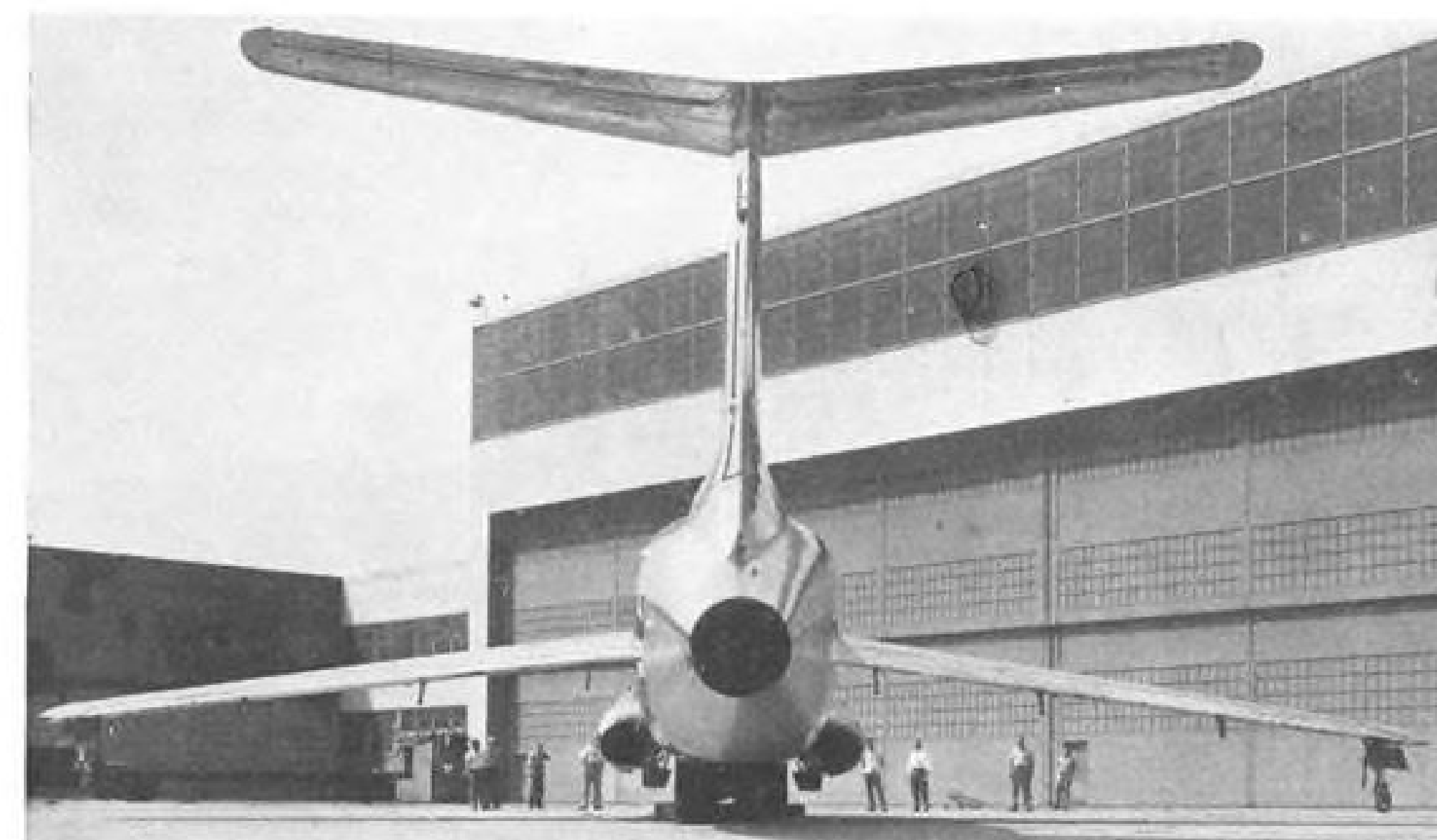
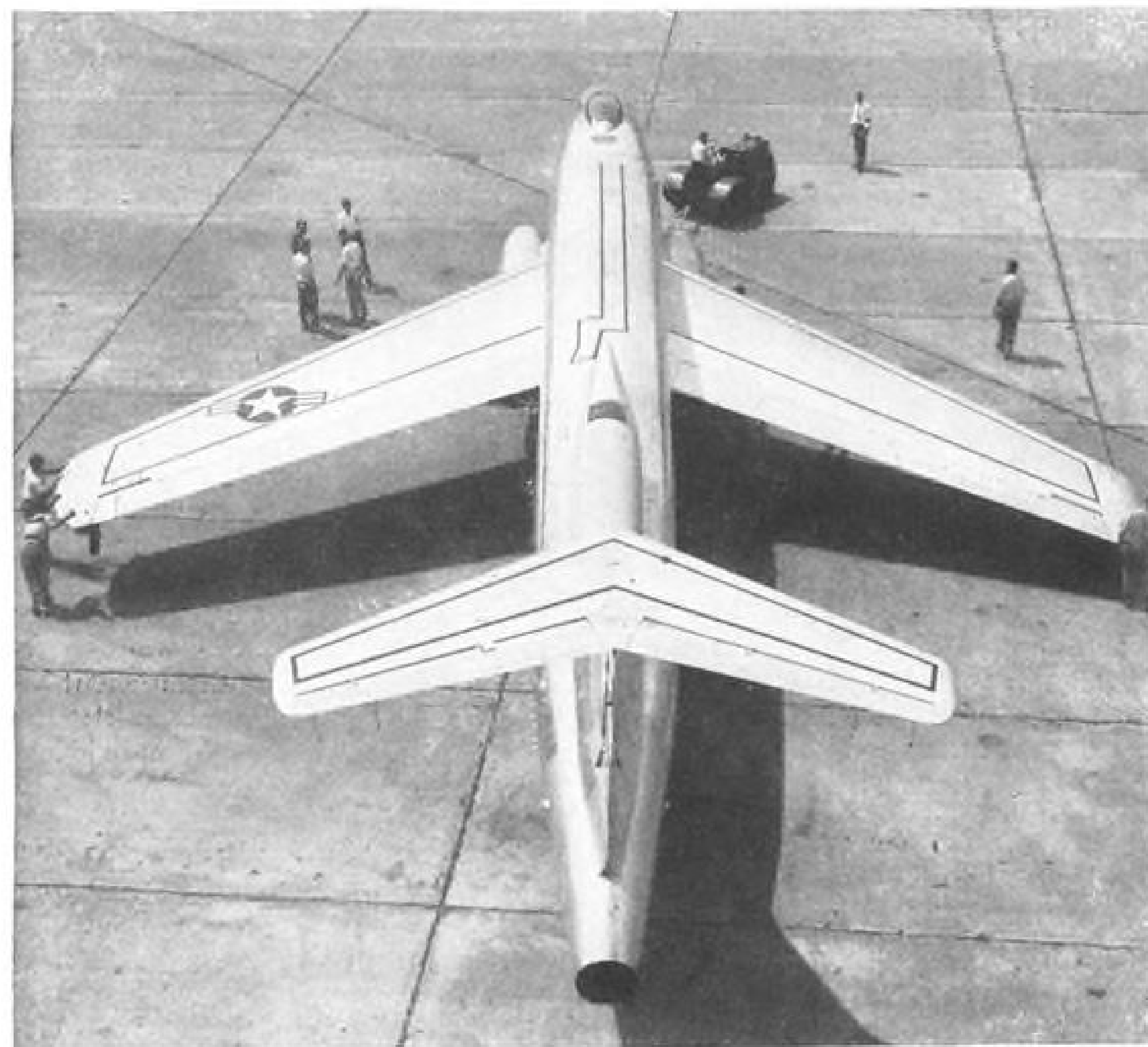
Use of variable incidence in aircraft wings has been subject of experimentation for many years. In a sense, the first Wright Brothers' planes with wing-warping devices varied the incidence of their plane surfaces.

► **Cornelius Plane**—Probably the first practical application of true variable-incidence wings was made in the Cornelius "Fre-Wing" flown during the early 1930s.

This monoplane was flown several years for several thousand hours, from Glendale and Long Beach.

Later George Cornelius, its inventor, used a modification of the principle in his personal plane, the Mallard, (AVIATION NEWS, Sept. 20, 1943) and his XFG-1 bomber fueling glider, both built at Dayton, Ohio. Both varied the incidence of outboard wing panels.

► **German Development**—German firm of Blohm and Voss built two variable-



incidence wing twin-engine transports in France during the war (AVIATION NEWS, Nov. 26, 1945) but neither was flown. More recently British Supermarine 322 torpedo-bomber and Supermarine Seagull general-purpose amphibian also have used variable-incidence wing installations.

► **Basic Advantage**—Each of these uses of variable incidence has been for different purposes but basic advantage over a fixed-incidence design on the XB-51 is to permit takeoff and landing of the airplane in a near-horizontal attitude in order that both landing gear units can be fully utilized. During either of these high-lift conditions, a fixed-incidence airplane must usually point its nose high, placing the tail low in the classic "three-point" position.

With a tandem landing gear design, it is desirable that both units carry load simultaneously. Variable-incidence wing on the XB-51 also permits quicker takeoff and slower landing. Fast-acting mechanism would also permit improved maneuvering, such as in pull-up from a low-level bomb or strafe run. Further, it allows slightly higher maximum speed by permitting the airplane fuselage to assume a minimum drag attitude while the wing is at its near zero-lift incidence.

Principal objection to the device is the structural problem created, since one of the wing spars must be movable about the other. While previous installations have moved the rear spar, the XB-51 design rotates the front spar—which is more lightly loaded with a swept wing configuration—about the rear spar.

► **Many Patents**—No details are available on the mechanism but the many patents issued for such a device over the past 40 years are certain to have caused Martin engineers and attorneys considerable head-scratching during the design.

The XB-51, in other respects, is the last of the wartime jet aircraft projects approved by the Air Force on the basis

of a random proposal as distinct from the product of a tactical requirement.

Martin engineers never have been quite certain regarding the detailed tactical requirements of the airplane. It began as an Air Force design study in 1945 and this study was formalized into a prototype construction project as the XA-45 attack plane. This was one of three such jet-powered attack planes, the Curtiss X-43 (which later became the XP-87) and the Convair XA-44 (which became the XB-53) being multi-jet two-seat attack planes. Abolition of the attack category last year resulted in re-designation of the XA-45 as the XB-51.

► **Wing Spoilers**—The XB-51 wing features the use of spoilers for lateral control, although the design used is simply a flat plate forward of the trailing edge flaps, as pioneered on the Martin AM-1 Mauler. Desired variation in stick force is provided by two "trimming ailerons" at the extreme wing tips. The huge slotted flap panels also provide lateral control when both spoilers are at their maximum position during landing. Flat plate air brakes are provided on either side of the aft fuselage.

Stabilizer location atop the fin avoids jet and wing turbulence at slow speeds and guarantees maximum longitudinal control when it is most needed. This location, while structurally difficult, has had practical installation in the Curtiss XF-15C and the German DFS-346 (copied by the Russians in a special sonic research airplane).

► **Fire Power**—Armament aboard the XB-51 is mounted in an interchangeable arrangement of eight 20mm or four 75mm cannon in the nose. A variety of bombs up to 12,000 lb. is carried in the bomb bay located between the main landing gear units. Crew of two includes pilot in bubble canopy atop fuselage and navigator-radio operator located at a station within the fuselage behind and below the pilot.

XB-51 has a wing span of approxi-

mately 55 ft. and is approx. 80 ft. long. Gross weight is approx. 80,000 lb. Top speed is 600 mph. at sea level.

Craft features 35 deg. sweep in its wing and empennage. The tandem main gear, first developed on a modified B-26 bomber and incorporated on the Martin XB-48 and Boeing XB-47, folds rearward and into the fuselage. Small, retractable wingtip landing gear units prevent wingtip damage during ground maneuvers.

Air intake for the aft engine is located atop the fuselage. A temporary conical fairing is presently in place over the inlet, since the tail engine will not be used during initial test flights.

Swivelling Landing Gear

Newest wrinkle in the crosswind landing gear field is the improved model of the Goodyear swivelling crosswind wheel for DC-3 type planes, which now has a cockpit control to make the main wheels alternately steerable at the pilot's pleasure, for greater ease in taxiing.

Art Chapman, Goodyear test pilot who has done virtually all the flight work for his company on this three-year development, demonstrated the improved gear on a Goodyear-owned DC-3 at Washington National Airport recently to satisfaction of CAA, Air Force and industry observers and one of AVIATION WEEK's editors.

Advantage of the new hydraulically-operated lock which transforms the swivelling wheels into steerable ones is obvious when the plane is taxied.

If the pilot leaves the lock on in flight, the safetying pins will shear in the force of a crosswind landing, so that the wheels will be free to swivel. Control is not unlike those familiar to pilots for use with full-swivelling tailwheels which alternately can be locked for steerability.

Goodyear now has produced approximately 30 sets of the DC-3-size crosswind gears which are being marketed at a price somewhere around \$6,000 installed. Currently the company has installed seven big sets on demonstrator airplanes. This includes planes used by Goodyear, CAA, NACA, Canadian Pacific Airlines, the Australian government, Sperry Corp. (for use with its Zero Reader device), and the Goodyear Canadian company.

Approximately 500 smaller-size sets of crosswind wheels, in addition, have been shipped thus far for use on a wide variety of personal aircraft.

Details of the king-pin arrangement which permits the Goodyear crosswind wheel to caster freely within radius governed by stops, have been previously reported in AVIATION WEEK.

Air Force Negotiated Contracts

The Air Force has announced to AVIATION WEEK negotiation of millions of dollars worth of contracts. The following list shows those over \$100,000.

Announced in August:

- **Aircraft Gas Turbine Division**, General Electric Co., West Lynn, Mass.; \$10,000,000; 18 Aug. 49.
- **Air Products, Inc.**, Allentown, Pa.; spares for mobile oxygen generators; \$131,868; 29 July 49.
- **AiResearch Mfg. Co.**, Garrett Corp., Los Angeles, Calif.; air cycle air conditioners, engineering data and design and calculated performance data; \$200,720; 3 Aug. 49.
- **AiResearch Mfg. Co.**, Garrett Corp., Los Angeles, Calif.; heaters, detail design; tools and test equipment, motor and engineering drawings; \$865,955; 3 Aug. 49.
- **American Gas Accumulator Co.**, Elizabeth, N. J.; transformers, series; \$205,322; 22 June 49.
- **Bell Aircraft Corp.**, Niagara Falls, N. Y.; spare parts for YH-13, H-13 and H-13B Aircraft; \$410,431; 25 July 49.
- **Bendix Products Division**, Bendix Aviation Corp., South Bend, Ind.; carburetors, master controls, fuel injection systems and spare parts of each; \$2,578,932; 29 July 49.
- **Bendix Products Division**, Bendix Aviation Corp., South Bend, Ind.; fuel injection system spare parts; \$675,253; 28 July 49.
- **Bird Electronic Corp.**, Cleveland, Ohio; antenna, AT-225/APN-12; \$112,905; 13 July 49.
- **Bol Ltd.**, New York, N. Y.; type C-20 camera; \$170,500; 19 Aug. 49.
- **Briggs & Stratton Corp.**, Milwaukee, Wis.; engine assembly and component parts for Briggs & Stratton models; \$120,929; 26 July 49.
- **Cook Electric Co.**, Chicago, Ill.; 50 channel magnetic tape recorders; \$145,000; 27 June 49.
- **Curtiss-Wright Corp.**, propeller division, Caldwell, N. J.; propeller assemblies, less blades and control parts for (9) YC-122 airplanes; \$187,904; 30 Aug. 49.
- **Curtiss-Wright Corp.**, propeller division, Caldwell, N. J.; modification of 972 blades and 405 hubs required for B-36 series airplanes; \$537,111; 26 July 49.
- **Curtiss-Wright Corp.**, propeller division, Caldwell, N. J.; installation and spare propeller assemblies, spare blades, controls and spare parts for 54 each C-124A airplanes; \$1,181,135; 17 Aug. 49.
- **Consolidated Vultee Aircraft Corp.**, Consolidated Vultee Aviation Corp., San Diego, Calif.; miscellaneous spare parts for B-36 aircraft; \$200,000; 1 July 49.
- **Dayton Aircraft Products, Inc.**, Dayton, Ohio; dolly assembly, propeller and engine transportation, type C-1C and data; \$304,783; 29 July 49.
- **Devry Corp.**, Chicago, Ill.; miscellaneous photographic equipment; \$852,727; 10 Aug. 49.
- **Douglas Aircraft Co., Inc.**, Santa Monica, Calif.; spare parts for C-54 aircraft supporting "Vittles Project"; \$330,858; 15 July 49.
- **Duffy Construction Co.**, Cleveland, Ohio; modify engine test cell No. 2; \$126,100; 20 July 49.
- **Eclipse Pioneer Division**, Bendix Aviation Corp., Teterboro, N. J.; L-1 manifold pres-

sure transmitter; \$113,933; 5 July 49.

- **Eclipse Pioneer Division**, Bendix Aviation Corp., Teterboro, N. J.; indicator, fuel flowmeter, synchro style; \$159,863; 31 Aug. 49.
- **Eclipse Pioneer Division**, Bendix Aviation Corp., Teterboro, N. J.; multi-purpose transmitter type M-1; \$161,598; 28 July 49.
- **Gilfillan Brothers**, Los Angeles, Calif.; classified; \$577,608; 1 July 49.
- **Goodyear Tire & Rubber Co.**, Akron, Ohio; brake and spare parts; \$277,140; 28 July 49.
- **Ideal Electric & Mfg. Co.**, Mansfield, Ohio; motor generators; \$204,180; 22 June 49.
- **Jack & Heintz Precision Indus.**, Cleveland, Ohio; inverters; \$360,217; 5 Aug. 49.
- **Jamestown Metal Corp.**, Jamestown, N. Y.; weather equipment; \$251,155; 21 June 49.
- **Kollsman Instrument Div.**, Square D Co., Elmhurst, N. Y.; composite flight instrument transmitter; \$118,417; 4 Aug. 49.
- **Lockheed Aircraft Service, Inc.**, Burbank, Calif.; operation and maintenance of Keflavik Airport; \$4,227,138; 1 July 49.
- **W. L. Maxson Corp.**, New York, N. Y.; classified; \$295,476; 5 Aug. 49.
- **McGrath St. Paul Co.**, St. Paul, Minn.; type C-6 bomb hoist assembly; \$137,800; 22 July 49.
- **Northrop Aircraft Corp.**, Hawthorne, Calif.; facilities for production of F-89A airplanes; \$1,350,000; 23 Aug. 49.
- **Pan American Airways Inc.**, New York, N. Y.; operation of Roberts Field Airport, Liberia; \$290,000; 1 July 49.
- **Polan Industries**, Huntington, W. Va.; weather station fixtures; \$140,325; 13 July 49.
- **Ranger Aircraft Engines**, Fairchild Engine & Airplane Corp., Farmingdale, L. I., N. Y.; classified; \$237,366; 9 Aug. 49.
- **Scintilla Magneto Division**, Bendix Aviation Corp., Sidney, N. Y.; spare parts for magnetos and ignition harnesses; \$636,673; 16 July 49.
- **Sikorsky Aircraft Co.**, United Aircraft Corp., Bridgeport, Conn.; study, design, modification and test of H-5F or H-5G helicopter to permit serial tow of speeds in excess of the helicopter's normal cruising speed; \$117,177; 29 July 49.
- **Smith, Hinchman & Grylls, Inc.**, Detroit, Mich.; continuation on anti-icing system for military aircraft and component parts thereof; \$484,999; 1 July 49.
- **Sperry Gyroscope Co.**, Sperry Corp., Great Neck, L. I., N. Y.; \$631,453; 29 July 49.
- **Sperry Gyroscope Co.**, Sperry Corp., Great Neck, L. I., N. Y.; slaved gyro magnetic compass; \$2,479,060; 23 Aug. 49.
- **V & S Engineering Co.**, Chicago, Ill.; aircraft reconnaissance camera; \$196,323; 3 Aug. 49.
- **Victor Adding Machine Co.**, Chicago, Ill.; miscellaneous spare parts for "M" series bombsight; \$132,622; 24 Aug. 49.
- **Wells All-Steel Products Co.**, North Hollywood, Calif.; 39 each hoist, engine and turret portable 10,000 lb. capacity, type J-2; \$253,708; 26 July 49.
- **Western Electric Co.**, New York, N. Y.; classified; \$964,321; 17 July 49.
- **Western Electric Co.**, New York, N. Y.; technician services; \$313,200; 1 July 49.

Announced in July:

- **Aircraft Service Corp.**, Valley Stream, N. Y.; fuel tanks; \$166,572.
- **Boeing Airplane Co.**, Seattle; airplanes and spare parts; \$6,807,846.
- **Boeing Airplane Co.**, Seattle; miscellaneous spare parts; \$200,000.
- **Brach, L. S. Mfg. Corp.**, Newark, N. J.; antenna assemblies; \$166,932.
- **Canadian Commercial Corp.**, Ottawa, Canada; propeller assemblies; \$105,825.
- **Chicago Aerial Survey Co.**, Chicago; multi-control units; \$275,735.
- **Consolidated Radio Products Co.**, Chicago; aircraft camera magazine; \$265,101.
- **Fairchild Camera Instrument Co.**, Jamaica, N. Y.; camera, aircraft; \$815,255.
- **Federal Motor Truck Corp.**, Detroit; spare parts for fueling, servicing trailers, etc.; \$116,726.
- **Federal Motor Truck Corp.**, Detroit; block assemblies and pistons; \$104,895.
- **B. F. Goodrich Co.**, Akron; wheels and brakes and nose wheels; \$1,211,567.
- **Hoffman Radio Corp.**, Los Angeles; amplifier, indicator, etc.; \$1,089,893.
- **Jumbo Steel Products Co.**, Azusa, Calif.; shackles; \$122,422.
- **Lear, Inc.**, Grand Rapids, Mich.; remote control system; \$506,027.
- **RCA Victor Division**, Camden, N. J.; radio set; \$344,549.
- **Reed Products, Inc.**, Milwaukee; flying clothing; \$212,016.
- **Republic Aviation Corp.**, Farmingdale, N. Y.; modification of aircraft; \$344,793.
- **Sigmund-Eisner Co.**, Red Bank, N. J.; flying clothing; \$125,622.
- **Sikorsky Aircraft**, Bridgeport; helicopters; \$395,400.
- **A. O. Smith Corp.**, Milwaukee; propeller blades; \$249,578.
- **Sperry Gyroscope Co., Inc.**, Great Neck, N. Y.; surface controls, and data; \$234,639.
- **Telemark, Inc.**, Stamford, Conn.; radio receiver; \$472,118.
- **Thew Shovel Co.**, Lorain, Ohio; crane shovel power unit; \$783,446.

Navy Bid Proposals

The following bid invitations have been announced by the Navy Dept. Aviation & Supply Office at Philadelphia. Bid forms may be obtained from the Aviation & Supply Office, Oxford Ave. and Martin's Mill Road, Philadelphia. Specifications are not furnished unless requested by number.

- Bolts and nuts**, 3 items machine bolts, black and galv.; 1000 steel toggle bolts; 2 items hex. nuts, specs. 43-B-11d, 42-S-5e, 32-B-14e; invitation No. 8567; bids due Oct. 20.
- Bolts and nuts**, 5000 mach. bolts; 3000 studs; 3500 hex nuts, specs. 43-B-11d, -14e; invitation No. 8570; bids due Oct. 20.
- Ball bearings**, 7 items, single row; invitation No. 8592; bids due Oct. 25.
- Balancing equipment**, dynamic outfit, 6 ea., Vibroscope Co.'s.; invitation No. 8610; bids due Oct. 20.
- Micrometer stop countersinks**, 768 ea., adj., 4 in. overall length, Schribo Aero Tool; invitation No. 8611; bids due Oct. 20.
- Stainless steel wire**, 5 items, non-magnetic, tinned, spec. 22-W-17 (Ships); invitation No. 8620; bids due Oct. 20.
- Solder**, 5000 lb. tin-lead, rosin-cored, 3/32 in. dia., spec. QQ-S-571b; invitation No. 8629; bids due Oct. 20.
- Packing**, 6800 yd., flax or hemp fiber and lubricant, sq. braided; also 4700 yds. 1 in., Navy spec. 33-P-1j; invitation No. 8582; bids due Oct. 25.



Design Report on Canada's Avro Jetliner

U. S. airlines eye outstanding construction and excellent performance demonstrated in tests of short-haul C-102.

By Irving Stone

MALTON, ONTARIO — Progress made with A. V. Roe Canada Ltd.'s short-to-medium range XC-102 places our northern neighbor in the front rank of jet transport development. And this Jetliner, as they call it—first on the American continent—can be taken as a clear reminder that the U. S. is neglecting to develop the role for which it should be preparing in the future transport field.

First version of the Jetliner has been built to the highest standards of construction—it is one of the cleanest prototypes this reporter has yet seen. Bulk of parts are on hand for the second prototype, but assembly is being held up so that lessons learned from the first may be incorporated. It is expected that the second craft will be the demonstrator, ready and fitted, as for airline service, within a year.

► **Flight Impressive**—Exhibiting its air handling characteristics in an experimental flight witnessed by this AVIATION WEEK representative, the Jetliner gave an excellent performance. It now has approximately six hours aloft.

In taking off at a gross weight of about 49,000 lb., the run appeared very short before the craft was seen to be airborne.

Climb was rapid. Flying over the field at about 400 ft., the plane was rolled and banked with quick, flipping motions, indicating excellent aileron con-

trol and dispelling any idea of sluggishness.

After buzzing the field at about 50 ft. at a speed of about 250-300 mph., the plane climbed sharply.

► **Noise, Vibration Low**—Commenting on the quiet within the craft, Avro flight engineer A. W. Baker said: "Sound and vibration conditions are so satisfactory, that immediately after takeoff, with undercarriage retracted and fairing doors closed, the sudden drop in noise level and vibration are so pronounced that one experiences the sensation normally associated with complete power loss in piston-engine craft. Earphones are not necessary."

It is claimed that noise—a low rumble—doesn't become a factor until well aft of the passenger cabin, and this space will be used for baggage and galley, according to plans.

► **Maintenance Ease**—Another impressive feature is maintenance accessibility. The low-wing configuration, mounting four underslung Derwent 5 turbojets, gives easy reach from the ground. With the large enclosing panels dropped, a mechanic's work on engine, landing gear and miscellaneous systems will be greatly simplified. And intercom plug-in stations located at engine nacelles and tail permit mechanics in cockpit to speak with ground men.

Use of parts standard in the U. S. aircraft industry has been stressed to simplify familiarization and changes for personnel.

► **Performance**—Speed, of course, is one of the main justifications for the Jetliner.

Its maximum cruise is expected to be 417 mph. at 30,000-35,000 ft. at a gross weight of 60,000 lb. Stalling speed at landing weight of 50,000 lb. with flaps in landing position is 87 mph. At landing weight of 40,000 lb. it is 78 mph.

Normal range with 50 passengers, baggage and all allowances for taxiing and takeoff, stacking, fuel for alternate, and instrument approach, is estimated at 500 mi. Maximum still-air range, without emergency allowances, is projected at 1400 mi.

The craft has been designed to operate from 4000 to 5000 ft. runways, under standard ICAN conditions.

► **Proving Comes First**—U. S. airline reaction to the Jetliner has not crystallized yet, but Avro feels that Eastern Air Lines has displayed considerable interest in the craft, following its development closely; also, that it is likely that an arrangement could be made with EAL to place the Jetliner on route survey work probably in the not-too-distant future.

However, Avro is not greatly stressing the sales angle at this time, feeling that it has at least a year's leeway before this phase becomes important.

By that time the company expects to accumulate extensive data on maintenance and operating costs for the transport. For quantity production, price aim will probably be in the neighborhood of \$700,000.

► **Speed Factor**—It is Avro's opinion that even though direct operating costs,

because of greater fuel consumption, would be substantially higher than those with piston- or turboprop-powered transports, there would be considerable savings in indirect costs due to the Jetliner's higher block speed.

An example of the craft's application could be illustrated in the high density Los Angeles-San Francisco run. Avro technicians estimate that Jetliner block time would be 1½ hr. (at a cruising speed of 400 mph.); DC-6 block time, 1½ hr.; and 2 hr., 5 min. for the DC-4, showing a saving of ½ to about ¾ hr. with the jet craft.

► **Operational Benefits**—Here are the advantages Avro feels will be inherent in the Jetliner because of its basic features:

- **Jet power.** No propeller purchase, overhaul or maintenance costs; operation possible on wide range of low-grade fuels; simple engine installation, making quick change possible; almost negligible oil consumption; engine and control simplicity; increased aircraft regularity; shorter undercarriage, affording reduced weight and ease of loading and servicing; and reduction in parasite and induced drag.

- **Higher block speeds.** Fewer aircraft required to handle a given amount of traffic; reduced investment in airline equipment; reduced crew expense for a given mileage; and increase in daily revenue mileage.

- **Passenger appeal.** Quiet cabin; high pressurization, giving sea level conditions up to 21,500 ft., permitting fast descent from 25,000 ft. with no passenger discomfort; "warm wall" heating, air being changed once a minute; and trip times substantially reduced.

- **Pilot appeal.** Cruising speeds above

400 mph; exceptionally high rate of climb; high acceleration possible on takeoff; normal landing speeds; engines can be started in air up to cruising altitude; and full directional control with any two engines in operation; little tendency to yaw.

- **Performance.** At 60,000 lb. gross, takeoff run over 50-ft. obstacle, at sea level under ICAN conditions, is estimated to be 3100 ft. At maximum land-

ing weight of 52,000 lb., landing distance from a height of 50 ft., under same conditions, is expected to be 2870 ft.

► **Fuselage Details**—The Jetliner's overall structural makeup is simple and straightforward. Use of complicated castings and forgings are avoided, and, wherever possible, standard sheet and extrusion stock is employed.

Fuselage, about 10 ft. in diameter, is a parallel circular cross-section for approximately 60 percent of its length. Its four main components—nose, front, center portion (carrying the center wing), aft center portion, and tail section (including lower fin)—are bolted together.

To obtain highest strength for the fuselage former rings, stringers are external to the outside former flanges, thus eliminating cutouts and preserving strength continuity. Formers are spaced at approximately 20 in. in the passenger cabin. Fuselage structure is stressed at 16.6 psi.

Entrance doors for passengers and crew are located on the port side at each end of the main cabin. An additional loading door can be provided on the starboard side for the rear baggage compartment. Passenger cabin windows are non-misting circular double panes.

► **Flight Deck**—Windshield structure is a high-strength aluminum alloy casting. The three center panels are of sandwich construction, incorporating the "NESA" system of electrical anti-icing. The vinyl core insures pressure being

XC-102 Jetliner

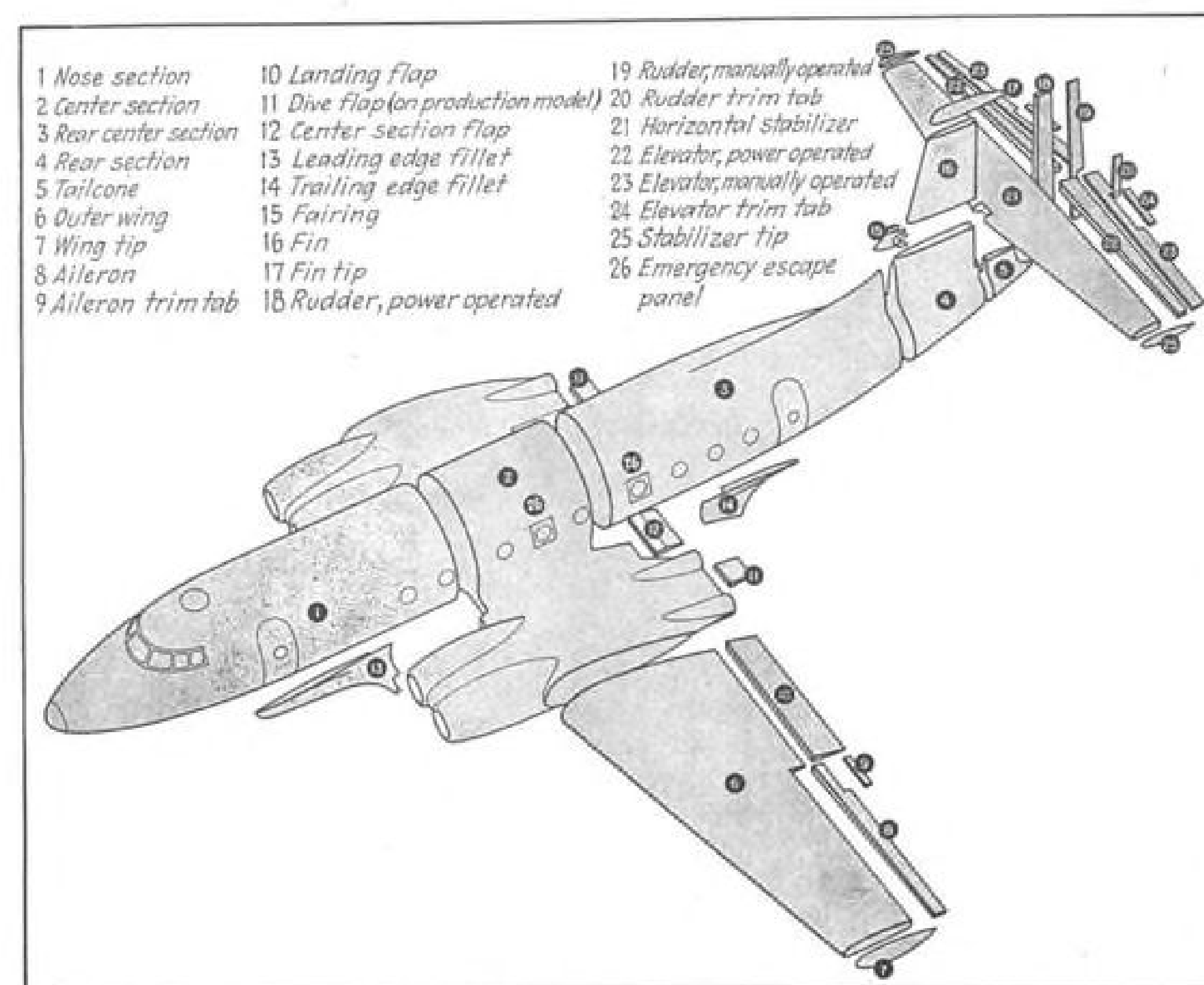
Basic Data

Dimensions

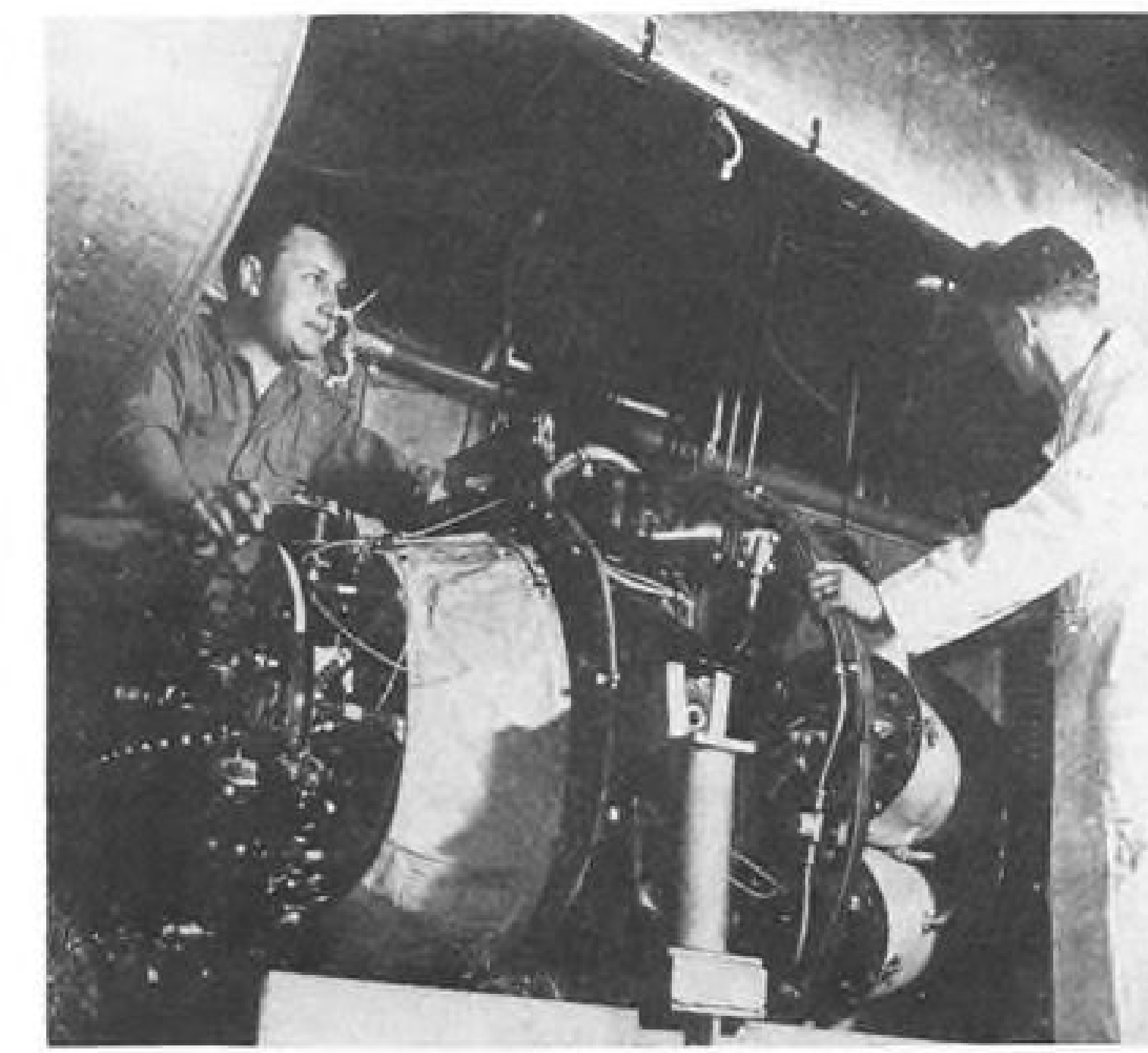
Wing area	Gross, 1157 sq. ft. Net, 1097 sq. ft.
Wing loading at 60,000 lb. gross	51.8 lb./sq. ft.
Wing span	98 ft. 1 in.
Aspect ratio	8.31
Fuselage length, overall	82 ft. 9 in.
Fuselage diameter	10 ft.
Wheel track (mean)	22 ft. 6 in.

Control Areas

Aileron	51.6 sq. ft.
Wing	251.2 sq. ft.
Elevator, total	56 sq. ft.
Fin and dorsal	net, 122.6 sq. ft.
Rudder, total	net, 38.6 sq. ft.
Total dorsal, fin & rudder	161.2 sq. ft.
Landing flaps, outer wing	105.2 sq. ft.
Landing flaps, center section	21.6 sq. ft.
Dive flaps, nacelle (production version)	15.6 sq. ft.
Total landing flap area, outer wing and center section	126.8 sq. ft.
Total dive flap area, nacelle and center section	37.2 sq. ft.



LOW NACELLE, large panels make maintenance easy, and . . .



ENGINE REMOVAL is simple with sling through top of nacelle.

retained in the cabin in event of windshield damage.

Wind-tunnel results on the nose canopy has shown a critical Mach number higher than that of the wing.

Instruments are grouped in accordance with up-to-date requirements of radio navigation and automatic and blind landing aids. Main electrical panel is in the roof within easy reach of either pilot or copilot. Air conditioning control panel is to the left of pilot and oxygen and de-icing control panels to right of copilot. Circuit breaker panels for both electrical and radio equipment are accessible on the aft flight deck bulkhead.

Each seat is adjustable fore and aft and slides back for easy access. Offset control columns avoid obstructing pilots' knees.

Main aircraft batteries are located on the floor aft of copilot. A jump seat, hinging on the battery box, is available for an observer.

► **Cabin Layout**—In the projected 40-50 passenger version, double reclining seats of the armchair type, with hinged center arm, would be arranged on each side.

For high-density work, it is expected that up to 60 passengers could be carried by using 5 seats abreast, with a 19-in. aisle clearance.

In addition to individual reading lights on underside of the luggage rack, cabin illumination would also be by ceiling lights and indirect underseat lighting.

A stewardess position is planned for the aft end of the cabin, with a folding seat and table. An instrument panel is located here for a temperature indicator and control, altimeter, oxygen flow indicator, and clock. A panel with call lights and lighting switches will also be

provided, as well as telephone communication with flight deck.

► **Air Conditioning, Pressurization**—These are integrated into a completely automatic system. Either filtered or ram air is passed from intakes to two cabin superchargers, one on each powerplant gear box. Each supercharger has an air capacity of approximately 30 lb. per min. at 30,000 ft. against a cabin differential pressure of 8.3 psi.

A constant air flow of about 60 lb. per min. at all altitudes is maintained by automatic regulation. Either supercharger is capable of delivering this flow up to 13,500 ft.

Automatic control of cabin pressure is maintained by a discharge valve, set to provide sea-level conditions up to 21,500 ft. At 30,000 ft., cabin pressure is equivalent to 4000 ft. altitude.

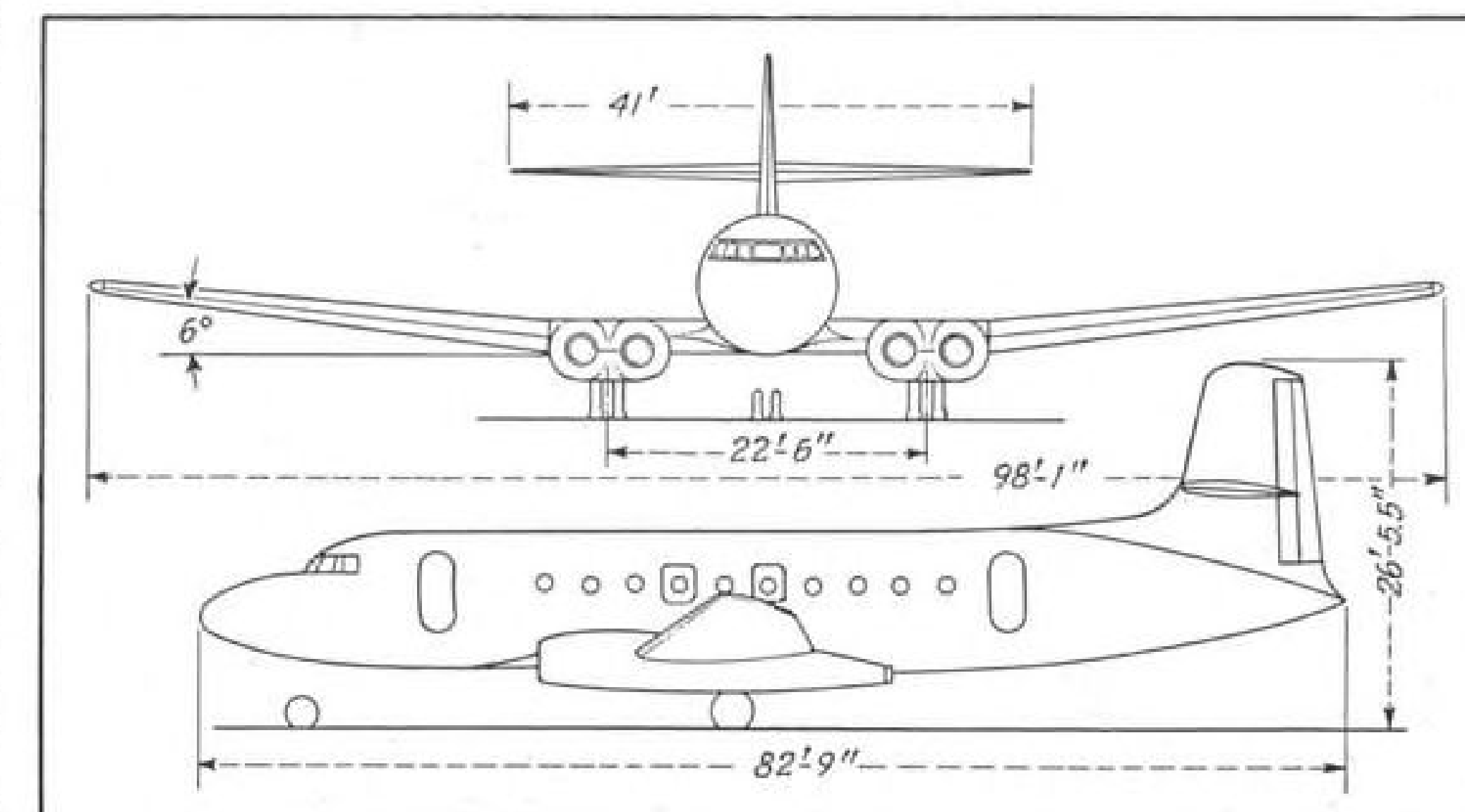
Ventilating air is temperature-conditioned by equipment in the accessory compartment. Heat is supplied by a combustion-type heater of 200,000 Btu. per hr. capacity. Cooling is ac-

complished by means of heat exchangers and a cooling turbine.

Tempered air is distributed to the cabin through the main supply duct to wall ducts which utilize the space between the Fiberglas insulation blanket and the cabin trim. Air is discharged above head level through a grille in the baggage rack. Air exhaust from cabin to underfloor space is through floor-level grilles. The air is finally discharged through a valve on the fuselage bottom.

► **Wing**—Since the plane was designed as a medium-speed transport, a compromise had to be made between high- and low-speed characteristics in selection of the airfoil. It obviously was essential to cut the drag to a minimum and, at the same time, obtain the highest $C_{L, max}$ for takeoff and landing performance.

The section chosen was a comparatively thick NACA series airfoil, affording ample fuel storage capacity. It is considered to have very high gust resistance



characteristics—necessary for fast flying in rough air.

Washout was considered but did not seem to offer any great promise, because although it gave slightly better stall characteristics, the effect of the extra induced drag at high speed was less favorable, and manufacturing difficulties would also be increased.

The extended wing fillet takes care of fuselage upwash and prevents premature root stalling. On the production version, wing fillets will have air intakes for cabin heat, permitting removal of the air intake on fuselage belly for maintenance work.

The wing is built in three main sections. Center portion is integral with the fuselage center section and carries the four powerplants. It is a conventional two-spar structure with chordwise ribs and heavy gage skin. Spars are twin-boom, solid shear-web type. Outboard panels, also of two-spar makeup, are attached to the center section by continuous butt-strap joints. Heavy-gage skin and stringers afford high torsional stiffness necessary for increased speeds.

In this outer compartment, 75ST is used extensively to insure maximum strength-to-weight ratio.

► **Tank Ailerons, Flaps**—Two integral tanks are contained between spars in each outboard panel. Tanks have a total capacity of 2623 gal. and may be filled through underwing connectors.

The problem of kerosene seepage was solved with extruded, injected and lay-on application of sealant made by Minnesota Mining Mfg. Co.

Ailerons extend approximately 53 percent of the outer wing-span, are unbalanced aerodynamically, and are power-assisted hydraulically in the ratio of 5 to 1. Internal mass balances and a manual trim are fitted.

The split-type landing flaps are hydraulically operated. Additional split-type dive-flaps are fitted on the center wing, and are also scheduled to be installed on the aft section of the nacelle in the production version. The split flaps on the center wing can also be used as landing flaps.

► **Double Rudders, Elevators**—The empennage comprises an upper and lower fin section with high horizontal stabilizer, double rudder and double elevator surfaces.

Lower fin, integral with the fuselage, is a two-spar, twin-boom, shear-web arrangement, with extra heavy gage skin for torsional rigidity. Stabilizer, also of two-spar makeup, is attached to the lower fin by high tensile steel pins through steel end fittings parallel to the spars. Top portion of the fin is fastened to the stabilizer by the same method.

Elevators are piano-hinged to sta-

bilizer, and have a double surface arrangement functioning from zero to "up" to accommodate for adverse CG in a landing flare condition. Rear surface is operated manually, while the auxiliary (front) surface is power operated. Electrical trimmers are fitted, which can be operated manually if desired.

Rudder comprises two unbalanced surfaces, the rearmost hand-operated, and the auxiliary (front) power-operated. Both are carried on piano hinges on the port side. Normally, the manual surface only is required, the auxiliary surface being brought into play only in the event of engine failure at low speeds. A trim tab is provided, which can be manually operated during operation of the manual surface, and electrically operated when the auxiliary surface functions.

On the production version, the manual elevator or rudder portion would reach the end of its travel and then cause the power-operated section to come into play.

► **Powerplants**—Four Derwent 5 jet engine are mounted in pairs in two underslung nacelles also housing the main landing wheels. Each engine is rated at 3500 lb. static thrust at sea level, ICAN conditions.

Accessories driven by the engines are mounted in each nacelle on a gear box located between engines and attached to the wing front spar. Oil tank and oil system are an integral part of the engine.

Upper half of the cowl is a permanent structure provided with small access doors for an engine sling, and a larger door to permit access to the upper part of the accessory gear box. Lower half of the cowl consists of large panels swiveling to the side of the nacelle and one panel swinging to the rear, providing excellent access to engines and accessories. Panels are locked via flush type, quick release fasteners. The two main panels can be detached quickly.

Each engine can be replaced in about 15 min. by uncoupling the jet pipe, drive shaft, connectors, detaching the engine from the mount and lowering it directly to an engine dolly.

The jet nozzles slope down 7 deg. to bring the jet line of action as close as possible to the normal CG position.

The methyl bromide installation provides for two shots to each engine. A carbon dioxide fire extinguishing system is provided for the gear box compartment.

A water methanol system is installed to increase thrust for takeoff under hot weather and power at altitude conditions.

► **Fuel System**—Each group of two engines has its independent fuel system.

Fuel from any tank, however, can be delivered to any engine. The system installation is simple and handled through two selector switches, each operating selector valves. When set for start-up, they need not be touched until all fuel is used from the four tanks. If switch is set at inboard tanks, the selector valves are sequenced from outboard to inboard tank, then to engine. Setting would be for outboard tank only when this tank's fuel was to be used for any two or all engines.

A signal light system permits pilot to check instantaneously the operational conditions of the fuel system, on a diagram located at the top of the central instrument panel.

Fuel gages indicate quantity of fuel in the tanks to within 2 percent. Any appreciable difference in weight of fuel carried on either side of the aircraft is indicated by a warning light, enabling pilot to correct the plane's trim by manual selection of tanks.

► **Hydraulic System**—This operates at a normal pressure of 1800 psi. Cut-out pressure is 2200 lb. plus or minus 200, and relief valve pressure is 2700 lb. plus or minus 100.

Power is via two constant-pressure, variable-displacement, engine-driven pumps providing duplication against failure. Operated by the main system are undercarriage, brakes, nosewheel steering gear, landing flaps, dive flaps, and aileron power booster.

In addition, an electrically driven hydraulic powerpack is provided for emergency, in the event of main system failure.

► **Anti-Icing System**—A high-capacity alternator mounted on each engine gear box supplies power to the anti-icing system comprising resistance wire embedded in pads attached to the leading edges of outer wing panels, fin and horizontal stabilizer, together with cycling relays to turn power on and off, and system protection units.

A warning light system is installed to indicate improper functioning of the system. The alternator has voltage regulation and temperature protection, and has an additional safety unit which insures satisfactory operation at the extreme ends of the engine speed range under full load. A safety device is also installed on the pad system to prevent burnout in ground tests.

► **Undercarriage**—Nosewheel unit retracts forward into the use cavity in front of the forward pressure bulkhead, while the main units, hinged adjacent to the wing rear spar, retract forward between the spars, and in up position lie between the jet pipes.

Wheel rims are made to American Tire and Rim Assn. specifications, enabling standard tires to be fitted.

New Jet Engine Oils



Another PLUS for Socony-Vacuum!

A PIONEER in aircraft lubrication since the Wright Brothers' first engine, Socony-Vacuum continues to keep pace—pioneering jet engine lubricants—developing oils that surpass Air Force Specifications—used in the latest jet fighters and long-range jet bombers.

Latest of these new oils is Mobil Aero Multi-

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SOCONY-VACUUM OIL CO., INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

Widest Wingspread

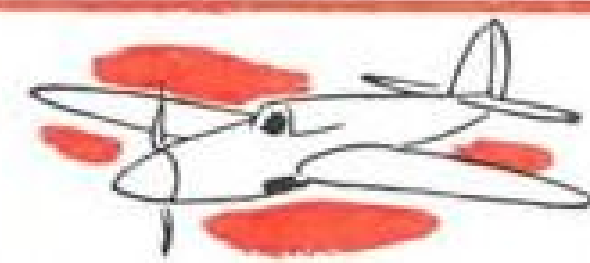
ON U.S. AIR LANES—

Flying Horsepower





Here's why South Wind



HEATS THE NATION'S LEADING AIRCRAFT!



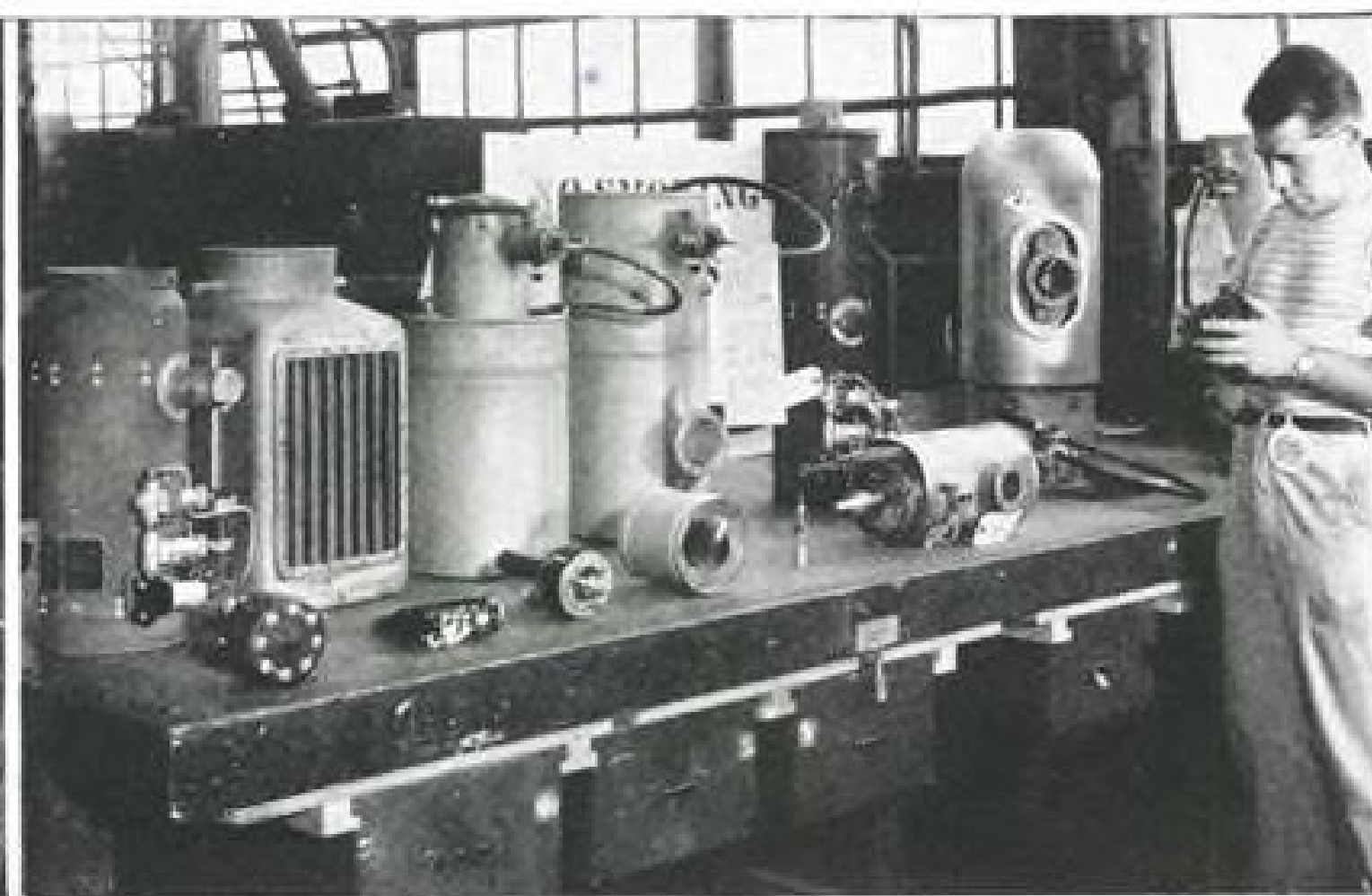
South Wind Engineering developed the first combustion heater to be used in production aircraft. Ever since, South Wind has been designing and building lightweight aircraft heaters unsurpassed for long-life performance, safety and dependability—specifically developed for the individual requirements of every known type of aircraft. Today, South Wind equipment heats the nation's leading aircraft.



South Wind Research and Development Facilities are second to none! This large Altitude Test Chamber is typical of the specialized equipment that insures top-notch dependability from every aircraft heater built by South Wind. Each model is subjected to the most rigorous life and performance tests at altitudes in excess of 40,000 feet and refrigeration to temperatures below -65°F .



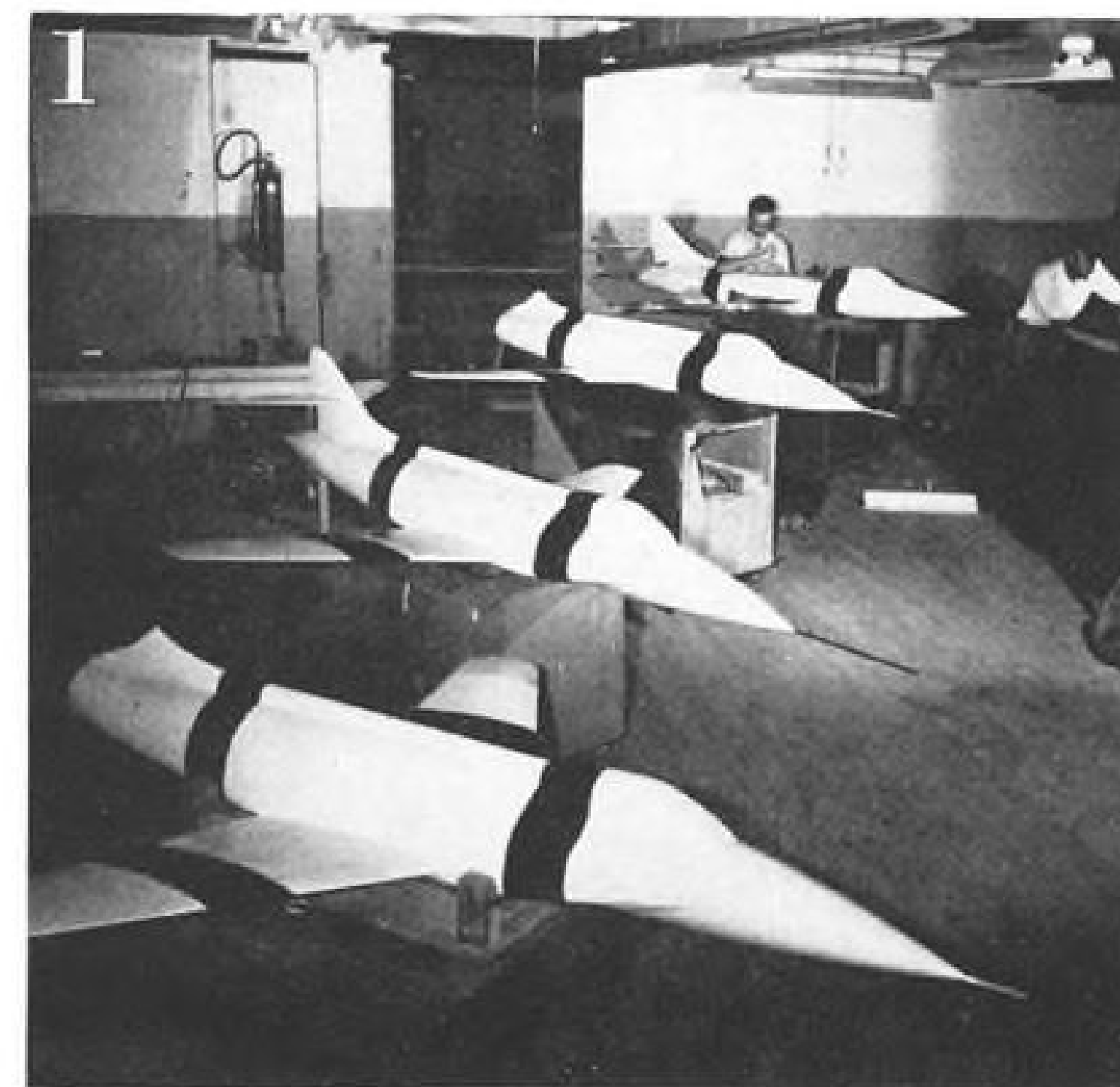
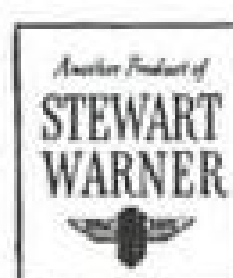
South Wind Production Facilities are specifically adapted to the specialized techniques of aircraft parts production. Only government certified welders, for example, work on South Wind aircraft heaters. This heli-arc welding of the tube bundle on an aircraft heat exchanger requires top-notch precision and skill to withstand the great thermal stress of exhaust-gas flow in high-altitude operation.



United States Air Force Standards are met by every South Wind aircraft heater, regardless of whether it is built for military, commercial or civilian use. Rigid government inspection is satisfied before any South Wind heater leaves the plant for aircraft installation. That's why manufacturers of the nation's leading aircraft depend on South Wind heating equipment for utmost safety, maximum efficiency and minimum maintenance.

South Wind stands ready to help you solve your aircraft heating problem. From 25,000 to 800,000 BTUs per hour, South Wind Heat Exchangers or Combustion-type Heaters are adaptable to any type aircraft. For specific model information or expert assistance on development or production, write now to the South Wind Division, Stewart-Warner Corporation, Indianapolis 7, Indiana.

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AIRCRAFT HEATING AND
THERMAL ANTI-ICING EQUIPMENT



How Models Cut F-90 Development Cost

Accurately scaled test models have played an important role in the design and development of Lockheed's F-90 twin-jet fighter—newest in the Air Force flock.

Although the craft is slated for flight-testing at Muroc for almost a year, much of the data which ordinarily would have to be gathered in the trials already have been obtained with these pre-test models.

For example, dropping the models from altitude have afforded about half the information commonly supplied through risky dive trials. While cost of making such a test vehicle was high, since it was destroyed in a single flight, Lockheed engineers estimate that many thousands of dollars were saved with

reduction in amount of testing normally required with the completed plane, not considering the minimization of danger.

Makeup and applications of these scale configurations in the advance test program are shown in the accompanying photos:

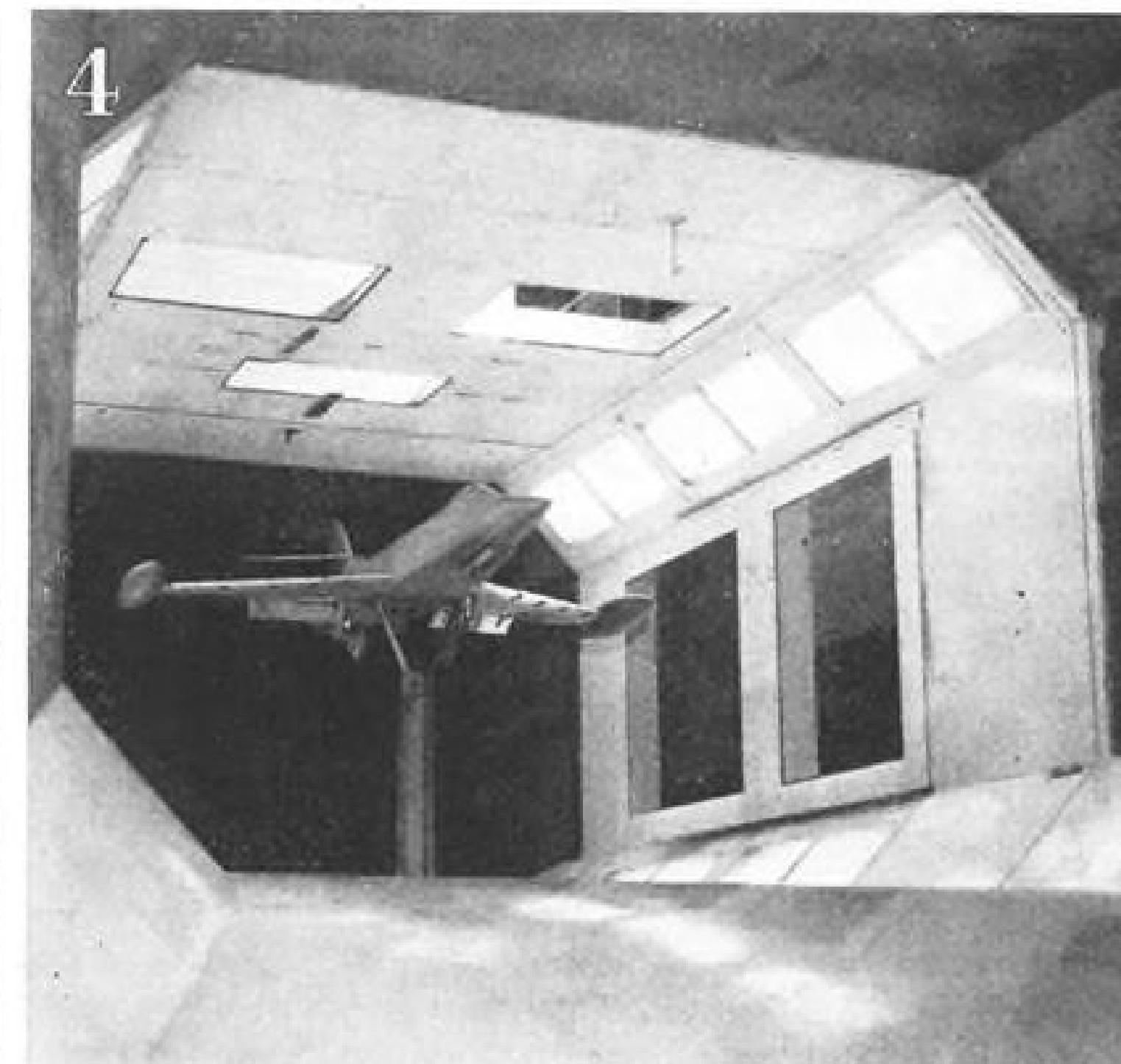
1 Production line for F-90 drop test models, prior to final development of the aircraft. Sweptwing units are constructed of steel and plastic and finished to within few thousandths of an inch accuracy.

2 Lockheed engineer uses miniature scale model to investigate vibration frequency of F-90's swept airfoil. All parts of the structure were studied to determine response to vibrations and

buffeting expected at maximum speed.

3 Scale model attached, inverted, to belly of P-38, to be carried aloft and dropped from 35,000 ft. for high-speed descent. Flight characteristics were observed via radar tracking. Tiny radio within model transmitted continuous control force air load data.

4 Another scale model is checked in Lockheed's 300-mph. tunnel for landing characteristics with gear and flaps extended and with tip tanks installed. Other runs were conducted to study flight characteristics. Other tests were run at Caltech's huge cooperative wind tunnel and in Air Force's Dayton spin tunnel.



Plastics Proving

How stepped-up testing is done by National Bureau of Standards.

Increasing use of laminated plastics in aircraft, particularly in accessories and semi-structural parts, such as bulkheads, partitions, linings, propellers, wing flaps, and ducts, has stressed the need for more comprehensive data on effects of weather, temperature, and humidity on properties of these materials.

To evaluate these plastics and prepare adequate specifications, the National Bureau of Standards, under sponsorship of the National Advisory Committee for Aeronautics, initiated a study to determine effects of outdoor weathering, accelerated weathering and accelerated service conditions on the weight, dimensions, and flexural properties of representative phenolic and unsaturated-polyester plastics.

For accelerated weather testing specimens were subjected to cycles of ultraviolet light and fog, while accelerated service tests consisted of cyclic exposure to various temperatures and relative humidities.

► **Plastics Studied**—Test materials were commercial products, and included laminated plastics and a macerated-fabric-filled phenolic plastic, types commonly employed in aircraft. These materials were (first figure following the designation is average thickness in inches; second, density in grams/cu. cm.; third, number of plies):

Glass-fabric, unsaturated polyester, .116, 1.70, 7.

Grade AA phenolic (asbestos fabric, reinforced), .149, 1.50, 5.

High strength-paper phenolic, .121, 1.43.

Grade L phenolic (cotton fabric, reinforced), .125, 1.34, 19.

High strength-paper, phenolic, .124, 1.43.

Muslin-cotton-fabric, unsaturated polyester, .131, 1.27, 7.

Grade C phenolic (cotton fabric, reinforced), .122, 1.36, 7.

Enameled-duck-cotton-fabric, unsaturated polyester, .145, 1.37, 6.

Lignin paper, .128, 1.38 (included to serve as a control on severity of tests, because of the known dimensional instability of this type of plastic).

Macerated-cotton fabric phenolic molding compound, .121, 1.37 (specimen was in sheet form prepared from a molding compound, while all other materials were laminated sheet.)

► **Test Conditions**—Sets of specimens, mounted on racks at an angle of 45 deg. facing south were exposed to outdoor weathering on the roof of an NBS building. At the end of two years, weight and dimensions, and flexural properties were determined on these specimens.

In the accelerated weathering test of alternate exposures to ultraviolet light and misty atmosphere, one set of specimens was used to measure weight and dimensions. From another set, flexural properties were determined after exposure to simulated conditions for 120, 240, 360, and 480 hr., respectively.

Six accelerated service tests involved exposure to cycles of temperatures from 70 to 175 F., relative humidities from 5 to 100 percent, and ultra-violet radiation. In each of the tests, weight and dimensions of one set of specimens were measured after 1, 3, 5, and 10 cycles.

The flexural properties were determined on other sets at the end of 5 and 10 cycles.

► **Criteria**—Changes in weight, dimensions, and flexural properties were the criteria used in analyzing the data obtained during the investigations. In most of the tests, changes in weight and plane dimensions were negative, any positive changes being encountered in thickness. There were several instances where an increase in flexural strength resulted from accelerated weathering and service conditions. This strength increase was attributed to further cure of the resins.

Results of laboratory aging tests did not, in all cases, correlate with the results of outdoor weathering. A laboratory evaluation procedure for a material must therefore be selected on the basis of the materials, properties to be determined, and conditions of service.

An accelerated service test consisting of alternate exposure for 24 hr. at 175 F. and 95 to 100 percent relative humidity, followed by 24 hr. at 175 F. and a relative humidity of less than 5 percent, was the most severe used in the investigation. All materials, except the asbestos-fabric phenolic laminate, increased in thickness during the trials. Only this material increased in flexural strength and flexural modulus of elasticity on exposure to this accelerated service test.

Asbestos-fabric phenolic and glass-fabric unsaturated-polyester laminates were the most resistant of the materials tested. The paper-base phenolic laminates were not so stable in weight and thickness after outdoor weathering as the other materials tested. These results indicate that the most resistant laminates are those made with materials which are least affected by water.

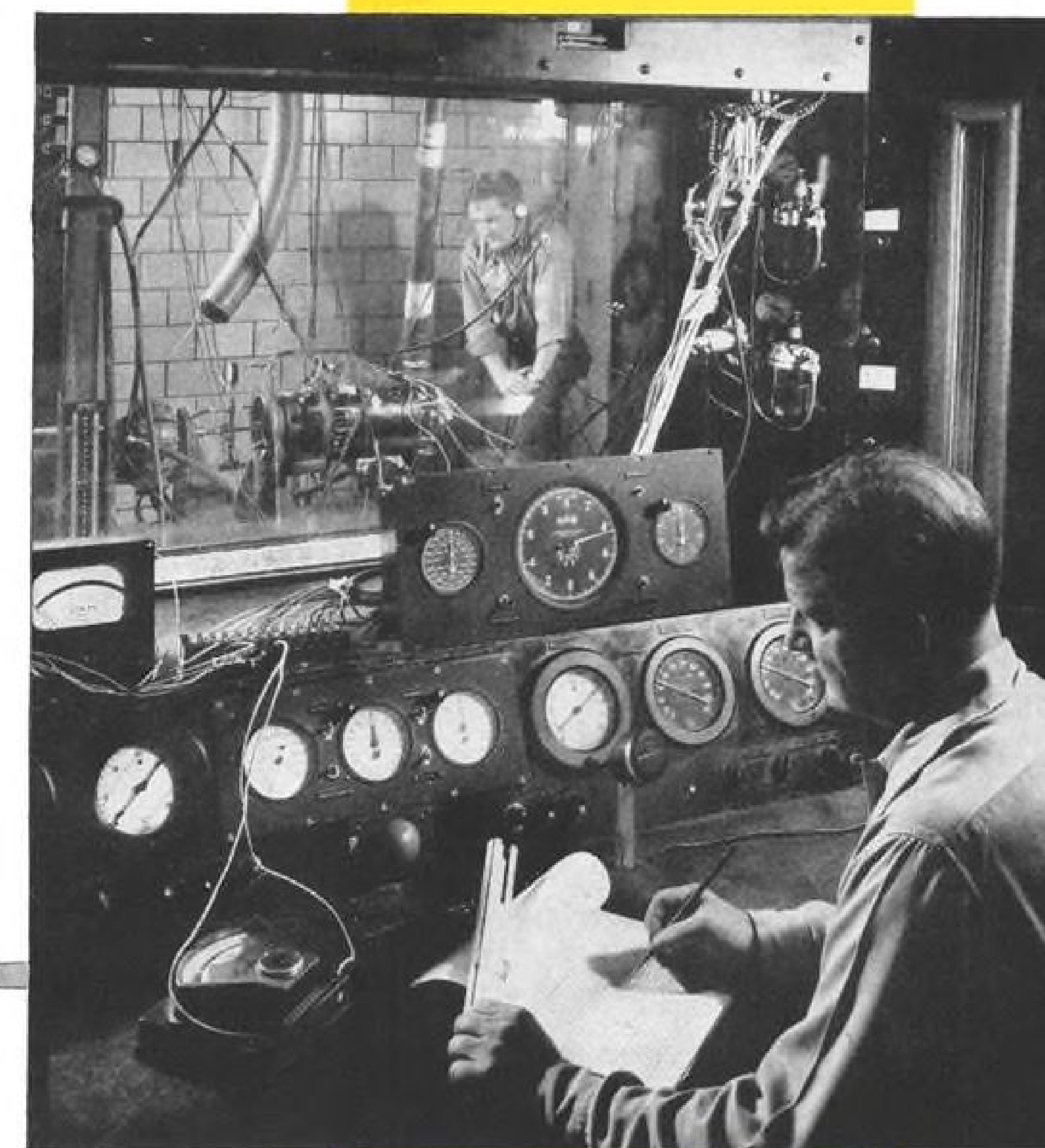


"MORE" PROP FOR SAME DIAMETER

New Curtiss Electric 15-ft. propeller, with blade activity factor of 120 as against 75 in former model of same diameter, has been approved by Civil Aeronautics Administration for unrestricted operation on L-749 and L-749A Constellations up to 107,000 lb. gross. New design embodies more effective blade area, affording greater thrust, particularly for takeoff and climb, and shorter takeoff run. Smoother flight with this prop is reported, with boost in plane

cruise speed over that with former model. Latter had spinner to improve engine cooling, whereas tests with new model have indicated that improved cuff geometry eliminates need for spinner. Propeller has been installed on first of the Connie fleet delivered in September to KLM-Royal Dutch Airlines. Similar units are slated for craft for Air France, Air India, and South African Airways. New model is designated C634S, uses No. 830 blade design.

STAMINA BEGINS HERE!



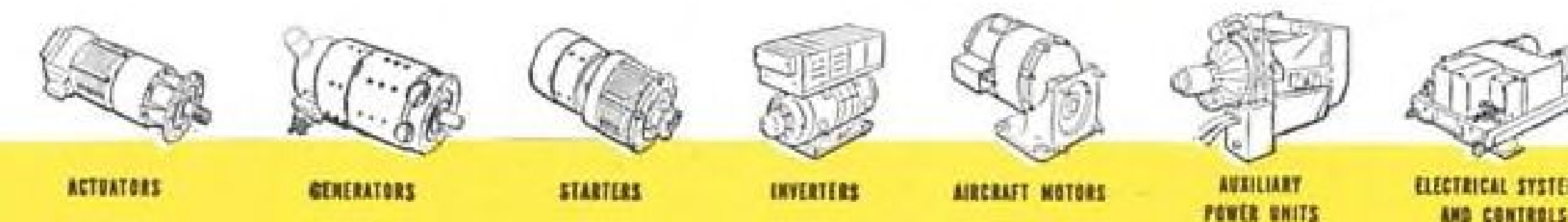
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Men like *you* have learned a vital fact about Jack & Heintz *precision* aircraft equipment—ounce for ounce, it delivers more amps, more torque, more punch—all with dependability.

Your superior aircraft deserves our superior accessories.

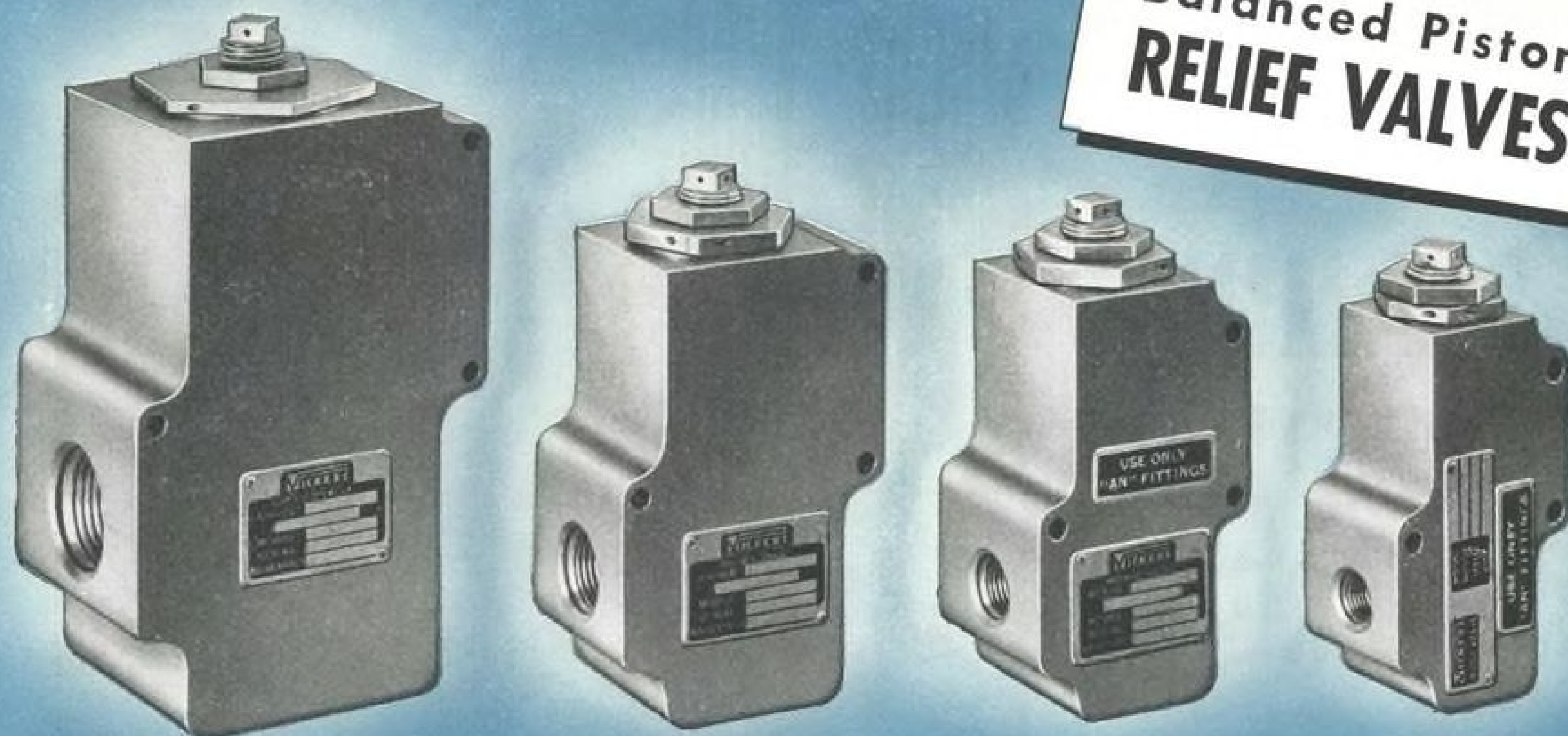
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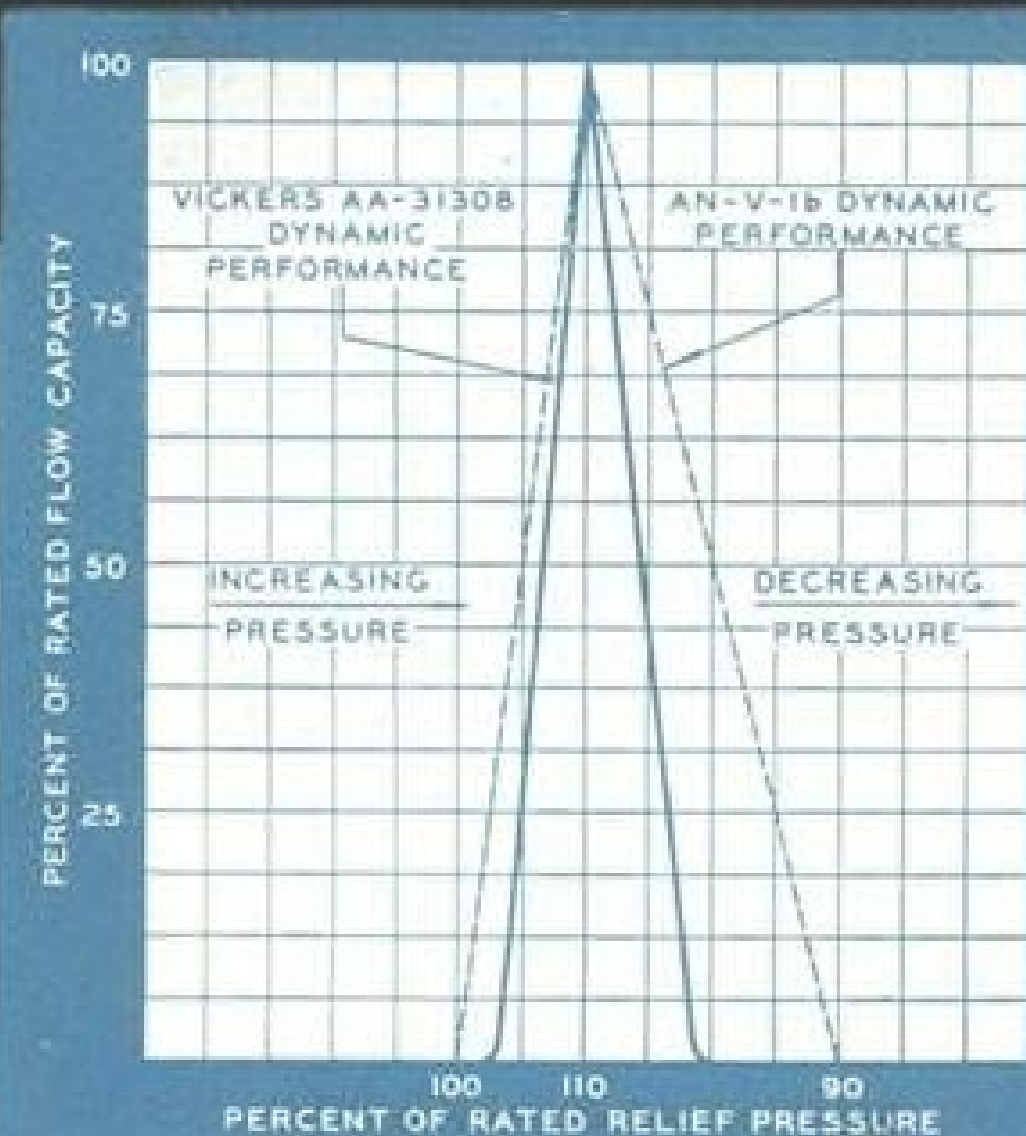


IMPROVED RELIEF VALVES

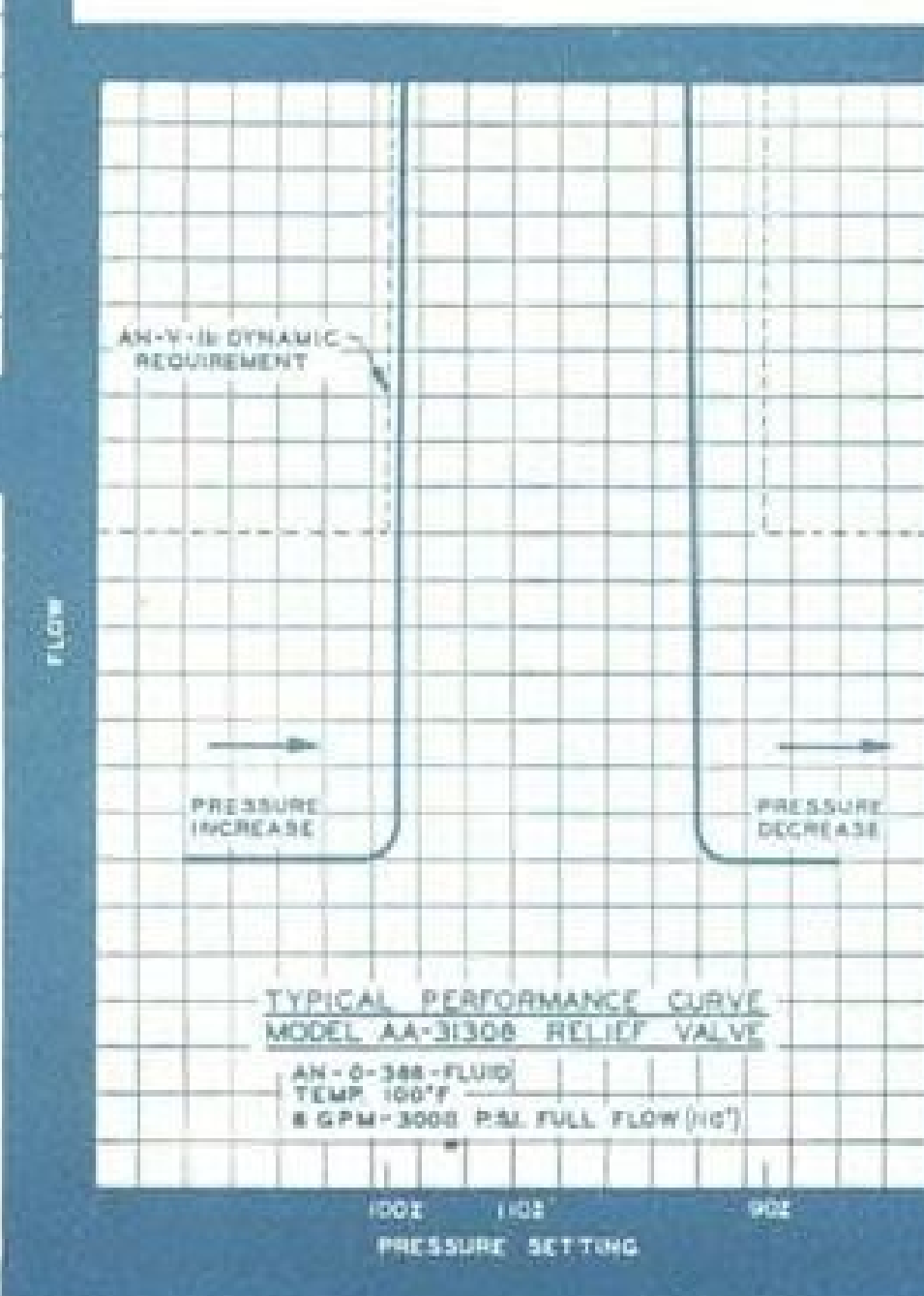
VICKERS Two-Port Balanced Piston RELIEF VALVES



for Aircraft Hydraulic Systems



(Above) Pressure variation from cracking point to maximum rated capacity of Vickers Balanced Piston Relief Valve is considerably less than permissible by AN Standards. Consequently less pressure differential is required between relief valve setting and unloading valve pressure. (Right) Curve showing extremely low internal leakage of Vickers Balanced Piston Relief Valve.



These Vickers Two-Port Balanced Piston Relief Valves (AA-31300 Series) have internal leakage characteristics which are less than required by AN Specifications. Their rated capacities (3, 6, 9 and 24 gpm) are also greater than required by AN Specifications (1.2, 3.5, 6 and 16 gpm respectively), yet dimensionally they comply with the AN envelope. Temperature operation range is from -65° to $+160^{\circ}\text{F}$ with approved AN type hydraulic fluid.

Smoother operation and greater accuracy throughout a wide range of pressure adjustment are other important advantages. Operating pressure range is adjustable from 500 to 4500 psi without parts change.

Ask for Data Sheet No. 125147.

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Engineers and Builders of Oil Hydraulic Equipment Since 1921

Fog Preventer Claimed by Inventor

A West Coast company claims to have developed a process which would carry a guarantee to bring about a 50-percent reduction in fog over a 12-month period at any airport.

Known as Hygrotrol, the process reportedly has been tested successfully at California's San Jose and Sacramento Municipal Airports. It depends primarily on a "secretly compounded battery" invented jointly by C. R. Pleasants, Sr., president of Hygrotrol Corp., San Jose, and his son, secretary of the firm.

► **Preventive**—The process works on the principle of producing "trigger-like actions at vital responding points in the meteorological cycle" to create atmospheric conditions inimical to fog. It is said to be most effective when employed as a preventive rather than dispersal measure.

According to Pleasants, weather conditions at a particular airport and size of the field determine location and number of units needed. Each installation is contained in a $4 \times 4 \times 6$ -ft. housing which can be designed for placing underground or for submerging in waterways.

The company states that, during a three-month test last winter, Hygrotrol reduced by 57 percent the number of hours Sacramento Airport was closed to instrument flight—compared with average closed hours of the same months in the previous eight years.

► **Seems to Work**—To suggestions that, by coincidence, clear weather just naturally prevailed more than normally at the time, Pleasants asserts that areas surrounding the airport experienced some of the worst fogs in years.

To back his claims, the inventor produces figures which show, with Hygrotrol installed for two months, average visibility and ceiling at San Jose Airport was 53 percent better than at Moffett Field, only eight miles away.

The firm already has approached the Civil Aeronautics Board to secure a permit to install its equipment at Washington National Airport. It also is attempting to interest the Port of New York Authority in running tests at La Guardia Field.

It has offered to pay costs for installing the equipment if, after six months, Hygrotrol does come up to requirements.

► **Non-Patentable**—Pleasants claims the elusive nature of his process makes it difficult to patent, while he can secure certain parts of the equipment, he cannot patent the principle on which the process is based. For this reason, he says, details of Hygrotrol operation cannot be revealed.

AVIATION WEEK, October 3, 1949

THE SPOTLIGHT IS ON

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Versatile Electro-Mechanical Equipment

ROTORAC

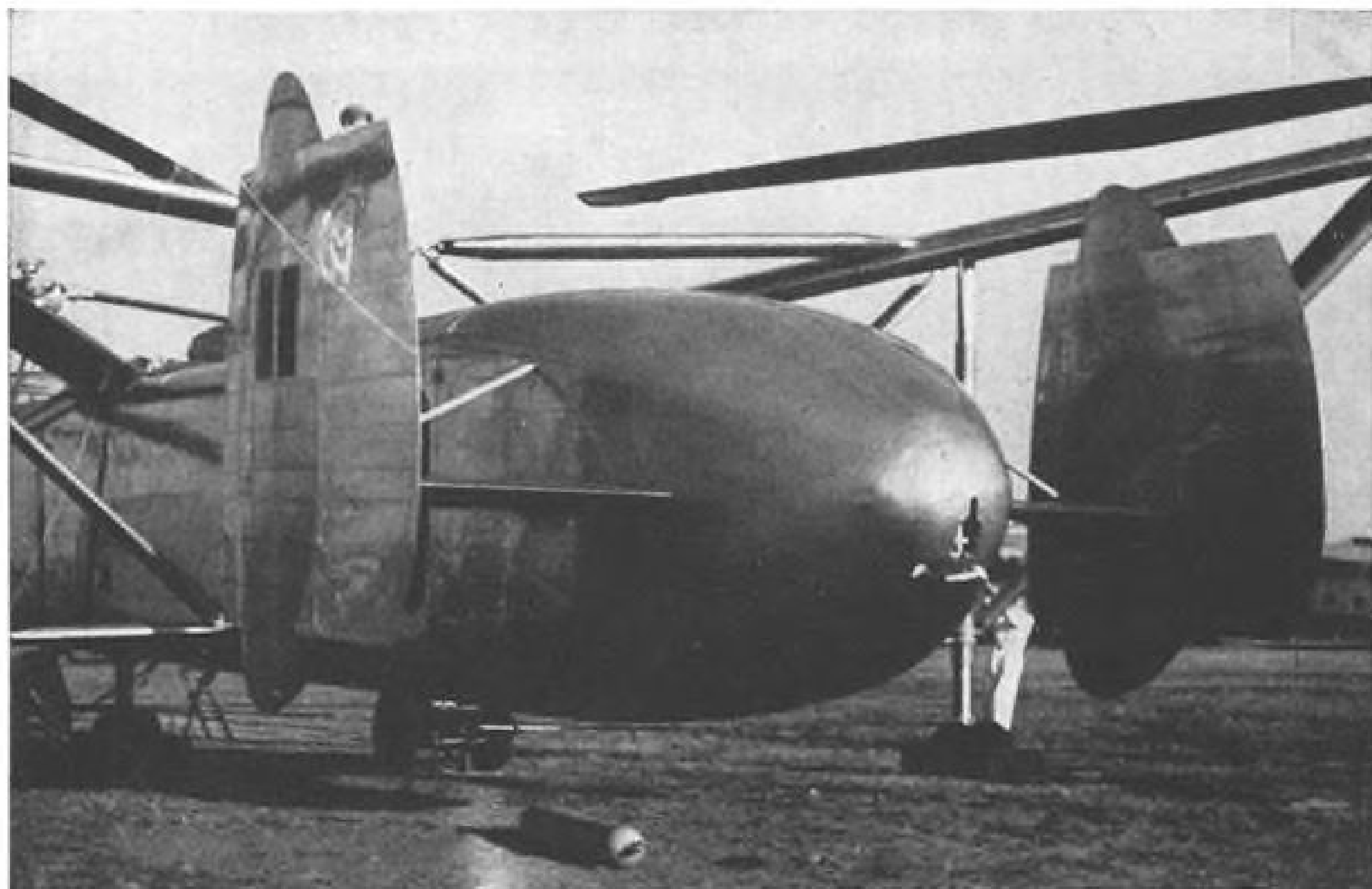
ANGLO

OCT. 6-7-8 THE S.A.E. SHOW
BILTMORE HOTEL, LOS ANGELES, CALIF.

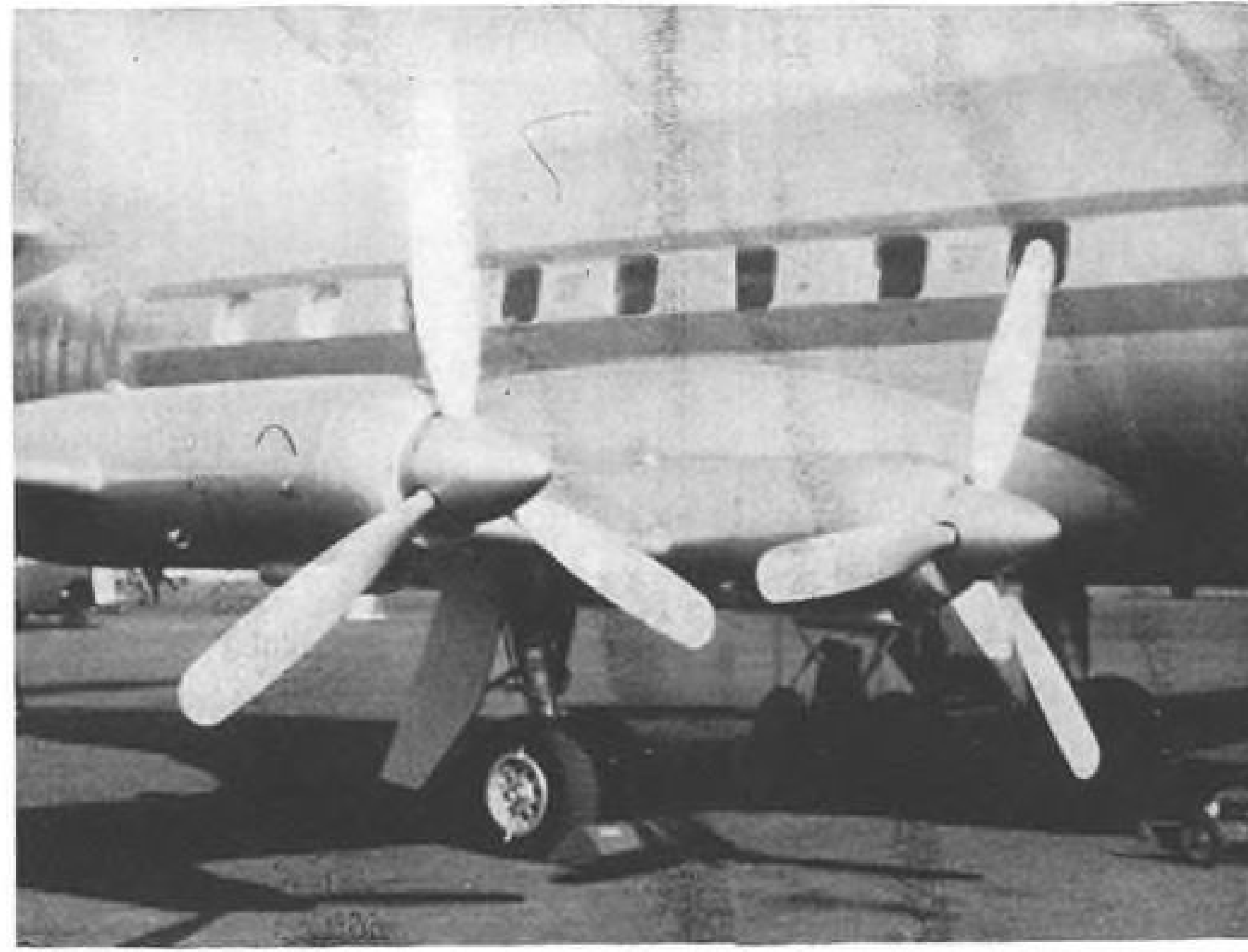
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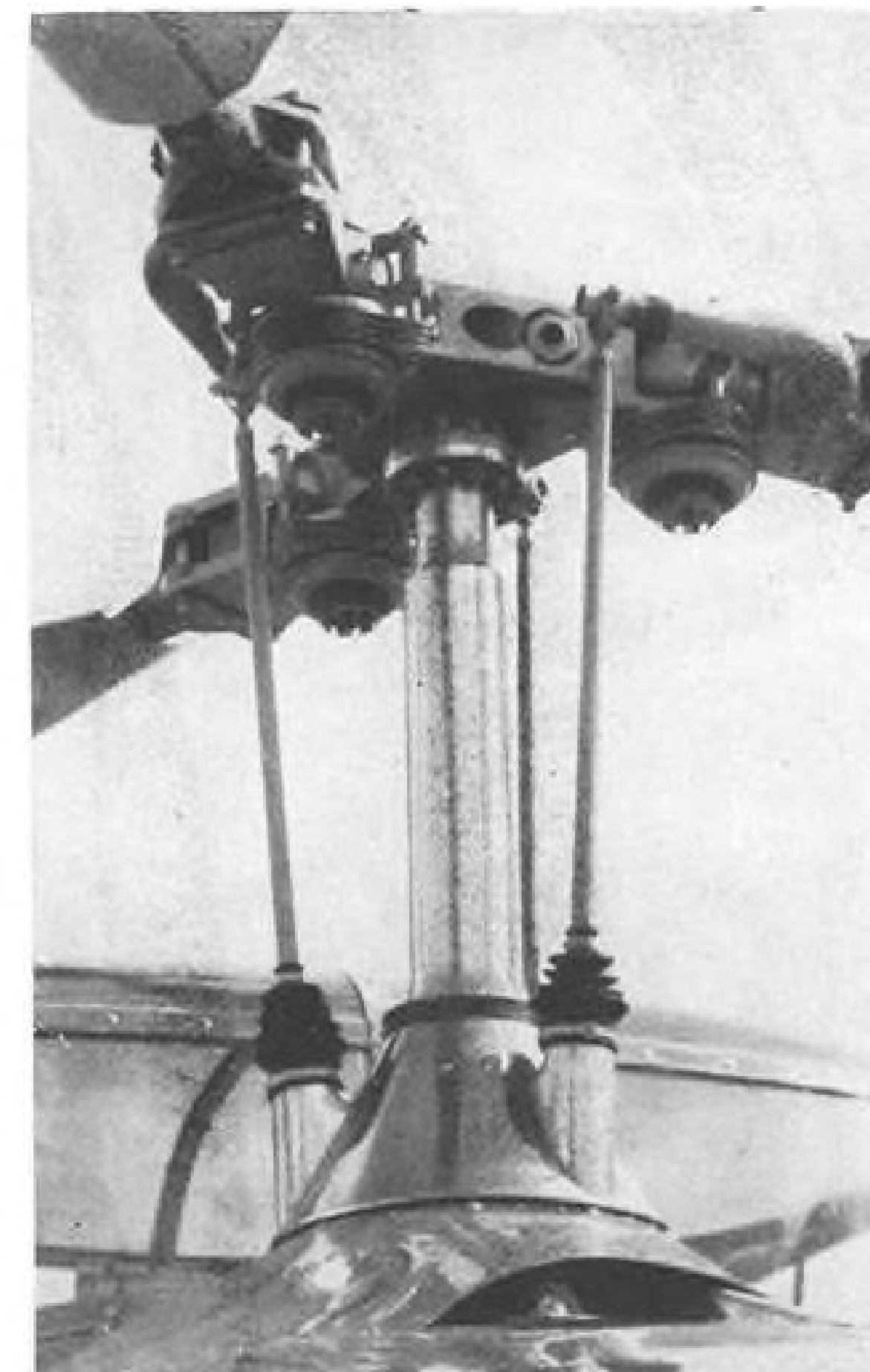
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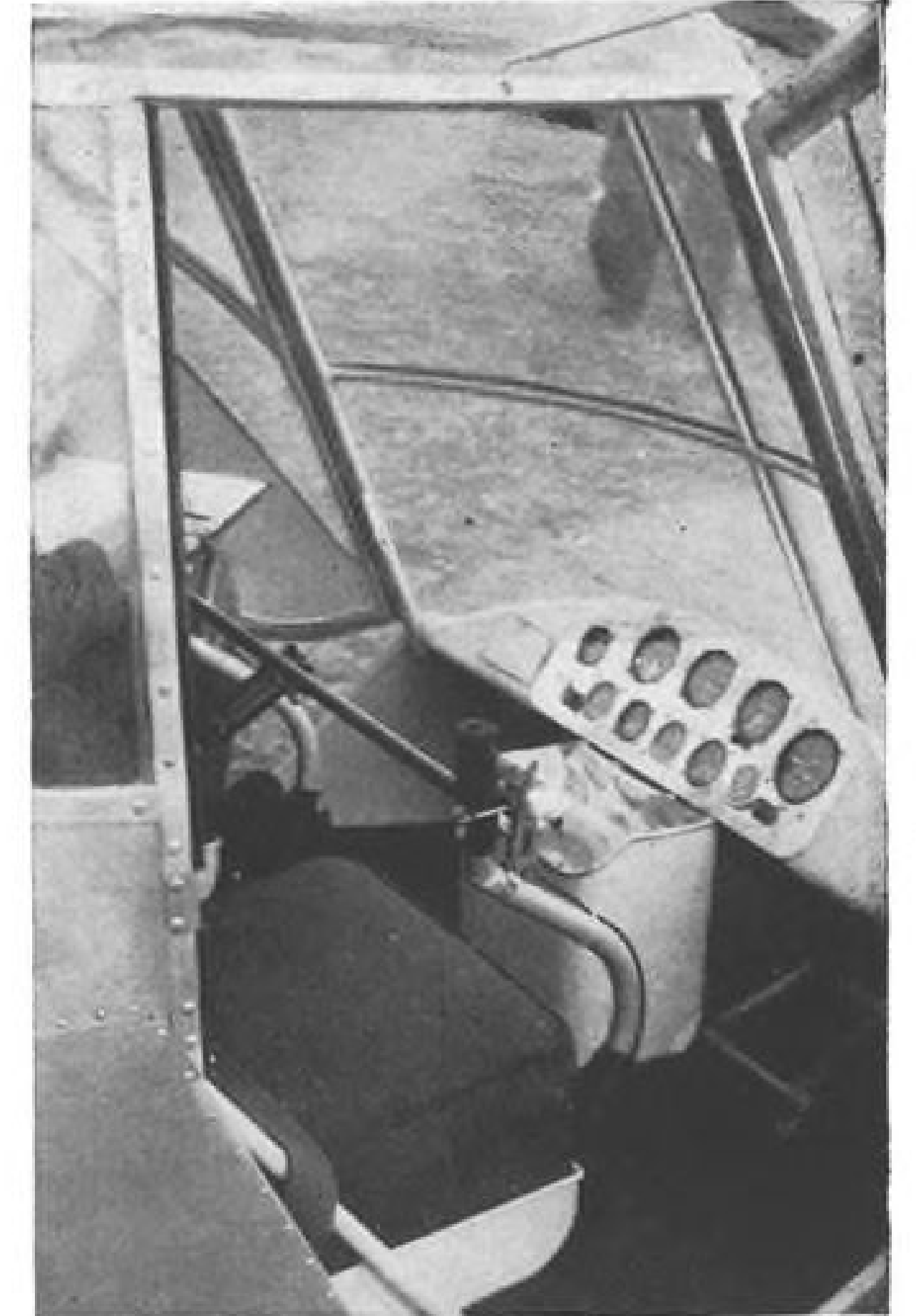
AIR HORSE: Depicted are details of the double tail on Cierva's huge helicopter, redesigned to provide improved directional stability and better control.



APOLLO: Small diameter of Armstrong Siddeley Mamba turboprops (1400 hp. each) is shown to good advantage here.



SKEETER: Rotor hub details on Cierva's Skeeter Mk. II helicopter.



The tiny Skeeter's cockpit is very clean and attractively styled. Good visibility is apparent.

Camera Probes Details of New British Planes

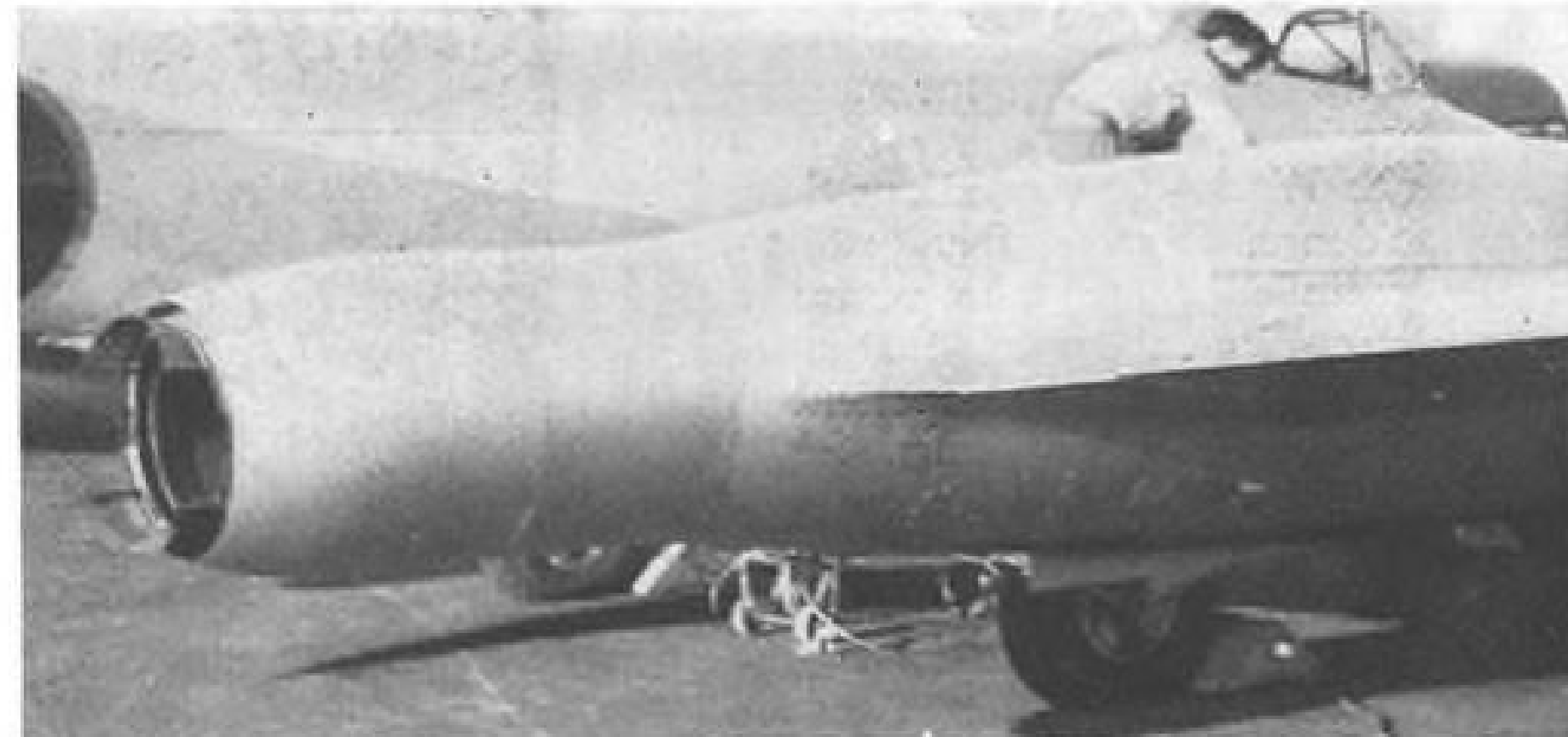
The Society of British Aircraft Constructors' recent show at Farnborough, England, brought out the most interesting British aircraft designs. Realizing

the opportunity for learning British design progress, AVIATION WEEK assigned its news editor, Robert B. Hotz, to on-the-spot coverage. These exclusive

photos were taken by Frederick R. Brewster, McGraw-Hill's chief correspondent in England, with the advice and assistance of Hotz.



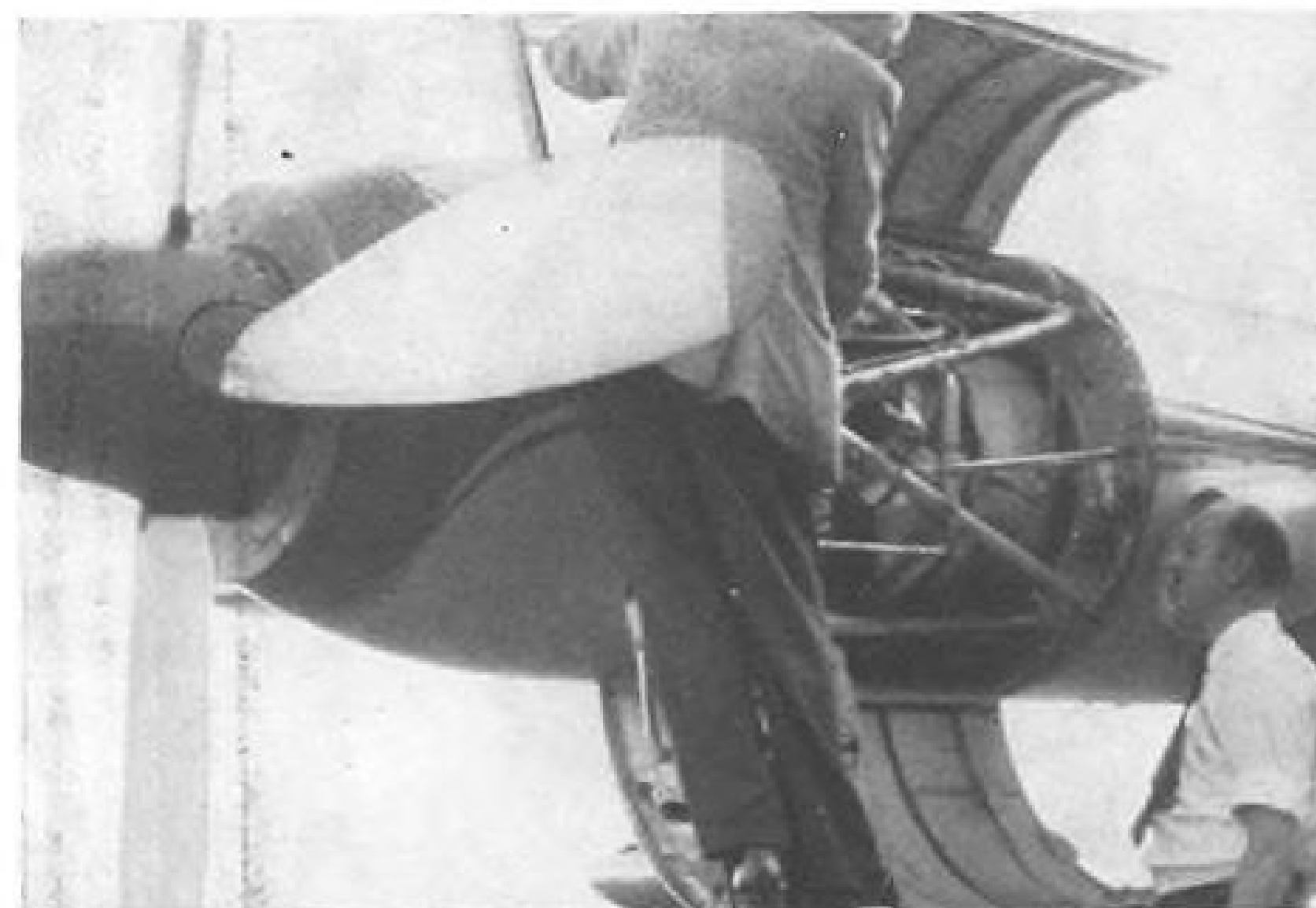
WYVERN: Aviation Week's Bob Hotz points to tail hook on Westland fighter.



METEOR: Derwent engines on this special Gloster fighter is fitted with afterburners (re-heats in Britain). Installation is neatly fitted.



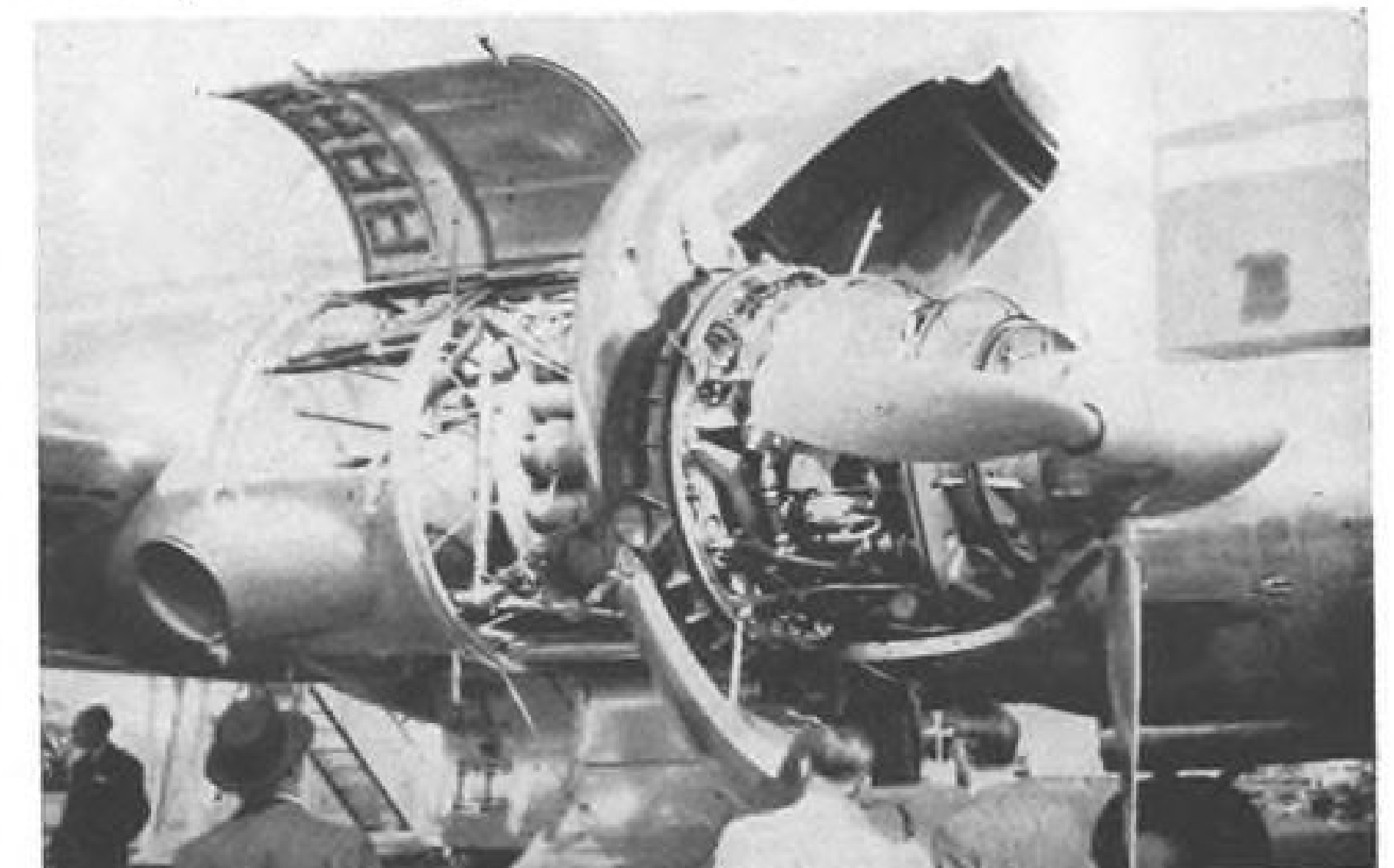
VENOM: Mechanics have easy access to innards of new DH fighter's engine, instruments and armament. Thin airfoil is fitted.



VISCOUNT: Inner cowling open on Dart turboprop shows engine mount structure.



METEOR: New tail on Mk. VII fighter to raise critical Mach number on this Gloster.



HERMES V: Engineers evidently paid a lot of attention to designing Theseus turboprop cowling, shown here "peeled".



Normal tail on Mk. IV Meteor clearly points up extent of modification made on Mk. VIII shown in photo at left.



Buck Rogers come true

Imagine you are Captain Buck, test pilot. You squeeze into the cockpit of a swept-wing turbojet. You check your instruments, jiggle the controls, signal readiness.

You start down the runway and pick up speed. Suddenly, your plane seems to stand on its tail like a maddened shark and hurtle straight into the sky. Behind you stream two plumes of billowing vapor.

Minutes later, you are in thin air, traveling at the astounding speed of *one mile every six seconds!*

Fantastic? Not at all!

JATO (jet assisted take-off) is only one of the many amazing developments of modern aviation. In fact, every art and science known to man is applied in modern aviation.

More than any other industry, aviation reaches into the future. That's why, *today*, it is a golden opportunity for manufacturers.

Right now, in its vital new program of expansion and development, the aviation industry is spending almost *ten million dollars a day!*

No matter what you make or sell, aviation offers a vast new field of opportunities for you. The sky is the limit for those who act *now!*

★ ★ ★

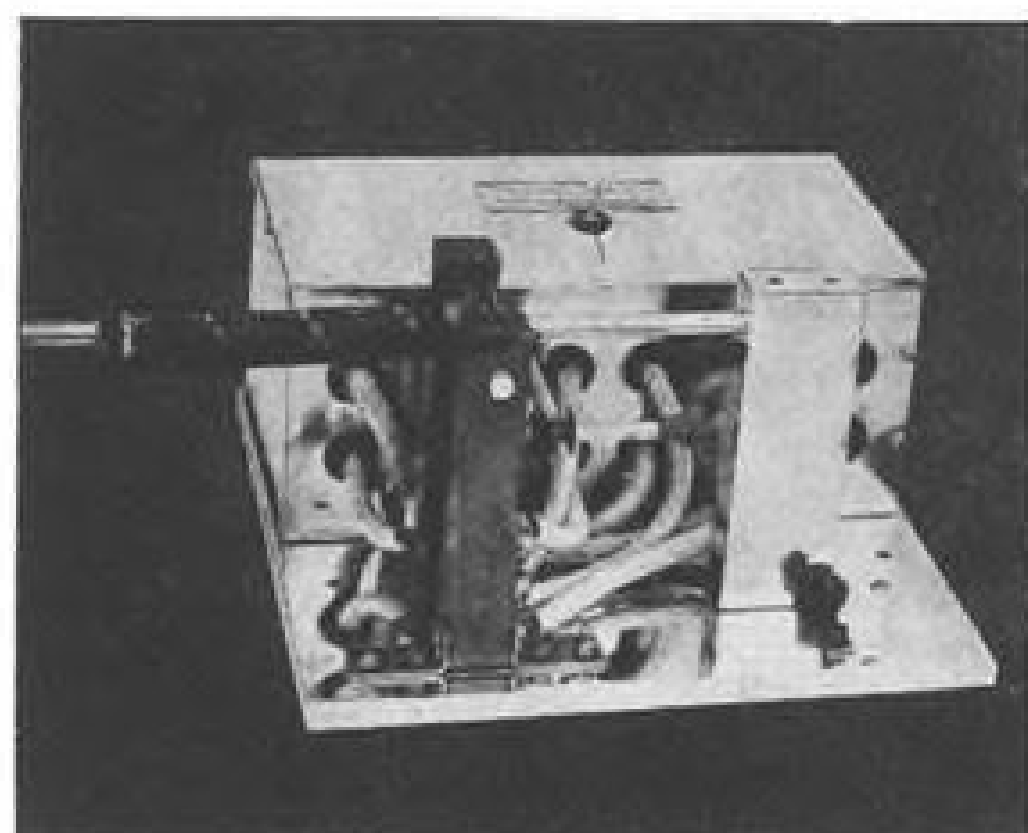
For a detailed outline of the market potential of your products in aviation, write for "Aviation Week—and the Market It Serves." Aviation Week, Dept. A, New York.

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*Look to the Sky
for your market*



NEW AVIATION PRODUCTS

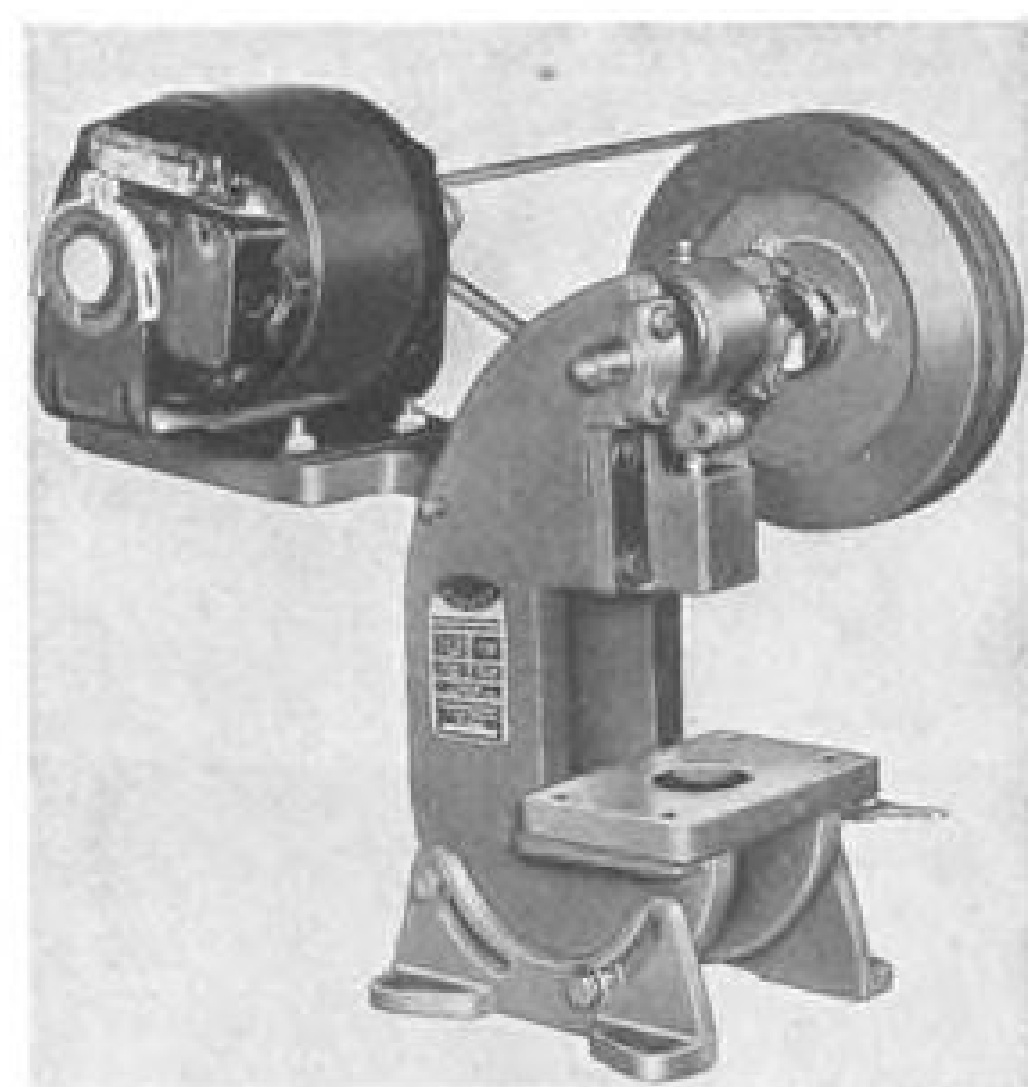


Conduit Assembly Aid

For soldering ferrules to flexible conduits, special bench fixtures, offered by **Durst Mfg. Co.**, Cumpston St., N. Hollywood, Calif., is designed to meet requirements of rapid production assembly lines.

Based on principle of generating heat in conduit instead of applying it externally, device's operation is aimed to prevent cold joints, speed-up production, reduce solder consumption and cut-down number of rejected parts.

Mandrel supporting post holds conduit between spring-loaded electrodes. Mandrel and one of the electrode posts are hinged to permit fast loading and unloading of parts. Since current for electrodes is controlled by switch on top of fixture or by non-locking foot switch, operator has both hands free for handling work and applying solder.



Midget Punch Press

For small punch press jobs now being performed on machines of greater tonnage than actually necessary, **Benchmaster Mfg. Co.**, 2952 W. Pico Blvd., Los Angeles, Calif., offers "Midget" punch press having 1-ton capacity and

capable of continuous, heavy-duty operation.

Weighing only 65 lb. (less motor), device has $\frac{3}{4}$ -in. maximum stroke and $\frac{3}{4}$ -in. hole in ram. Approximate speed with $\frac{1}{4}$ -hp., 1725-rpm. motor is 290 strokes per min. Unit has positive single-trip safety mechanism used in 4-ton models produced by company. Ram can be made to repeat simply by removing one screw. Ram dovetail is gibbed for wear adjustment and ram screw gives $\frac{1}{2}$ -in. adjustment.

Steel crankshaft with $\frac{3}{4}$ -in. o.d. rotates in replaceable bronze bushings and is equipped with sliding key clutch and 20-lb., 9-in. flywheel.

Dimensions for unit are: Height, $17\frac{1}{2}$ in.; die space to bolster plate (ram up), $3\frac{3}{4}$ in.; throat depth, $2\frac{1}{2}$ in. Removable bolster plate is $4 \times 6 \times \frac{5}{8}$ in. with $1\frac{3}{4}$ -in. hole in center.



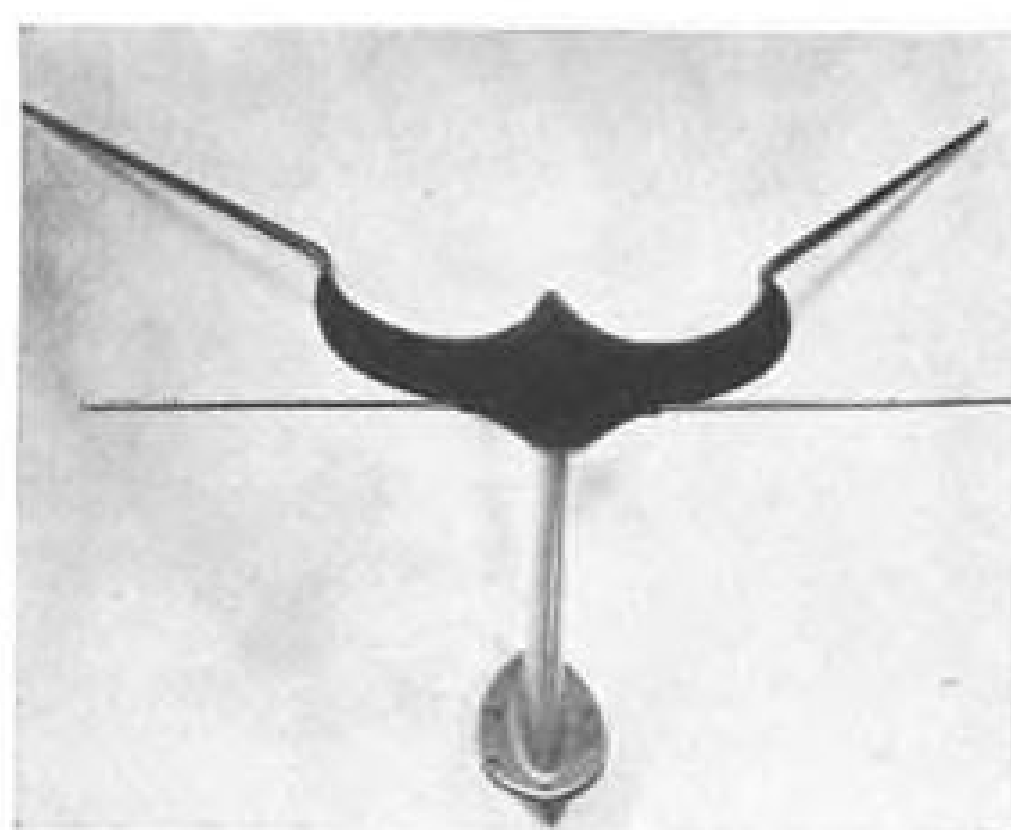
High-Amp. Breakers

Aircraft circuit breakers, having current ratings up to 600 amp. for 28v., d.c. models and 250 amp. for 120v., d.c. units are offered by **General Electric Co.**, Schenectady, N. Y. Interrupting ratings for these devices are 12,000 and 5000 amp. respectively.

Breakers are represented to maintain efficient operation up to 2000 ft. altitude. They are designed with long-time delay reverse current trip mechanisms for use in generator circuits, and with directional or non-directional trippers for other applications. Electrically and manually closed units have trip-free mechanisms, with former incorporating anti-pump control arrangement. Flag-type indicator, behind transparent window, shows when manually closed unit is tripped. Flexible rubber boot covers closing lever.

Both moving and stationary contact tips are made of arc-resistant silver

tungsten carbide material to give longer life and freedom from welding. Units are said to be applicable for bus sectionalizing, and for single or dual feeder distributing and load circuits.



Aircraft Antenna

A-13 VHF navigational antenna, made by **Aircraft Radio Corp.**, Boonton, N. J. is designed for reception of omni-range and runway localizer navigation signals. Approved under CAA certificate No. 1R4-4, unit covers 105-122 mc. band with less than voltage standing wave ratio of less than 2.5 into 50-ohm coaxial line. Mounting is interchangeable with AS-27A/ARN-5. Antenna comes with ARC Type 15B omni-range equipment or can be supplied separately.

Phenolic Laminate

Grade LRF phenolic laminate with matted, unwoven cotton filler, produced by **Synthane Corp.**, Oaks, Pa., is represented to have high impact fatigue factor and superior machinability without sacrifice in electrical or chemical values.

Material is said to wear more evenly than products fabricated from conventional woven-fabric-filler plastic laminates, because random fibers of virgin cotton are evenly distributed and lay in all directions, rather than in parallel planes as in woven fabrics.

Company claims average values for tensile, flexural and compressive strength of Grade LRF exceed National Electrical Manufacturers Assn. averages for Grade L and Grade C products. Grade LRF is stated to show greatest superiority in flatwise impact fatigue values. In tests conducted by Synthane, which consisted of dropping 1-lb. weight from height of 1 ft. at rate of 40 blows/min., Grade LRF is reported to have resisted 5000 impacts as against 50 for Grade L and 100 blows for Grade C.

Material comes in 36-sq. in. sheets $\frac{1}{8}$ -2-in. thick, in 36-in. long rods, $\frac{1}{8}$ -1 $\frac{1}{2}$ in. diameters, and in molded tubing with $\frac{1}{2}$ in. minimum i.d. and 4 in. maximum o.d. walls from $\frac{1}{8}$ - $\frac{1}{2}$ in.

Rocker Box Gasket

Gasket material having silicone rubber coating on woven Fiberglas cloth has been developed by **Acushnet Process Co.**, New Bedford, Mass., for sealing between aircraft engine rocker boxes and covers. Product also is claimed to have many advantages in industrial applications where strength, minimum weight and thickness, and resistance to oil and extreme temperatures are important requirements.

Represented to easily withstand temperatures up to 500 F. material currently is furnished in thickness varying from .013-.020 in. Fiberglas cloth without coating weighs 6 oz./sq. yd. and has minimum breaking strength of 250 psi. on the warp and 200 psi. on the fill.



British Fire Truck

Aircraft fire-fighting tender with VHF two-way radio-telephone, developed by **Pyrene Co. Ltd.**, Brentford, Middlesex, England, is designed to provide heavy discharge of foam, CO₂ gas, or water.

Tender is capable of pumping foam at 2500 gpm. Already ordered by Ministry of Civil Aviation for 18 British civil airports, tender is capable of pumping foam at 2500 gpm. Radio equipment has 10-mi. effective range.

MCA tenders are mounted on Austin Motor Co. chassis, but Pyrene states it has developed improved version using Thornycroft Nubian TF/AC4/1 chassis (shown). This model has 85-bhp., 4-cylinder engine and four-wheel drive.

Pyrene-Thornycroft tender carries 500-gal. water tank; 40-gal. foam-making tank; centrifugal water pump delivering 400 gpm. at 150 psi.; 2 mechanical, 1250-gpm. foam generators; two 80-ft., 4-in. canvas hoses for connecting generators to foam discharge nozzles six 50-lb., 850-psi CO₂ bottles; two CO₂ hose reels, each carrying 100-ft., $\frac{1}{2}$ -in. hose with distributor horn.

Enough foam compound is provided for 1000 gal. of water. Extra water from external source can be brought in through pump suction inlet. There is large compartment for 5-man crew, and 4 doors; two of sliding type.

Boeing Selects

WHITTAKER
SHUT-OFF VALVES

for new B-47
Stratojet



Zooming into the sky, the new Boeing B-47 Stratojet with its six powerful jet engines and auxiliary rocket units is one of the world's fastest bombers. It can take off and climb at almost incredible speed. It can carry 20,000 pounds of bombs. And it flies at better than ten miles a minute. Like other outstanding aircraft, the new B-47 is equipped with WHITTAKER motor-operated shut-off valves on the vital fuel and jet engine compressed air take-off systems. Whenever the service is vital . . . whenever dependability is a must . . . you will find WHITTAKER valves. WHITTAKER's versatile engineering staff stands ready to assist you on your aircraft valve problems. Write Engineering-Sales Dept., Wm. R. WHITTAKER Co., Ltd., 915 North Citrus Avenue, Los Angeles 38, California.

Diaphanous
view of
WHITTAKER
Motor-
Operated
Shut-Off
Valve.



Whittaker

First IN DESIGN

First IN PERFORMANCE

First WITH VALVES THAT ARE FIRST CHOICE IN INDUSTRY

PRODUCTION

Aircraft Industry Backlog Record

(In millions of dollars)

	June 30 1948	Sept. 30 1948	Dec. 31 1948	Mar. 31 1949	June 30 1949
Airframe and parts:					
Military	\$2,158	\$2,082	\$1,962	\$1,868	\$1,793
Civil	157	145	132	124	129
Engines and parts:					
Military	669	772	760	746	651
Civil	24	26	27	38	37
Propellers and parts:					
Military	105	102	96	99	106
Civil	11	10	7	5	5
Other products and services	88	99	121	113	160
Total	\$3,212	\$3,236	\$3,105	\$2,993	\$2,881

Source: Census Bureau

Midyear Position Promising

Backlog declines slightly, even though new orders increase, while sales and profits are climbing.

Backlog of orders for the aircraft industry stood at \$2,881 million at mid-year 1949, a scant 4 percent decrease from the \$2,993 million reported Mar. 31, 1949, according to the Census Bureau.

The figure includes orders for aircraft, engine and propeller companies, and breaks down this way:

- **Airframe and Parts**—Military, \$1,793 million; civil, \$129 million.
- **Engines and Parts**—Military, 651 million; civil, \$37 million.
- **Propellers and Parts**—Military, \$106 million; civil, \$5 million.
- **Other Products and Services**—\$160 million.

Individual airframe manufacturers reported the following figures in a separate AVIATION WEEK survey:

Beech Aircraft Corp.—Unfilled orders as of June 30 were \$10,377,467, of which \$6,200,431 was military and \$4,177,036 was commercial. First six month sales totaled \$9,834,555, and net income after taxes was \$321,977.

Bell Aircraft Corp.—Backlog figure was not available, but net profit for the quarter ended June 30 was \$82,672, compared with a first quarter net profit of \$50,660. Sales and other income at midyear were \$5,624,905.

Boeing Airplane Co.—Backlog at mid-year was \$359,028,203, after eliminating

nearly \$85 million because of cancellation of the Air Force B-54 contract. Sales for that period amounted to \$110,825,138, principally B-50s to the military and Stratocruisers to airlines. Company reported a net profit of \$662,349 for this period.

Consolidated Vultee Aircraft Corp.—Unfinished work under unfilled orders totaled \$240,647,103 at June 30, of which \$237,847,490 was military and \$2,799,613 was commercial. Net sales for the six months ending May 31 totaled \$104,352,596 and net profit for the period was \$1,585,327.

Douglas Aircraft Corp.—Backlog on July 1 was \$200,001,457, of which 98.2 percent was military orders and 1.8 percent commercial business. Sales for the first six months were \$52,122,930, and net income, after taxes and other provisions, was \$2,976,343.

Grumman Aircraft Engineering Corp.—Backlog figure was not available, but profit before tax totaled \$2,432,734 for first half 1949. Net profit, after estimated effect of the Vinson-Trammell Act, was \$1,457,734.

Lockheed Aircraft Corp.—Backlog at midyear was \$202,268,000, of which \$41,534,000 was commercial, \$83,102,000 was for Air Force, and \$77,632,000 was for Navy. Domestic and international orders for additional Con-

stellations raised percentage of commercial orders in backlog from 7 percent at the beginning of the year, to more than 20 percent on June 30. Air Force and Navy deliveries will run throughout next year. Company showed a net profit of \$2,237,416 for the six months. Sales of airplanes, parts and services totaled \$55,785,060.

McDonnell Aircraft Corp.—Backlog as of June 30 was \$61,896,041.

North American Aviation, Inc.—Unfilled orders at midyear were \$238,012,667, compared with \$418,685,645 a year ago. During the third quarter ending June 30, company obtained \$7,385,350 worth of new business and made shipments totaling \$35,803,002. Net income during this quarter was \$2,182,386. Sales and other income for the nine months ending June 30 were \$93,300,583.

Republic Aviation Corp.—Backlog on July 1 was \$56,500,000, all of which is in military orders. Net income after taxes was \$317,883, while sales for the six-month period totaled \$17,779,302.

United Aircraft Corp.—Backlog on Mar. 31 was \$330 million, of which 80 percent was in military orders. First quarter shipments totaled \$58,829,228. Net income, after taxes, was \$1,206,831.

According to the Census tabulation, total new orders received by the industry during the quarter ending June 30 totaled \$317 million, compared with \$270 million net new orders received during the first quarter.

Breakdown of new orders:

- **Airframe and parts**—Military, \$157 million; civil, \$37 million.
- **Engines and parts**—Military, \$13 million; civil, \$11 million.
- **Propellers and parts**—Military, \$23 million; civil, \$3 million.
- **Other products and services**—\$73 million.

Industry net sales during the quarter ended June 30 were \$429 million, compared with \$382 million for the previous quarter. Aircraft and parts accounted for \$264 million; engines and parts, \$120 million; propellers and parts, \$19 million; other products and services, \$26 million.

PRODUCTION BRIEFING

► **Irving Air Chute Co.**, Buffalo, in addition to its military parachute contracts, is working on restricted projects with Bell Aircraft Corp. and Cornell Aeronautical Laboratory.

► **National Aeronautical Corp.** has increased employment and unit production by more than 50 percent in order to reduce its backlog of orders for omnirange equipment.

Latest Air Force Bid Awards

Air Materiel Command procurement Division makes available to AVIATION WEEK the latest bid awards, shown on this page. Requests for further information should be addressed to Contracting Officer, AMC, Wright-Patterson AFB, Dayton, Ohio, attention: MCPPSX72.

ABSTRACTS

For 648 gun chargers (50-17):

H. Z. Rosenberg & Co., Buffalo, on a bid of \$966.25; American Surplus Co., Los Angeles, on a bid of \$2798.50; D. Moody & Co., Tulsa, on a bid of \$2400, and Electromatic Associates, Richland, Wash., on a bid of \$300.

For indicators (49-2449):

United States Gauge, Sellersville, Pa., on a bid of \$4300.47.

For 1696 chairs (50-3):

McConaughy Stationers, Inc., Springfield, O., on a bid of \$4664.

For meters (50-23):

General Electric Co., Schenectady, on a bid of \$35,188.08.

For arm assemblies (49-1833):

Companies sharing—National Carbon Co., Inc., New York, on a bid of \$933.70, and Victor Adding Machine Co., Chicago, on a bid of \$132,621.70.

For trainer flight equipment (49-2227):

Companies sharing—G. W. Holmes Co., Columbus, O., on a bid of \$19,440; Rheem Mfg. Co., Lester, Pa., on a bid of \$8185, and American Automatic Typewriter Co., Chicago, on a bid of \$8750.

For 284,500 feet of wire cable (49-2223):

Companies sharing—MacWhyte Co., Kenosha, Wis., on a bid of \$385; Phelps Dodge Copper Products, Corp., Hahirshaw Cable & Wire Div., New York, N. Y., on a bid of \$4202, National Magnet Wire Corp., New York, N. Y., on a bid of \$49.75.

For 48 tester assays (49-2148):

Schuttig & Co., Inc., Washington, D. C., on a bid of \$5232.

For testers and technical data (49-2344): Monument Engineering Co., Inc., Indianapolis, Ind., on a bid of \$27,720.

For transmitters (50-25):

Kollsman Instrument, Div. of Square D Co., Elmhurst, New York, on a bid of \$8575.

For sheets (50-38):

Companies sharing—Armstrong Cork Co., Lancaster, Pa., on a bid of \$629; Anchor Rubber Co., Dayton, O., on a bid of \$3799.75; United States Rubber Co., New York, N. Y., on a bid of \$2508; B. F. Goodrich Co., Akron, O., on a bid of \$7191, and Quaker Rubber Corp., Philadelphia, Pa., on a bid of \$3509.68.

For grommet channels (50-51):

Companies sharing—Rubbercraft Corp. of Calif., Los Angeles, Calif., on a bid of \$552.59; Arrowhead Rubber Co., Los Angeles, Calif., on a bid of \$318.12, and B. F. Goodrich Co., Akron, O., on a bid of \$2950.73.

For 299 boards (49-2130):

Polan Industries, Huntington, W. Va., on a bid of \$140,925.30.

For 5945 each insulators (50-35):

Companies sharing—United States Rubber Co., New York, N. Y., on a bid of \$497.32; Lord Mfg. Co., Erie, Pa., on a bid of \$9321.25, and Robinson Aviation, Inc., Teterboro, N. J., on a bid of \$56.70.

For 2234 antenna couplers and mountings (50-16):

Diamond Instrument Co., Wakefield, Mass., on a bid of \$12,145.20.

For indicators and spare parts (50-32):

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., on a bid of \$26,921.79.

For 100 bar and lark assemblies (49-1941):

Hermann Mfg. Co., Lancaster, O., on a bid of \$6136.32.

For antennas, antenna bases and adapters (50-15):

Companies sharing—Phaostrom Co., South Pasadena, Calif., on a bid of \$81,702.16; Specialty Assembling & Packing Co., Inc., Brooklyn, N. Y., on a bid of \$19,343; Cook Electric Co., Chicago, Ill., on a bid of \$6616; Specialty Automatic Machine Corp., Chelsea, Mass., on a bid of

\$1002.76; White Tuning Corp., New York, N. Y., on a bid of \$12,400.84, and Aeromotive Equip. Corp., Kansas City, Mo., on a bid of \$36,813.10.

For modification of gun charger (50-18):

R. & C. Machine Co., Dayton, O., on a bid of \$2505.80.

For beam and wrench assemblies (49-2145):

Companies sharing—Rocky Mountain Steel Products, Inc., Los Angeles, Calif., on a bid of \$8318.46; Port Clinton Mfg. Co., O., on a bid of \$8289.50; Jayson-Balley Co., Binghamton, N. Y., on a bid of \$1816.77;

Patton Mfg. Co., Inc., Springfield, O., on a bid of \$1930.60; Rane Tool Co., Inc., Jamestown, N. Y., on a bid of \$335.60; Northwestern Tool & Engr. Co., Dayton, O., on a bid of \$475.20; Anderson, Inc., Chicago, Ill., on a bid of \$2377.50; Neal Machine & Tool Co., Lima, O., on a bid of \$1780.35;

Pan American Tool & Machine Corp., Dayton, O., on a bid of \$1192.65, and Industrial Precision Products Co., Chicago, Ill., on a bid of \$1856.20.

For glasses & goggle assemblies (49-2243):

Companies sharing—Rochester Optical Mfg. Co., Rochester, on a bid of \$9773.65, and Mine Safety Appliances Co., Pittsburgh, on a bid of \$69,063.05.

For office equipment (49-1696):

Companies sharing—Security Steel Equip. Corp., Avenel, N. J., on a bid of \$39,301.40; McConaughy Stationers Inc., Springfield, O., on a bid of \$27,757; Eugene Dietzgen Co., Chicago, on a bid of \$20,184.35, and Browne-Morse Co., Muskegon, Mich., on a bid of \$18,243.

For test sets TS-541/TPS (49-1568):

Espey Manufacturing Co., Inc., New York, on a bid of \$131,500.

For 205 demonstrator trainers (49-1807):

Companies sharing—Plastic Mfgs. and Designers Corp., Indianapolis, on a bid of \$630; Management & Research, Inc., Primos, Pa., on a bid of \$3960, and Carleton R. Elliott Co., Dayton, on a bid of \$4046.30.

For tester & engineering data (49-2024):

Inland Equipment Co., Nashville, on a bid of \$20,250.

For 144 switches & trolleys (49-2029):

Companies sharing—The American Monorail Co., Cleveland, on a bid of \$6798.72, and Yale & Towne Mfg. Co., Philadelphia Div., Philadelphia, on a bid of \$1478.40.

For 20 rubber self-sealing fuel tanks (49-2496):

United States Rubber Co., Mishawaka, Ind., on a bid of \$17,800.

For 83,040 rolls friction & rubber tape (49-2240):

Companies sharing—Plymouth Rubber Co., Canton, Mass., on a bid of \$11,754.58; United States Rubber Co., New York, on a bid of \$1080, and Browning Brothers, Inc., New York, on a bid of \$404.78.

For 230 trainers (49-1802):

Carleton R. Elliott Co., Dayton, on a bid of \$5234.80.

For 695 cable assemblies (49-2242):

Mines Equipment Co., St. Louis, on a bid of \$23,052.

For 415 blackboards (49-2197):

Companies sharing—New York Standard Blackboard Co., New York, on a bid of \$3379.30, and McConaughy Stationers, Inc., Springfield, O., on a bid of \$232.90.

For jack assemblies (49-2328):

Jumbo Steel Products Co., Azusa, Calif., on a bid of \$168,531.75.

For grinders (49-2139):

Companies sharing—The Brown-Brockmeyer Co., Dayton, on a bid of \$1446.12, and Wyzenbeck & Staff, Inc., Chicago, on a bid of \$6982.04.

For 232 bench type grinders (49-1750):

Companies sharing—Brown-Brockmeyer Co., Dayton, on a bid of \$3727.62; Cincinnati Electrical Tool Co., Cincinnati, on a bid of \$3779.10; Intestate Brake Testing Mach. Co., Los Angeles, on a bid of \$38,325.

For 114 demonstrator trainers (49-1803):

American Automatic Typewriter Co., Chicago, on a bid of \$10,943, and Design Fabricators, Inc., Dayton, on a bid of \$1797.94.

For testers and engineering and maintenance data (49-2335):

Liquidometer Corp., Long Island City, N. Y., on a bid of \$7248.

For stationary air compressors (49-2399): Chicago Pneumatic Tool Co., Detroit, on a bid of \$9854.

For mechanics steel case (49-2410):

Companies sharing—Diamond Metal Products Corp., Blairsville, Pa., on a bid of \$64,955.40; National Tool & Chest Co., Chicago, on a bid of \$1883.70; Browning Brothers, New York, on a bid of \$2499.28; Reasor Mfg. Co., St. Charles, Ill., on a bid of \$2661.14; Aircraft Tools, Inc., Los Angeles, on a bid of \$5983.25; Nicholson File Co., Providence, on a bid of \$3920.20, and Aero Tool Co., Los Angeles, on a bid of \$2615.15.

For test stands (49-2416):

Denison Engineering Co., Columbus, O., on a bid of \$37,480.

For office equipment (49-2198):

Jamestown Metal Corp., Jamestown, N. Y., on a bid of \$251,155.39.

For 48 milling machines (49-2075):

N. Ransohoff, Inc., Cincinnati, on a bid of \$33,360.

Invitations to Bid

Bid openings are 20-30 days after approximate issue dates shown in the following bid proposals. Bid sets containing specifications for items to be procured will be sent to qualified applicants who state bid invitation number.

One bid set will be available for examination without obligation by prospective bidders, after bid publication date, at each of the seven AMC procurement field offices. This will enable firms to see specifications before writing or telegraphing for their own bid sets.

Procurement field office locations: Boston Army Base, Boston 10, Mass.; Government Aircraft Plant No. 4, Ft. Worth 1, Tex.; 39 S. LaSalle St., Chicago 3; Wright-Patterson AFB, Dayton, Ohio; West Warren and Longo Aves., Detroit 32; 155 W. Washington Blvd., Los Angeles; 67 Broad St., N. Y. 4.

INVITATIONS

Battery Testers, 20 each, bid invitation No. 50-139, issue date Sept. 20, delivery 21 days after approval on first article in 30 days.

Bolt, 1-62 items, bid invitation No. 50-136, issue date Sept. 20, delivery Feb. 1950.

Oil Indicators, 1-2 items, bid invitation No. 50-134, issue date Sept. 19, delivery, item 1A, and 2, 20 monthly, item 1B, 10 monthly.

Level Assembly, 1000 each, bid invitation No. 50-140, issue date Sept. 20, delivery 45 days after approval of first article in 30 days.

Parachute Assembly, 1020 each, bid invitation No. 50-132, issue date Sept. 14, delivery 60 days.

Propeller Governor Cover, 3000 each, bid invitation No. 50-133, issue date Sept. 14, delivery at least 60 days.

Alum Alloy Washer, 1-6 items, bid invitation No. 50-141, issue date Sept. 20, delivery Feb. 1950.

Blackboards, 1-8 items, bid invitation No. 50-151, issue date Sept. 26, delivery 30 days.

Pneumatic mattress, 200 each, bid invitation No. 50-152, issue date Sept. 27, delivery 60 days.

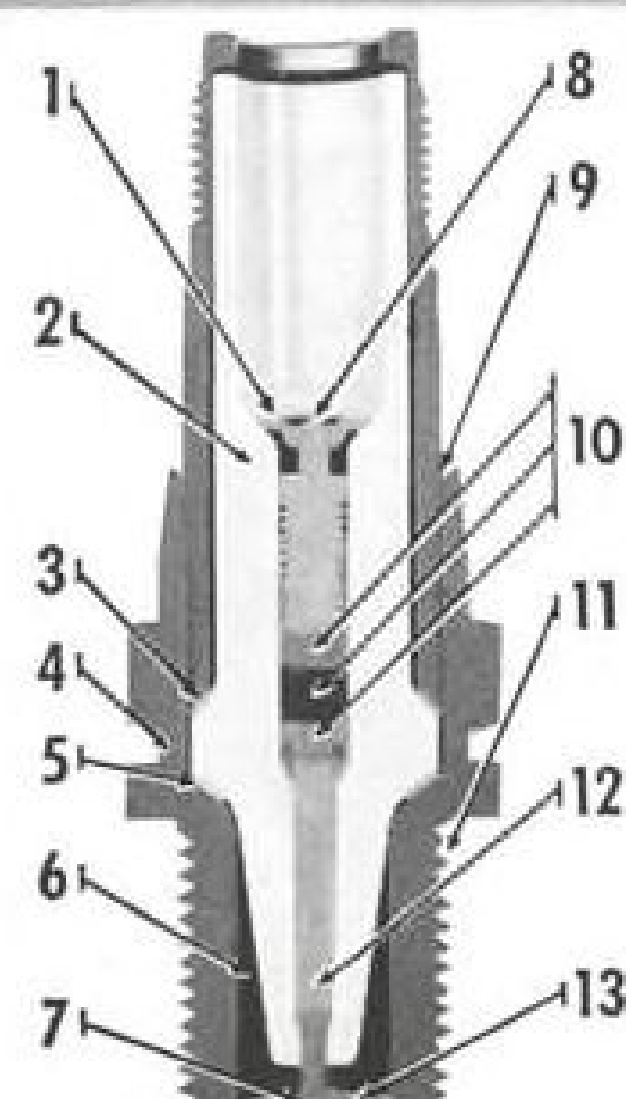
Photographic equipment, 1-39 items, bid invitation No. 50-143, issue date Sept. 21, delivery 30 Jan., 1950.

Propeller cone, 2,500 each, bid invitation No. 50-147, issue date Sept. 21, delivery as soon as possible.

Hydraulic tank, 15 each, bid invitation No. 50-144, issue date Sept. 21, delivery 60 days.

Drain valves, 65,000 each, bid invitation No. 50-156, issue date Sept. 27, delivery 60 days.

Reduces off-schedule plug changes



- 1 Core contact cap
- 2 One-piece insulator:
 1. Patented Corolox. 2. No flashover downward from contact cap. 3. Eliminates dirt trap between core insulator and shielding barrel insulator. 4. Facilitates cleaning terminal well. 5. Mechanically rugged.
- 3 Nickel gasket.
- 4 Heat-sealed, leakproof assembly
- 5 Nickel gasket
- 6 Ample clearance for abrasive blast cleaning
- 7 Platinum center electrode tip .060" dia.
- 8 Steel core pin
- 9 Brazed one-piece construction with zinc-plated finish
- 10 Gastight Hermetic seal
 - Copper-glass conducting seal. Glass-graphite resistor seal, halving electrode wear. Copper-glass conducting seal.
- 11 18 MM threads, precision-rolled to mirror finish
- 12 Silver, centrifugally cast to insure good heat conducting contact with insulator
- 13 One of two large .040" square platinum ground electrodes

Air lines report that the AC-181 Spark Plug produces an important reduction in off-schedule plug change costs. Back of these reports is sufficient flying time to make it very certain that this longer life is no mere happenstance. Yet, significant as it is, this is only one of the outstanding features of the AC-181 which, combined, have won it Pratt & Whitney and C.A.A. approval on five P & W engines.

Check over the construction features illustrated. They are duplicated in no other aircraft plug.



AC Plugs for jet engines have also participated in the establishment of many speed records.



OTHER AC AIRCRAFT PRODUCTS

AC makes many aircraft products, all to AC's highest quality standards:

TACHOMETERS • TEMPERATURE GAUGES • AMMETERS
PRESSURE SWITCHES • FUEL GAUGES • OIL GAUGES
FLEXIBLE CABLE • FUEL PUMPS

AC SPARK PLUG DIVISION • GENERAL MOTORS CORPORATION • FLINT 3, MICHIGAN

SALES & SERVICE

Private Pilots

C.A.R. amendment to liberalize use of small planes for business.

An amendment to the Civil Air Regulations aimed at clarifying and liberalizing restrictions against use of aircraft by private pilots for business soon will be submitted by the Bureau of Safety Regulation for approval by the Civil Aeronautics Board.

The proposed amendment would revise controversial CAR Section 43.60 which, according to the Bureau, has been difficult to interpret and has unduly restricted operations of private pilots.

► **Broader Meaning Sought**—The Bureau wants not only to change the wording of the old rule to eliminate confusion, but to "broaden privileges" of this group.

Section 43.60 currently states that a "private pilot shall not pilot aircraft for hire. . ." This is followed by an explanatory note—nub of the confusion—saying the regulation "permits sharing the expenses of a flight or piloting aircraft in furtherance of a business when the flight is made solely for the personal transportation of the pilot."

The Bureau had asked interested

persons to submit their views on the new proposal by September 25.

As tentatively written, the new amendment reads: "A private pilot shall not pilot aircraft for compensation or hire, or in connection with any business or employment, unless the flight is merely incidental thereto and does not involve the carriage of persons or property for compensation or hire."

► **CAB Proposals**—The Bureau gives the following interpretations to show how the proposed rule would apply to the private pilot:

- He may share actual operating expenses incurred during flight—one or more passengers may contribute.

- As a salesman, he may fly aircraft in the course of his employment, since the flight would be incidental to his business of selling. Samples of merchandise also could be carried.

- He may fly company airplane on business to reach another office of firm and may take friends or other employees, provided there is no charge.

- He may crop dust or seed his own land, but not the land of another if he does so for compensation or hire.

- He may ferry aircraft when the flight is not for compensation or hire.

- As a real estate operator, he may fly prospective purchaser to land offered for sale.

- He cannot demonstrate aircraft in flight to customers, as an employee of,

or otherwise for the account of, a person or company engaged in the business of selling aircraft. In this case, the demonstration of aircraft is not merely incidental to the employment or business of the pilot, but an integral part of the business of selling.

Mail Ads Boost Used Plane Sales

Plane Mart, the recently established new department of Pacific Aircraft Sales Co., with operations at Lockheed Air Terminal, Burbank, Calif., and Oakland Airport, uses a direct mail advertising program which has achieved early responses about four times as great as those anticipated.

Norman Larson and Ivar Akelsen, owners of PASC, set up the new organization to act as a broker for used plane sales, on a buying and resale program not unlike a used car business. Each day their new program has brought into their offices an average of six bona fide airplane prospects plus other inquiries by mail and telephone.

► **Query Plane Owners**—A 7000-name mailing list of persons known to own or to have owned an airplane within the past three years was used to make the first announcement of Plane Mart. Each received a self-mailer questionnaire which asked him to fill out replies stating his aircraft needs, what he had to sell, or wished to buy.

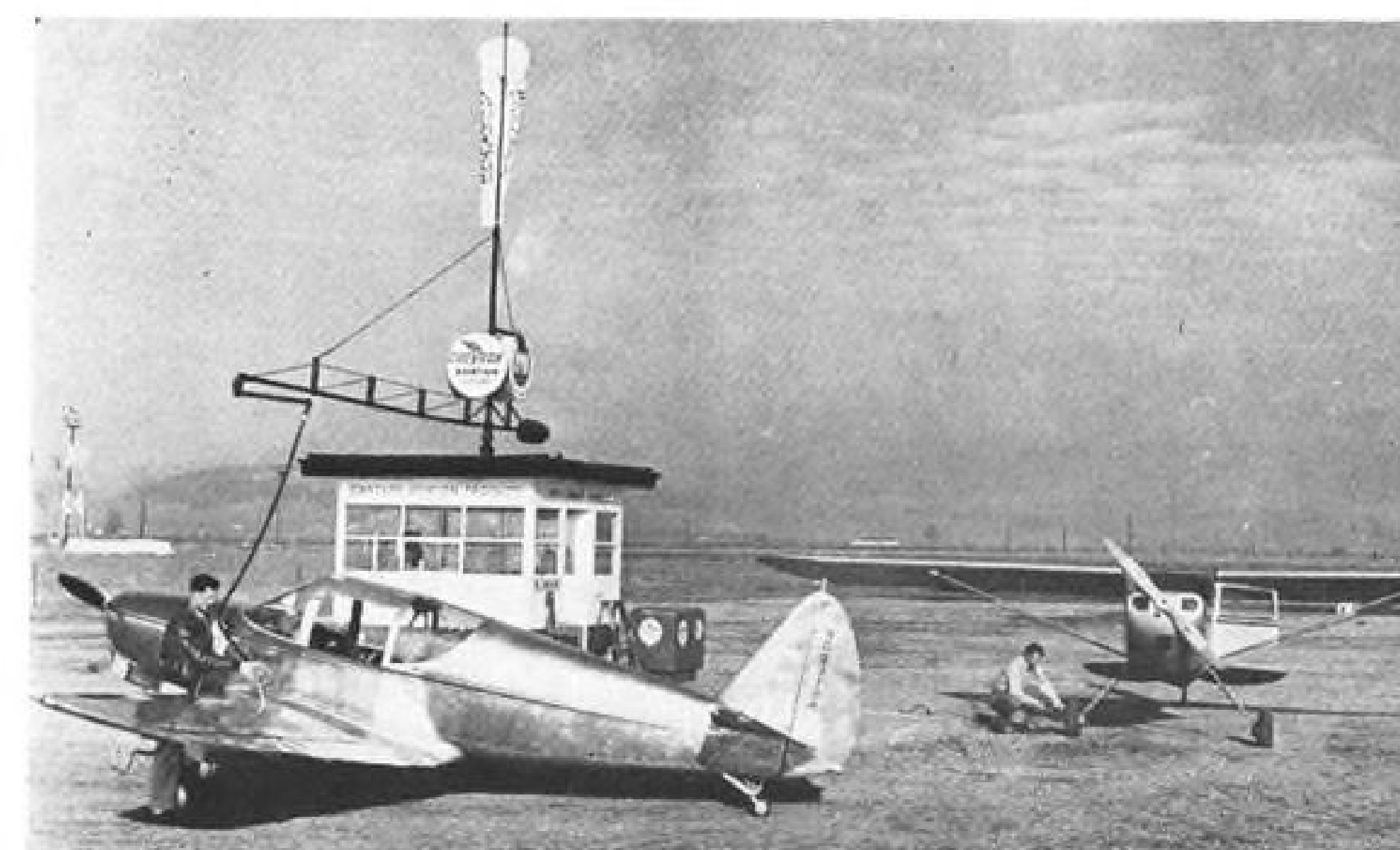
"When you want to sell," said a letter which was part of the questionnaire, "the Plane Mart will accept your airplane on consignment either at Oakland or Burbank. The airplane will be displayed prominently. It will be advertised in trade journals and by direct mail bulletins. Work by and coordination with each office will assure its sale. All planes are stored in protected, paved, special tie-down areas."

Subsequent mailings list planes available with a footnote: "Space does not allow listing many of the excellent used planes we have for sale. Write us your requirements."

Larsen and Akelsen, who have been operating PASC since 1917—a long time for a continuous operation in the aviation business—are watching their original mailing list grow as new prospects are added.

► **Plan Follow-Ups**—They plan to send out a questionnaire twice a year, and mail a list of the planes currently available for sale at Oakland and Burbank six times a year.

They believe the used plane sales department is a necessary adjunct to a complete airplane distributor's business, and look for it to augment considerably the sales volume which they now have as Beech distributors in California and Nevada.



LIGHTPLANE GAS STATION

Globe Swift is "gassed" at lightplane fueling station providing complete, one-stop service in gasoline, tires, batteries, oil, air and water. Station is built on 40½ ft. diameter apron. Swinging boom permits overhead fueling and prevents damage from hose

being dragged over small craft. Circular apron keeps planes out of each other's prop blast. Designed by aviation division of Standard Oil Co. of California, it is located at Napa County Airport near San Francisco Bay.

FINANCIAL

Manufacturers' Profits Fluctuating

Postwar transition period supposedly now is past, but operations still have not shaken down to normal.

Conflicting trends are pronounced in the periodic reports currently being released by leading aircraft builders.

Nevertheless, more than four years after the end of the shooting war, stability of operations is lacking among the industry as a whole.

► **Boeing: Case History**—Even in those instances where large backlogs exist, is there any guarantee of assured profitability and earnings? The experiences of Boeing Airplane Co. illustrate a number of the peculiar problems facing the industry in a peace-time economy.

At 1948 year-end, Boeing's backlog aggregated more than \$445.7 million. Certainly, this was no cause for alarm in the company's outlook. For the six months ended June 30, 1949, on total sales of \$110,825,138, a net profit of only \$662,349 was realized.

In other words, a net profit margin of only 6/10ths of 1 percent prevailed. (The aircraft industry, as a whole, showed a profit margin of 4 percent in 1947 and 1.4 percent during 1948.) The average for all general manufacturing enterprises in the United States is around 7.5 percent with 10 to 15 percent not uncommon.

An analysis of Boeing's low rate of profitability leads to its commercial Stratocruiser program as the main reason. Included in 1948 accounts is a charge-off of \$7.2 million of an estimated total loss of \$10.5 million on the Stratocruiser development. The implication was that the remaining loss of \$3.3 million would be recorded against 1949 results. Such did not prove to be the case.

In the first six months, another \$5.9 million on the Stratocruiser program was written off, bringing total charges to \$13.1 million. Thus, in addition to the \$3.3 million identified as a further potential loss, another \$2.6 million has been added.

But that is not all. The company discloses that the estimated total loss on the Stratocruiser project is now expected to reach \$15.4 million. In other words, at least another \$2.3 million remains to be charged to operations from this source during the second half of 1949.

► **Loss Unexpected**—When the Strato-

cruiser program was first launched in 1945, Boeing was expected to realize a profit on the project. Firm orders for 55 planes were received from four American carriers and two foreign lines. Deliveries were expected to start in 1947 but various modifications and comprehensive tests delayed the project. A major strike at the Seattle plant last year further postponed delivery schedules.

Nevertheless, the company's loss on its Stratocruiser program is amazing in the light of the strong safeguards applied. For example, Boeing exacted substantial deposits and progress payments on its transport orders. Further various protective provisions such as escalator clauses were incorporated in contracts.

Boeing remains with a sizeable order backlog despite the \$85 million cancellation of the B-54 program. At June 30, 1949, unfilled orders were listed at more than \$359 million, mostly military.

► **United**—United Aircraft Corp. is also having difficulty reaching a plateau of satisfactory earnings. For the quarter ended June 30, 1949, the company showed consolidated net income of \$2,388,590. This compared with \$2,495,501 for the like period a year ago. For the first half of 1949, net income aggregated \$3,595,421 compared with \$5,743,731 for the same period in 1948. Sales have remained fairly stable, however, ranging between \$51.6 to less than \$55 million for each quarter.

► **Republic**—A sharp contraction in earnings is evident for Republic Aviation Corp. For the six months ended June 30, 1949, the company discloses a net profit of \$317,883 on total sales of \$17,779,302. The comparable period of 1948 shows a net of \$1,826,668.

Republic's 1949 earnings include \$301,680 re-imbursement claims under cost-plus-fixed fee contracts delivered in prior years. A partial offset to this item is the provision of \$120,000 taken from current earnings and credited to a reserve for contingency provisions. Adjusted, net earnings for the first six months of 1949 would appear to be much closer to \$136,203 than \$317,883, as reported.

On this premise, with no qualifications revealed in the net profit of \$254,055 reported by Republic for the first quarter, second quarter results as adjusted, appear to have been conducted at an actual loss.

► **North American**—Less involved are the results for North American Aviation, Inc. For the six months ended Mar. 31, 1949, the company had total sales of more than \$57 million upon which it realized a net profit of more than \$3 million after payment of federal taxes amounting to almost \$2 million. For the same period in 1948, billings amounted to only \$19.5 million, resulting in a net profit of about \$750,000 after tax payments of less than \$500,000.

It is noteworthy, as emphasized in the North American account, that most aircraft builders are now subject to the full 38 percent impost of federal taxes. Tax credits were of immeasurable aid in tempering losses and retaining profits following the war.

► **Convair**—An outstanding exception where material tax credits still apply is in the case of Consolidated-Vultee. Through the carry-forward provision of the tax laws, Convair may be expected to retain the full measure of its earnings during its 1949 fiscal year, and possibly for 1950 as well. The company has written off the huge development costs pertaining to the introduction of its Convair transport.

Despite the acceptability of this transport in current airline operations, additional sales appear to be limited at the present time. The fact that current operators paid an average of about one-half of the existing price tag, is enough to give pause to other carriers considering the acquisition of this equipment. The more immediate source of earnings is expected to stem from the company's B-36 production.

► **Grumman**—Reporting only semi-annually, Grumman Aircraft Engineering remains as the most consistently profitable aircraft manufacturing enterprise. For the six months ended June 30, 1949, after a tax provision of \$975,000, the company reported a net profit of \$1,457,734. For the same period of 1948, a net profit of \$1,027,706, after taxes of \$630,000, was realized.

Grumman shows total billings of about \$60 million for this year. For the first six months, total sales are estimated to have passed the \$17.5 million mark.

Interim reports of the aircraft companies are most helpful in supplying a trend of prevailing operations. It is frequently misleading, however, to accept net earnings or deficit figures at their face value without some inquiry or analysis of adjustments that may surround such reports. —Selig Altschul



S-700



S-300



S-100



S-50



S-25



V-15



Scandinavian Airlines System, Inc.

AGENT FOR
DANISH AIR LINES · NORWEGIAN AIR LINES · SWEDISH INTERCONTINENTAL AIR LINES · S.A.S.
MEMBERS OF IATA

NEW YORK, N. Y.
H. V. INTERNATIONAL AIRPORT
JAMAICA 30, N. Y.



TELEPHONE
OLYMPIA 4-5900

August 25, 1949.

Surface Combustion Corporation,
2375 Dorr Street,
Toledo 1, Ohio.

Attention: Mr. James W. Ashby,
Sales Manager.

In 1948 twelve DC-6 aircraft were delivered to the Scandinavian Airlines System.

The heat source for the airconditioning system as well as the anti-icing system for the wings and tail surfaces consists of "Janitrol" Surface Combustion Heaters (300,000 BTU per hour). Accordingly "Janitrol" heaters are used in vital systems where dependability and safety are essential.

The aircraft of the Scandinavian Airlines System are flying to 27 countries in five continents including North and South America. Thus our high-altitude aircraft during their flights are meeting the most adverse weather conditions, such as high and low temperature, high and low humidity, etc. It is a great pleasure for us to be able to confirm that under all these conditions the "Janitrol" heater has been operating satisfactorily.

Our DC-6 aircraft have now averaged approximately 2,000 hours of flight time each, covering in total nearly 6,000,000 miles, and during this time only routine inspection and maintenance has been required.

Very truly yours,
SCANDINAVIAN AIRLINES SYSTEM, INC.

I. Edengran
I. Edengran,
Supervisor of Maintenance

IE:tjb

"Routine" is the word many airlines use to describe Janitrol heater maintenance. "Routine" because Janitrol heaters consistently establish high records of uniformly dependable operation . . . the rule rather than the exception. If you want maximum heat delivered from the smallest, lightest weight units—safely and dependably—call in your nearest Janitrol representative early in the design stage. He can help you put the heat wherever you want it—on military or commercial aircraft from the smallest to the largest.

Janitrol
AIRCRAFT AND AUTOMOTIVE HEATERS *with the whirling flame*
AIRCRAFT-AUTOMOTIVE DIVISION • SURFACE COMBUSTION CORP., TOLEDO 1, OHIO

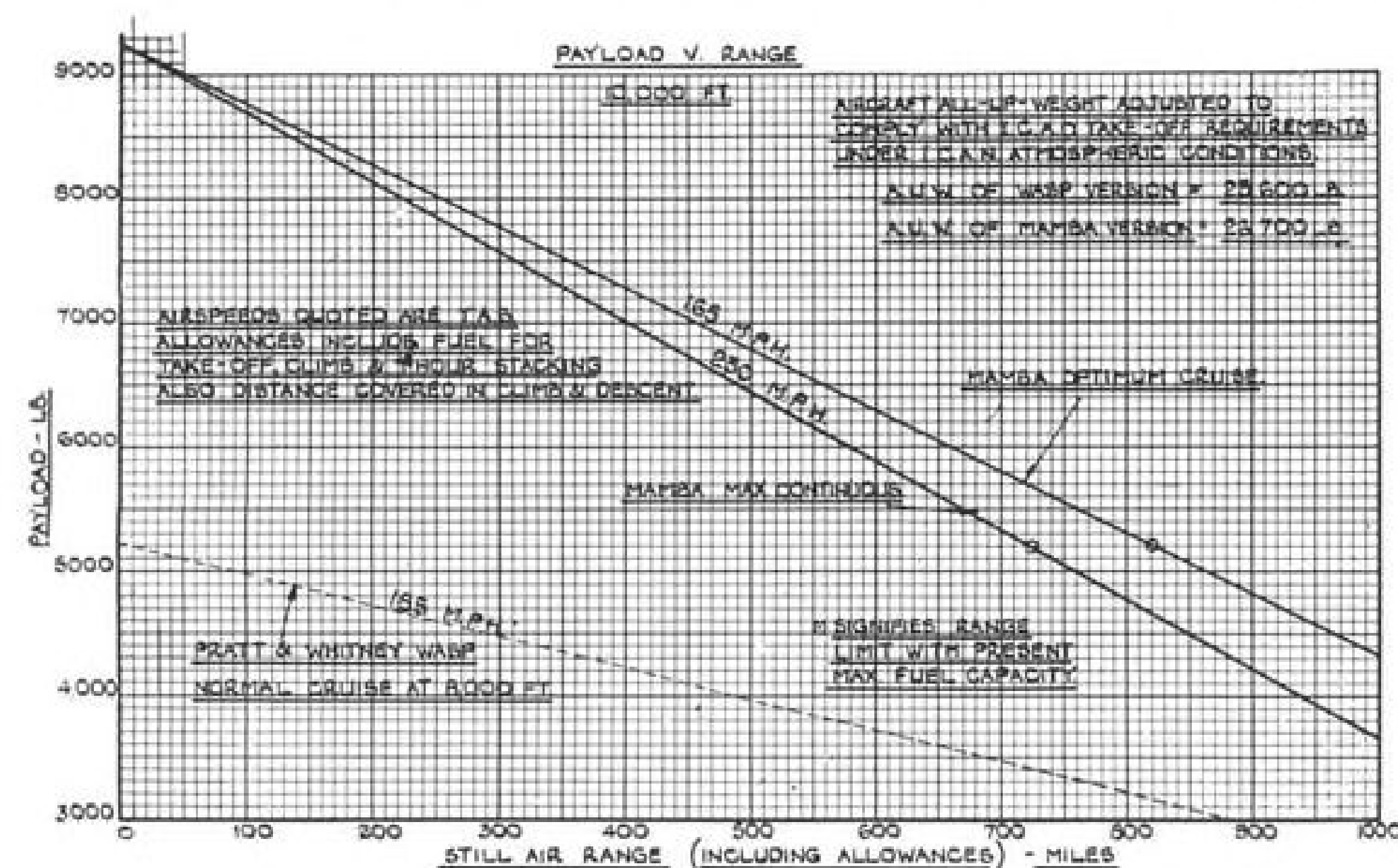


NEW YORK, N. Y., 225 BROADWAY; KANSAS CITY, MO., 950 DIERKS BUILDING; LOS ANGELES, CALIF., 714 OLYMPIC BLVD.
CENTRAL DISTRICT OFFICE, ENGINEERING DEVELOPMENT AND PRODUCTION, COLUMBUS, OHIO; HEADQUARTERS, TOLEDO, OHIO

AIR TRANSPORT



MAMBA-POWERED DC-3 conversion of Armstrong Siddeley retains the basic Douglas airframe, but offers great advantages in . . .



PAYLOAD AND SPEED over the piston-engine DC-3s which must be replaced by 1953.

British Offer Turboprop DC-3

Armstrong Siddeley plans international sales effort aimed at taking part of U. S. market from Super DC-3.

By Robert Hotz

RUGBY, ENGLAND—First mating of a British turboprop engine with an American airframe was displayed at Bitteswell aerodrome near here last week by Armstrong Siddeley Motors Ltd. before extremely interested groups of British and foreign airline engineers and U. S. military officials.

Armstrong Siddeley has installed two of its 1420-hp. Mamba II turboprops in a standard Douglas Aircraft Co.

DC-3 airframe to develop accurate flight test data on the operational and economic differences between piston and turboprop power plants. The DC-3 was deliberately selected for the initial experiment because of its universal acceptance as a reliable airframe.

► **Plan Sales Drive**—Although the project originated purely as a research job with Ministry of Supply support, Armstrong Siddeley is so pleased with the initial data obtained that it plans an extensive international sales campaign

on the Mamba conversion aimed at the 3000-odd DC-3s still in service with commercial operators.

The Armstrong Siddeley campaign is apt to set the pattern for the latest British export drive to build up foreign exchange and the initial attempt to crack the American aviation market. Rolls-Royce has also fitted a DC-3 airframe with two 1500-hp. Dart turboprops.

Most observers familiar with both the U. S. and British aircraft industries agree that the most saleable article for the American market now in the British aviation export showcase are engines, not airframes or complete aircraft. The most attractive British civil engines are available for delivery within three to six months whereas the initial deliveries of British turboprop or turbojet powered airliners ready for operation are at least 18 to 24 months away.

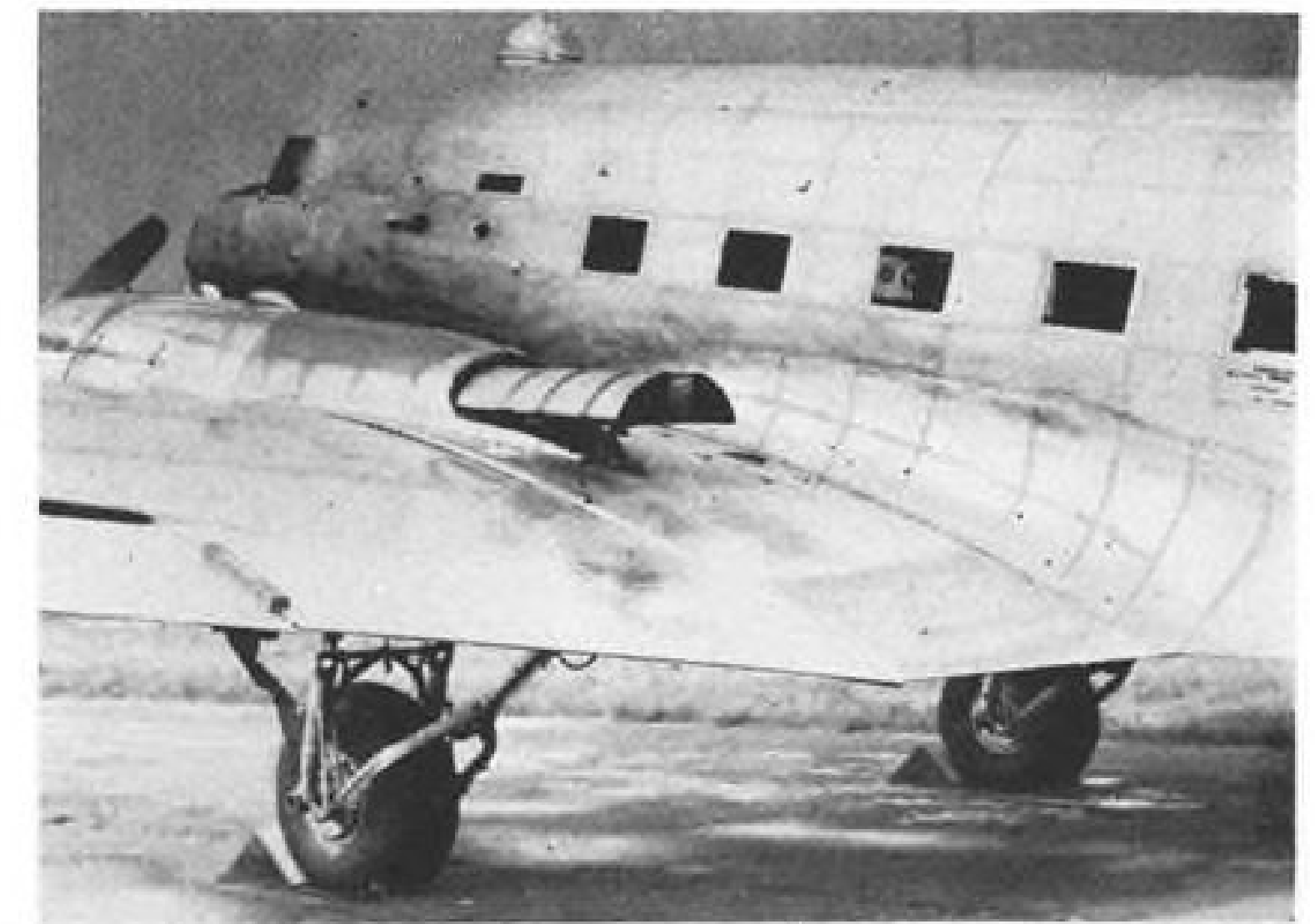
Observers also feel it will be easier, at least during the next year, to interest American airframe manufacturers in using British engines in airframes of their own design than in selling American airlines on buying British airliners.

► **Mamba Markets**—In selling the Mamba-powered DC-3 Armstrong Siddeley is aiming at two specific markets:

- **Airlines who now have DC-3s** and who can gain considerable operational experience in the use of turboprop airliners by converting a few of the Douglas airframes to Mambas. In this way the airline operator, who is now totally unfamiliar with the economic and operational possibilities of the new power plants, could run his own tests at a relatively low cost compared with the price of buying new turboprop airliners.
- **The hundreds of DC-3 operators** who



ENGINE ACCESSIBILITY is improved in the Mamba DC-3.



EXHAUST TAILPIPE in prototype can be reduced in length.

are faced with a drastic reduction in payload for their planes by 1953 in order to meet the new ICAO performance regulations. According to Armstrong Siddeley, the Mamba-powered DC-3 will meet the new regulations with a payload reduction of only 1300 lb. below the present 28,000 lb. maximum gross compared with a cut of 4400 lb. required with the 1200 hp. Pratt & Whitney Twin Wasp piston engines now used.

► **Douglas Competition**—In aiming at the present DC-3 operators faced by the 1953 ICAO deadline, Armstrong Siddeley will offer stiff competition to the Douglas Super DC-3 program also aimed at converting the present DC-3 airframe to meet ICAO requirements. Armstrong Siddeley estimates that price of two Mambas, plus installation, on the DC-3 airframe will be well under \$100,000 and require about 30 days. Douglas quotes its Super DC-3 conversion at from \$150,000 to \$250,000.

Douglas plans to use the Wright 1820 piston engine which has a take-off rating of 1475 hp., only 55 hp. higher than the present Mamba rating. For cruising, the Mamba would produce more power since it operates only slightly below its maximum while piston engines normally cruise at between 50 and 60 percent of maximum power.

The Mamba conversion involves no structural modification outside the engine nacelles. The Douglas conversion program calls for extensive re-working of the wing, empennage and lengthening of the fuselage. Under new ICAO requirements the Twin Wasp DC-3 would gross 23,600 lb.; the Mamba DC-3, 26,700 lb.; and the Super DC-3, 28,000 lb. For detailed comparison of the present Twin Wasp-powered DC-3 with the Mamba II version under the new ICAO requirements see the adjoining table. The figures were prepared by Armstrong Siddeley.

► **USAF Eyes DC-4**—Among interested observers of the Mamba DC-3 were

Mamba vs. Twin Wasp DC-3

Under new ICAO single-engine takeoff requirements, including allowance for taxiing, take-off, climb to cruising height and stacking for one hour, the estimated comparative performance at the stated takeoff weight would be:

[Takeoff weight: Twin Wasp Dakota, 23,600 lb.
Mamba Dakota, 26,700 lb.]

Range (still air statute miles)	TWIN WASP at 8,000 ft. at 175 mph.	Payload lb.			
		MAMBA II			
		at 10,000 ft. & 165 mph. (optimum range)	230 mph. (max. cruise power)	at 15,000 ft. & 185 mph. (optimum range)	225 mph. (max. cruise power)
200	4,700	8,250	8,150	8,150	8,050
400	4,200	7,300	7,000	7,250	7,100
600	3,700	6,300	5,900	6,350	6,150
700	3,450	5,800	5,350	5,950	5,700
800	3,200	5,300	5,500	5,250

The existing fuel tankage of the aircraft limits the maximum attainable ranges with the same allowances to:

Twin Wasp aircraft at 8000 ft. (2540 mi. : 1570 mi.) with 1150 lb. payload
Mamba version at 10,000 ft. (3000 mi. : At 165 mph.) 820 mi. } With
Mamba version at 10,000 ft. (3000 mi. : At 230 mph.) 725 mi. } payload
Mamba version at 15,000 ft. (4600 mi. : At 185 mph.) 875 mi. } of
At 225 mph.) 810 mi. } 5200 lb.

Maj. Gen. Carl Brandt, chief of USAF aircraft requirements; Maj. Gen. Donald Putt, director of research and development, and George Woods, special assistant to USAF Undersecretary Arthur Barrows. They indicated that USAF might be particularly interested in the possibilities of a DC-4 conversion with four Mambas, aimed at prolonging airframe life, decreasing maintenance costs and boosting performance of the current USAF C-54 fleet. A U. S. Navy group also inspected the Mamba DC-3. The Navy faces a reconversion problem on its fleet of R4D (Navy DC-3) transports which are now in operation.

Armstrong Siddeley believes commercial operators, who are concerned with hauls of 500 miles or less, will be particularly interested in the Mamba DC-3 since it will enable them to operate under the new requirements with

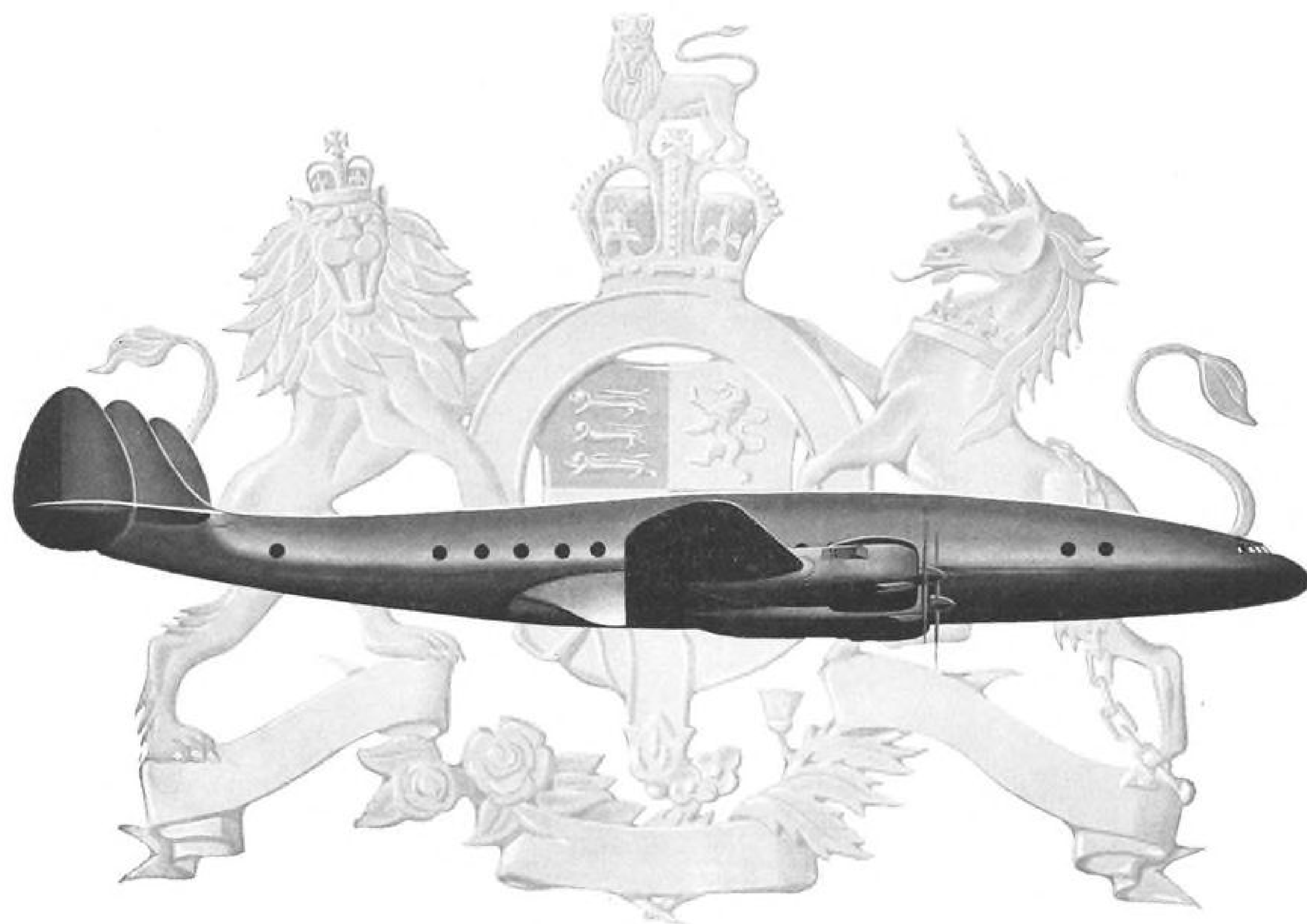
a payload only about 1200 lb. under their present allowances.

The Mamba II weighs 780 lb. compared with 1600 lb. for the Twin Wasp and about 1400 lb. for the Wright 1820 to be used in the Super DC-3.

► **Plan U. S. Tour**—The Mamba-powered DC-3 has now completed about 12 hours test flying with William Price-Owen, chief A-S test pilot at the controls. It was not allowed to fly in the SBAC show which is limited to British-built airframes and engines, but Armstrong Siddeley plans to bring it to North America so operators may compare it with the Douglas Super DC-3 which is now on an extensive sales tour.

The two Mambas are installed with their longitudinal axes in the same position as the Twin Wasp to avoid (Continued on page 41)

The Majestic Constellation



The newest member of the Lockheed Constellation family is the Union of South Africa. This government recently purchased a fleet of these 320-mile-an-hour transports for the South African Airways. Now, four members of the great Commonwealth of Nations fly the majestic Constellation.

Australia is represented by Qantas Empire Airways, India by Air India International and the United Kingdom by the British Overseas Airways Corp., all flying the Constellation. Eight other major world airlines also fly, and many have reordered, this famous *tried and proven* airliner, still the world's most reordered four-engined transport.

LOOK TO LOCKHEED FOR LEADERSHIP

Lockheed Constellation

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affecting the thrust line. Propeller rotation planes have been moved forward for CG reasons, bringing the blades opposite the cockpit. This will be changed in later conversions to conform with ICAO requirements.

Maximum diameter of the Twin Wasp nacelles has been retained for the sake of minimum structural changes although the Mamba diameter is considerably smaller. However, some drag reduction has been obtained through better flow over the tapered nacelle and elimination of cooling drag. Cooling intake on the nacelle underside has been replaced by a streamlined fairing for the retracted main wheels. Scottish Aviation Ltd., Douglas agents in Britain, assisted on the conversion.

► **Exhaust System**—The exhaust system is carried up over the top of the wing splitting to go round the main wheel strut and emerging about midway along the chord of the upper side of the wing in two triangular tailpipes. After initial tests, Armstrong Siddeley finds it can reduce the length of the tailpipes without any difficulty. There has been no sign yet of any deterioration of fabric-covered control surfaces on rudder and elevator or of rubber de-icing boots from the jet exhaust.

Two small cooling intakes are located on each side of the Mamba nacelle. One is for oil cooling and the other is used for internal cooling of the nacelle. Although internal tailpipe temperatures reach 590 degrees, it is possible to touch the outside of the exhaust pipes with your hand. Accessories located less than an inch away from the pipes are cool. The Mambas use either a compressed air or electric starter and can operate on either kerosene or 100 octane aviation gas.

► **Controls Simplified**—The normal two throttle, two propeller and two mixture controls on the DC-3 cockpit pedestal have been reduced to two throttle controls linked with the special Armstrong Siddeley automatic fuel and propeller control system and two high pressure fuel shut-off switches. Additional engine instruments include torque meters and tailpipe exhaust temperature gauges.

Price-Owen flew the Mamba DC-3 at a gross of 23,500 lb. with full fuel load using a maximum of 15,000 rpm. for takeoff and 14,000 rpm. for maximum cruise. Noise level was far below that of a Twin Wasp-powered DC-3 which flew for comparison with the Mamba job. Price-Owen demonstrated single-engine cruise, climb and maneuverability and re-lit the dead engine with no apparent difficulty. Full power is delivered to the propeller within two seconds of unfeathering with expectations of soon cutting the time lag down to one second.

► **Expect 1500 hp.**—Armstrong Sidde-

ley expects to develop 1500 hp. out of the present Mamba with some re-design of the rear of the turbine now under way. An even more powerful version—the Mamba III—is under development but no power estimates are available as yet.

The Mamba is expected to begin its commercial life with an overhaul period of 250 hours, with an increase to 500 within a year.

At present, de-icing is handled by bleeding turbine exhaust gas back into the front of the engine but plans are being worked out for methanol injection to provide de-icing of incoming air in addition to the thermal de-icing of the exposed engine surfaces.

► **Passed Tests**—The Mamba has passed its 150-hour military and civil type test and has about 8000 hours of test bed running with over 100 hours flight time in the Apollo airliner, Marathon feederliner, and the Athena and Balliol military trainers. The Mamba also completed a 500-hour endurance run according to official schedule with only 15 man-hours of maintenance during the test.

Devaluation

Westbound trans-Atlantic fares adjusted to dollar rates.

Long-term effect of foreign currency devaluations on overseas air travel will be beneficial, in the opinion of Warren Lee Pierson, TWA board chairman and next year's president of the International Air Transport Assn.

Devaluation will encourage American travel abroad because the value of the U.S. tourist's dollar is increased, Pierson declared. He said currency maneuvers will call for country-by-country reassessment of airline rate structures but expressed confidence no carrier would be so short-sighted as to take individual advantage of the situation.

► **Rates Vary**—Some dislocations in the North Atlantic rate structure followed immediately after last month's 30 percent devaluation of the British pound. U.S. operators raised their London-New York rate from about 86 pounds (which equalled \$350 before devaluation) to 125 pounds, the new equivalent of \$350. But British Overseas Airway Corp. continued to charge 86 pounds sterling (now only about \$240) for the westbound crossing—thus undercutting its U.S. competitors sharply.

IATA members immediately met in London to iron out the difficulties. It was decided that present dollar rates should continue over the North Atlantic.

Thus passengers buying a London-New York airline ticket will have to

pay 125 devalued British pounds or \$350. Similar rate hikes over the North Atlantic were proposed for other devalued currencies.

► **Dollar Fares Cut**—But IATA agreed to maintain rates in terms of British pounds sterling within the sterling area. Thus dollar-paying passengers flying within Europe, to the Middle East, Asia, Africa and Australia will benefit from 30 percent fare cuts.

This rate setup will continue at least until IATA's North Atlantic traffic conference meets in Mexico City early in November.

► **Mass Travel Studied**—Meanwhile, moves for early establishment of world-wide tourist-class air fares received a temporary setback at IATA's recently-concluded 30th anniversary meeting in The Hague. A traffic committee study-

ing the subject reported the reduced rates would be uneconomic.

Later, however, IATA decided that fare differentials may be advisable in some areas for slower and older airplanes. Regional traffic conferences were advised to study lower fares as a means of leveling off wide seasonal variations in traffic flows. It was also agreed that in the future rate changes should be adopted with less than unanimous consent.

Pan American Airways president Juan Trippe expressed belief that IATA members have become deeply interested in developing the mass air market. Northwest Airlines president Croll Hunter also voiced strong support for tourist rates.

Next year, IATA's general meeting will be held in the U. S.

► **Poor Business**—"Consequently, NWA has lost 2-cents-a-mile each on 60 percent of its coach passengers. Unless there is some misquotation, this looks like astonishingly poor business on Northwest's part," Putnam told Johnson, whose committee is investigating airline finances.

(A recent CAB study showed that not 60 percent but less than 35 percent of Northwest's coach passengers would have used regular-fare planes if the cut-rate service had been unavailable.)

Putnam conceded that where equipment is utilized at hours where it would otherwise be idle, experimental services are desirable provided a general breakdown of the rate structure does not occur.

"But to regard coach services as a panacea for the industry's basic troubles is unsound," Putnam said.

Rise in total mail payment for U. S. domestic and international carriers from \$42,967,000 in 1946 to \$69,489,000 in 1947, \$111,521,000 in 1948, and an estimated \$125 million in 1949 carries misleading implications, according to Putnam. He said the reason for the increase was that CAB had been behind in its rate cases, and the 1946 appropriation reflected only partial payment by the government on its accounts.

► **Mail Pay Declining**—"One cannot fairly call the process of catching up on over-due accounts an increase in mail pay or an increase in dependence on government. Actually, mail pay of the airlines per ton mile of mail carried has shown a steadily declining trend in the face of serious price rises."

Putnam Says Go Slow on Coach

Declares low fare flight would lose 20-cents-a-mile compared to flight at regular fare.

Certificated airlines should experiment in the air coach field with extreme caution, in the opinion of Chicago and Southern Air Lines board chairman Carleton Putnam.

Commenting on a speech made recently by Sen. Edwin Johnson (D., Colo.), Putnam challenged implications that the scheduled carriers have been remiss in not offering more coach service. Inferences that irregular carriers have shown superior vision in pioneering these cut-rate operations are unjustified, Putnam wrote the Senate Interstate and Foreign Commerce Committee chairman.

► **Aircoach Analysis**—Here's how Putnam sizes up air coach:

"A 50-passenger plane operating at 60 percent capacity (the industry's average load factor in first-half 1949) at the regular 6-cents-a-mile fare will take in \$1.80 a mile. The same plane operated at 80 percent capacity at the 4-cents-a-mile air coach rate will take in \$1.60.

"This is probably a reasonable comparison between load factors and returns on regular and coach service, with the coach operation taken at its best. The result is a comparative loss of 20-cents-a-mile on coach except insofar as costs are reduced by omission of meals and other services. These reductions probably would not exceed 7-cents-a-mile."

► **Other Side**—Putnam's analysis, observers noted, overlooks the fact that CAB requires certificated airlines operating air coach to employ higher-capacity planes. Northwest Airlines uses 44-passenger DC-4s for regular operations and

55-passenger DC-4s for coach flights. Thus at 80 percent load factor the company would take in \$1.76 a plane mile with a DC-4 air coach compared with \$1.58 a plane mile on a regular DC-4 at 60 percent load factor.

The C&S president quoted Johnson as saying that 40 percent of Northwest's coach passengers would not have traveled by air if it were not for the low fares. "If 40 percent would not have traveled by air," Putnam continued, "it follows that 60 percent would."



CENTRAL STARTS TO CARRY THE MAIL

Although weathered in on its first day of scheduled operations, Central Airlines next day inaugurated service on one segment of AM 81 from Fort Worth-Dallas to Oklahoma City with its single-engine Beech Bonanzas. The first haul included more

than 300 lb. of air mail, shown being unloaded at Oklahoma City by Pilot Gordon Bourland, left, the station agent of Continental Airlines, which has a consolidated ticket office with Central, and Sam Turner, of Central.

Putnam again attacked the proposed separation of service mail rates from "subsidy" payments. He said a few powerful carriers would like to see the subsidy stigma attached to other lines so that they can use it as an argument to take over "uneconomic" competitors. Surface carriers also would have a field day attacking appropriations ticketed directly for airline subsidy.

Air Coach Started On Southern Routes

Scheduled air coach service is making its first major penetration of the southern transportation market.

Last week, Eastern Air Lines inaugurated four-cents-a-mile service with late-evening 56-passenger DC-4 flights between New York and New Orleans via Washington, Atlanta and Birmingham. On Oct. 5 the low-fare operation will be extended from New Orleans to Houston.

Coincidentally with EAL's air coach inaugural, Capital Airlines extended its "Nighthawk" service from New York to New Orleans via Pittsburgh, Knoxville, Birmingham and Mobile; and from New York to Atlanta via Pittsburgh. Fifty-nine passenger DC-4s are being used.

► **New York-Miami Run**—On Nov. 1, National Airlines and Eastern plan to start New York-Miami air coach service with 56-passenger DC-4s. Intermediate stops will be at Washington and Jacksonville. New York-Miami coach fare will be \$46.80 against \$75.70 for regular six-cents-a-mile flights.

Meanwhile, Northwest Airlines has extended its DC-4 coach service to the Chicago-Portland, Ore., link. Western Air Lines is expected to start Los Angeles-San Francisco-Portland-Seattle operations with high-density DC-4s at four-cents-a-mile around the middle of this month.

► **Test Seen**—EAL and Capital coach flights from New York to Atlanta and New Orleans are expected to provide a severe test for the traffic-generating potentialities of the low-cost service. Delta Air Lines, in opposing the new operations, pointed out that regular-fare passenger traffic on the route is less than one-sixth the volume between New York and Chicago. In addition, rail fares are lower in the south, making diversion from train travel more difficult to accomplish.

Tigers Expand

The Flying Tiger Line, Burbank, Calif., has acquired six more planes to expand its recently-certificated all-cargo operations.

Five of the aircraft are C-46s leased from the Air Force. The other plane is a purchased C-54. President Robert

W. Prescott said the new equipment will soon be in service over the company's coast-to-coast routes.

The Tigers' fleet now includes 15 planes—seven C-54s, five C-46s and three C-47s. Total freight-carrying capacity is 75,000 lb.

Israeli Asks Permit

An Israeli carrier has asked CAB permission to start airline service between the Middle East and New York.

El-Al Israel National Airlines Co., Ltd., with headquarters at Tel Aviv, wants a foreign air carrier permit to fly from Lydda to the U.S. via points in Italy, Switzerland, France, England, Eire, Iceland, Greenland, the Azores and Canada. Organized in 1948, the company is partly owned by the Israeli government.

At present, the carrier owns two DC-4s which it has been operating to Rome and Paris. Purchase of additional aircraft, possibly DC-6s or Constellations, is anticipated, officials told CAB.

More Irregulars Cited By Board

Enforcement action against four more large irregular carriers charged with illegal operations has been announced by the Civil Aeronautics Board.

Peninsular Air Transport, Miami Springs, Fla., and Meteor Air Transport, Inc., Teterboro, N. J., were ordered to show cause why their nonscheduled letters of registration shouldn't be revoked for "knowing and wilful" violations of the Civil Aeronautics Act. Both allegedly have operated with excessive frequency and regularity and permitted tariff irregularities despite warnings from CAB.

► **Routes Cited**—Meteor has been especially active on the New York (Teterboro) to Detroit route, carrying passengers and cargo. Peninsular has been flying the New York-Miami-San Juan and New York-Los Angeles-San Francisco links.

Arnold Air Service, Anchorage, Alaska, was told to show cause why it should not be ordered to cease and desist from further violations of federal economic regulations. The company is accused of operating with excessive frequency and regularity between Anchorage and Seattle.

Airline Transport Carriers, Inc., Burbank, Calif., was ordered to stop leading the public to believe, directly or indirectly, that it operates regular flights between any two or more points. The transcontinental nonsked was forbidden to operate more than eight roundtrips between any two points during any four successive weeks.

Davis Confirmed

Nomination of Thomas W. S. Davis as assistant secretary of Commerce has been approved by the Senate.

A special assistant to United Air Lines President W. A. Patterson, Davis was named to the post last month by President Truman. His duties in the Commerce Department will relate for the most part to matters pertaining to aviation.

Davis has been with United Air Lines about five years. In 1939 and 1940 he was secretary to the Postmaster General. From 1933 to 1939 and from 1940 to 1942 he was employed by the Democratic National Committee.

New Star Route Contracts Readied

The Post Office Department is preparing to let its first contracts under air star route legislation recently passed by Congress.

CAB has been asked to certify that operation of a new route from Honolulu to a leper colony on the island of Molokai and continuance of an existing link from Charlevoix, Mich., to St. James, Mich., will not conflict with development of air transportation under the Civil Aeronautics Act.

► **Replaces Mule**—The proposed Hawaiian Island route from Honolulu to Kalaupapa, Molokai, is 54 miles long. Kalaupapa, the leper settlement, is separated from the rest of Molokai by a 1600 ft. precipice. Mail is now transported into Kalaupapa by messenger on muleback.

The 400 persons at Kalaupapa, including medical personnel, receive about 175 lb. of mail daily and dispatch about 50 lb. Post Office wants bids (on a poundage basis) to operate daily roundtrips into Kalaupapa's small airfield from Honolulu.

The 35-mile Charlevoix-St. James air route is operated only during mid-winter when Lake Michigan is frozen over.

St. James is on Beaver Island in the lake and receives mail service by power boat during the open season of navigation.

Pioneer Moving

Dispossessed of its present facilities at Houston, Tex., Municipal Airport, Pioneer Air Lines plans to shift its general offices and maintenance base to Love Field, Dallas.

The Air National Guard, which has a 99-year lease on the feederline's Houston hangar, gave PAL until Oct. 31 to move, although an extension of the deadline may be granted. Pioneer will build a hangar and office building

New kind of Buyer Now Dominates 4-Place Market

Surveys indicate that more and more sales in the 4-place airplane field are being made to business and professional men these days—men who haven't logged much time; and look for a rugged, safe and easy-to-fly plane.

Buyers like these are interested in a big, comfortable plane that they can fly safely themselves—and one that has maximum utility as a cargo-carrier. Many must make short or rough field landings a part of their every day flying. Small wonder then, that 1949 first quarter-figures find Ryan Navion leading sales in its price class.

Naturally Navion dealers are reaping increased profits from this market change.

A Ryan dealer franchise is one of the most generous in the industry. The product is backed by a unique and profitable service policy, and a hard-hitting national consumer advertising and merchandising program.

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(Adv.)

on the southeast end of Love Field, with completion expected in the first quarter of 1950.

► **Others Affected**—About 300 PAL employees and their families are involved in the shift. Houston Chamber of Commerce officials asserted that the Air National Guard could have remained at Ellington Field instead of forcing out the airline, with its \$1,250,000 annual payroll.

Other carriers are affected by the PAL move. Chicago & Southern Air Lines leased a third of Pioneer's space for servicing planes used on its Latin American run. Mid-Continent Airlines also used the hangar.

The shift to Dallas is expected to cost Pioneer \$75,000 in moving expenses.

Nonsked Violators

Transocean Air Lines, Oakland, Calif., and Seaboard & Western Airlines, New York, have violated the Civil Aeronautics Act in their foreign operations, according to CAB examiners.

Although finding the company's actions were not "knowing or wilful," Examiner Warren E. Baker said Transocean had violated federal laws by flying passengers in foreign air transportation as a common carrier without a certificate. TAL claimed the flights at

issue were under contract; but Baker said they were actually common carrier in nature even though a contract may have been signed.

► **Violations Listed**—Examiner Herbert K. Bryan said Seaboard & Western has illegally led the public to believe it operates regular cargo service (from New York to European points); has engaged in foreign transportation of passengers since Sept. 10, 1947 (when such activity was banned for nonscheduled operators); and has committed tariff violations.

Some of S&W's violations were found to be "knowing and wilful." It was recommended that both Transocean and Seaboard & Western be ordered to cease and desist from further illegal activity.

SHORTLINES

► **Air France**—Now flies to all six continents as a result of recent inauguration of service from Paris to Australia and Noumea, New Caledonia, via Tunis, Cairo, Basra, Karachi, Calcutta, Saigon and Batavia.

► **American**—Carried 1,400,000 parcels weighing 2,800,000 lb. during the first year of domestic air parcel post service ending Sept. 1.

► **American Overseas**—Harold R. Harris, vice president and general manager, described the four-jet, 36-passenger de Havilland Comet as "a first-class airplane" during his recent visit to the Society of British Aircraft Constructors exhibition in England. He said that "unless American manufacturers move rapidly it may eventually be necessary for U.S. operators to buy their next passenger planes abroad."

► **Canadian Pacific Air Lines**—Has inaugurated scheduled service from Vancouver to Tokyo and Hong Kong via the Aleutians.

► **Capital**—Together with Piedmont Aviation, a feeder, has received CAB authorization to serve Newport News, Va.

► **Chicago & Southern**—A CAB examiner has recommended that the carrier's application to abandon service to Peoria and Springfield, Ill., on economic grounds be approved.

► **FAMA**—Plans to open a new weekly DC-6 service between Buenos Aires and New York shortly with stops at Rio de Janeiro, Belem, Trinidad and Havana. The Argentine company's application for a foreign air carrier permit is now pending before CAB.

► **Mid-Continent**—Reports the trial arrangement under which nine Iowa fixed base operators have been acting as general agents for MCA since July 15 is proving successful. In the six

weeks ending Aug. 31, five of the fixed base operator-agents sold \$3000 worth of airline tickets for Mid-Continent.

► **National**—Inaugurated first-of-the-week family plan fares last month. Eastern, Chicago & Southern and Delta made similar tariffs effective about the same time. . . . NAL stockholders late last week were to vote on a proposal to increase the corporation's authorized stock by 600,000 shares. The increase covers options by Pan American Airways and W. R. Grace & Co. to purchase National stock.

► **Northeast**—Hit a three-year traffic peak in August when it carried 42,000 passengers—9000 more than in the same month last year. . . . NEA planned to put Convairs on its Boston-Montreal link last week.

► **Northwest**—Earned an operating profit of \$794,637 and a net of \$563,826 in August, bringing its net profit for the first eight months of 1949 to \$1,668,326, compared to a net loss of \$1,961,844 in the same period last year. President Croil Hunter said September looked like another profitable month.

► **Pan American**—Plans to inaugurate twice-weekly Stratocruiser service from San Francisco to Tokyo via Honolulu on Oct. 17. . . . Cargo flown to Hawaii during the first four months of the dock strike was four times greater than in the same period last year.

► **Wisconsin Central**—Showed a \$19,431 operating profit in August. The feeder made money during six of the first eight months of 1949.

CAB SCHEDULE

Oct. 3—Prehearing conference in Trans-Texas Airways' certificate renewal case. (Docket 3720)

Oct. 3—Hearing on Seaboard & Western and Transocean Air Lines applications for all-cargo certificates between the U. S., Europe and the Middle East. (Docket 3041 et al)

Oct. 3—Hearing on Hughes Tool Co. control of TWA. (Docket 2796)

Oct. 7—Hearing on foreign air carrier permit application of the Spanish airline "Iberia". (Docket 4038)

Oct. 10—Hearing on CAB investigation of International Air Transport Assn. agency resolutions. (Docket 3350)

Oct. 10—Hearing in Monarch-Arizona Airways merger case. (Docket 3977)

Oct. 17—Prehearing conference on CAB investigation of Twin Cities-Washington and Detroit-Washington service. (Docket 3661)

Oct. 17—Hearing on service to Springfield, Mass., through Bradley Field. Postponed from Oct. 3. (Dockets 3748 et al)

Oct. 17—Hearing in air freight tariff agreement case. (Docket 2719 et al)

Nov. 14—Hearing on final mail rate for Florida Airways. (Docket 3695)

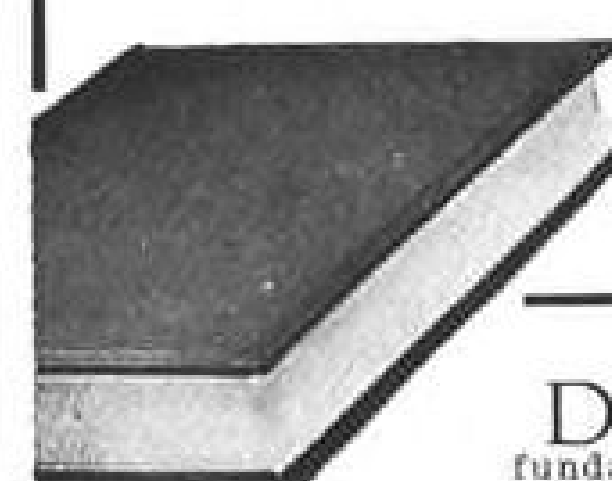
Nov. 14—Hearing in New York area helicopter case. (Docket 946 et al)

Dec. 5—Hearing in Western-Inland mail rate case. (Docket 2870)

Jan. 9—Hearing in air freight rate case. (Docket 1705 et al)

Jan. 15—Hearing in Colonial Airlines mail rate case. (Docket 2724)

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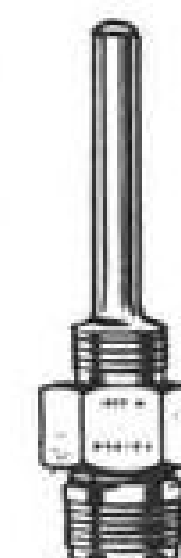
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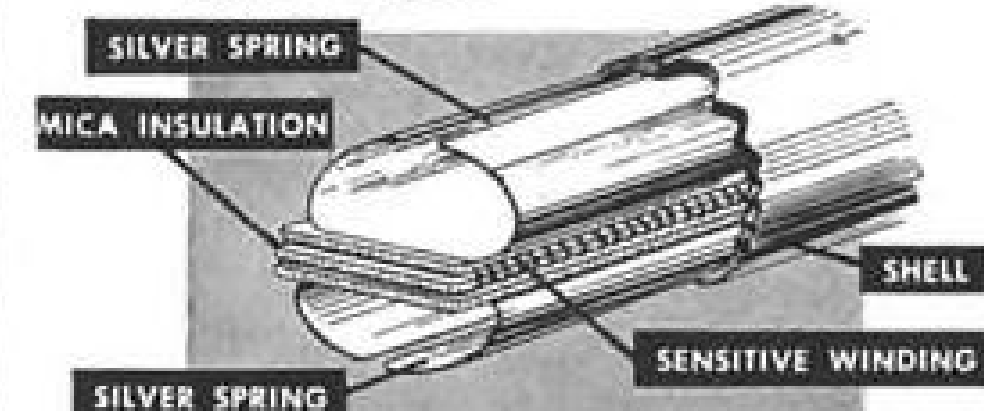
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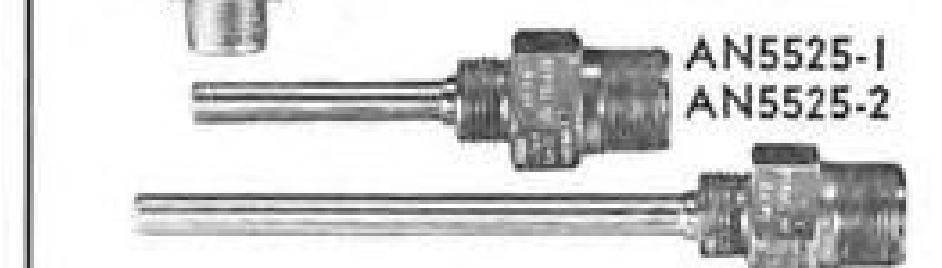


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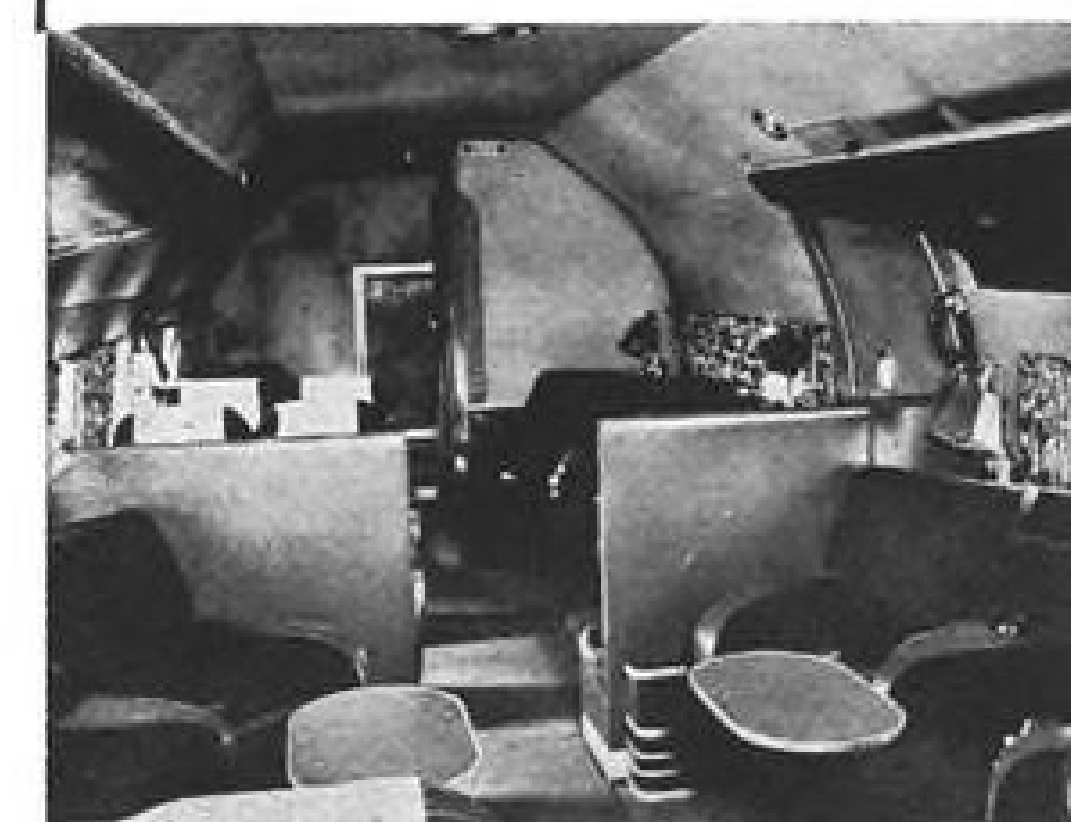
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"Atomic Energy Levels, Vol. 1" (containing sections 1-3) of National Bureau of Standards Circular 467, by Charlotte E. Moore, is a critically evaluated compilation of atomic elements 1-33. Obtainable from Supt. of Documents, Government Printing Office, Washington 25, D.C., 352 pp.

"Heat Transfer,—Vol. 1," by Dr. Max Jakob, is first volume of a set of two devoted to fundamentals of heat transfer, published by John Wiley & Sons, New York.

Trade Literature

Brochure put out by The Franklin Institute describes greatly expanded facilities of their research and development laboratories. Available by writing to: Administration Division, The Franklin Institute Laboratories for Research and Development, Benjamin Franklin Pkwy., at 20 St., Philadelphia 3, Pa.

Catalog covering radio and electronic equipment for industrial maintenance, research, and production is available from Allied Radio Corp., 833 West Jackson Blvd., Chicago 7, Ill.

"Case Studies in the Reduction of Metal Working Costs," is booklet covering 17 case studies made in metal working plants. Available from Hydraulic Press Manufacturing Co., Mount Gilead, Ohio.

Folders and booklets are available on new IBM products covering cardtype, accounting machine with wheel printing, card-programmed electronic calculator, electronic statistical machine, card punch, electronic collator, and consecutive spacing time recorder. Write International Business Machines Corp., 590 Madison Ave., New York 22, N. Y.

ADVERTISERS INDEXAVIATION WEEK
OCTOBER 3, 1949

A C Spark Plug Div., G.M.C.	34
Agency—D. P. Brothier & Co., Inc.	
Airborne Accessories Corp.	25
Agency—Weber-Thomson Associates	
B G Corporation, The	Front Cover
Agency—Albert Frank—Gunther Law, Inc.	
Beech Aircraft Corp.	Fourth Cover
Agency—Erwin, Wasey & Co., Inc.	
Edison, Inc., Thomas A.	45
Agency—The Schuyler Hopper Co.	
General Electric Company	9
Agency—G. M. Basford Co.	
Goodrich Co., The B. F.	3
Agency—Batten, Barton, Durstine & Osborn, Inc.	
Jack & Heintz Precision Industries, Inc.	23
Agency—Fuller & Smith & Ross, Inc.	
Kollsman Instrument Corp.	44
Agency—Erwin, Wasey & Co., Inc.	
Lewis Engineering Co., The	45
Lockheed Aircraft Corp.	40, 41
Agency—Foote, Cone & Belding Adv.	
McGraw-Hill Book Co., Inc.	45
National Aeronautical Corp.	8
Agency—J. Branch Briggs Adv.	
National Screw & Mfg. Co., The	49
Agency—Fuller & Smith & Ross, Inc.	
Phillips Petroleum Co.	5
Agency—Lambert & Feasley, Inc.	
Ryan Aeronautical Company	44
Agency—Batten, Barton, Durstine & Osborn, Inc.	
Searchlight Section	46, 47, 48, 49
Socony-Vacuum Oil Co., Inc.	19
Agency—Compton Advertising, Inc.	
Southwest Airmotive Company	8
Agency—Wilhelm-Laughlin-Wilson & Assoc.	
Sperry Gyroscope Company	Third Cover
Agency—Charles Dallas Reach Co., Inc.	
Stewart Warner Corp.	20
Agency—MacFarland, Aveyard & Co.	
Surface Combustion Corp.	37
Agency—Odiome Industrial Adv.	
Titeflex, Inc.	4
Agency—Sykes Adv., Inc.	
Truscon Steel Company	6
Agency—Meldrum & Fewsmith, Inc.	
Vickers, Incorporated	24
Agency—Witte & Burden Adv.	
Westinghouse Air Brake Co.	Second Cover
Agency—Ketchum, MacLeod & Grove, Inc.	
Whittaker Co., Ltd., Wm. R.	31
Agency—The McCarty Co.	

PROFESSIONAL SERVICES..... 46

SEARCHLIGHT SECTION
(Classified Advertising)

EMPLOYMENT	
Positions Vacant	46
Positions Wanted	46
Employment Agencies	46
EDUCATIONAL	
Schools	46
PLANES—EQUIPMENT	
(Used or Surplus New)	
For Sale	46-48

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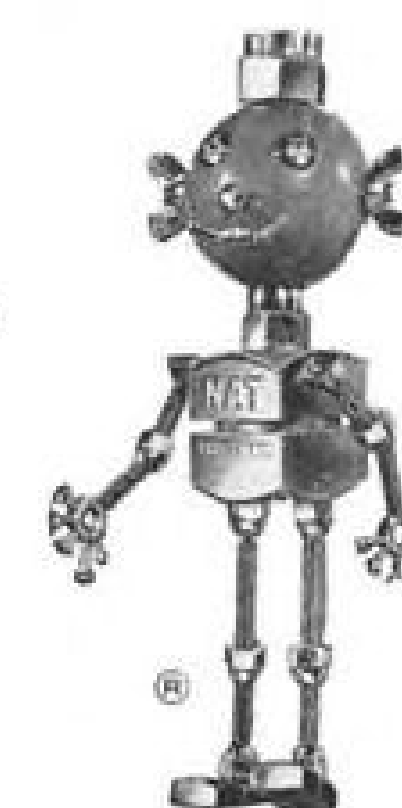
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EDITORIAL

Stop the Gobble-Gabble

There must be something to this bargain fare business, after all! Seven more continental airlines introduce or extend lower passenger rates while a few die-hard skeptics stand by and say it can't be done.

Eastern Air Lines starts its first four-cents-a-mile flights from New York into the South, and will extend them further next month.

Capital opens air coach service from New York to the South and Southeast.

National Airlines and Eastern will open New York-Miami coach service in November.

Northwest extends its coaches to include a Chicago-Portland link.

Western will soon start coach flights connecting major Pacific Coast cities.

TWA wins permission from CAB to continue its DC-3 coaches a few months longer between Kansas City and the West Coast.

Trans-Canada Air Lines starts a reduced rate family fare plan.

It may well be that all of these experimental services will not pay off. But at least these progressive operators are willing to try it, and we wish them well. At least they are not spending all their time over the slide rules, proving it can't be done, or wailing only for bigger and better payments from the Post Office Dept.

The skeptics are going even further than claiming all air coaches are impractical. They are misrepresenting the case by insinuating that advocates of air coach service have been painting it as the arrival of the millennium. One last week, admitting an advantage or two, said hastily, "But to regard coach services as a panacea for the industry's basic troubles is unsound." No one that we know has painted the air coach picture as the sole answer to the industry's prayers. It is perhaps significant to note that this same skeptic also takes a stand against separating service mail rates from subsidy payments to the airlines.

We hope the air coach skeptics will stop setting up the "air coach panacea" straw man in order to knock him over.

Give the air coach a chance. Wherever it works we will make progress; wherever it doesn't, we should stop it. But let's stop the gobble-gabble and the calamity howling and try to fly the millions.

Publicity for Contracts

Today, AVIATION WEEK offers another new industrial intelligence service to its readers. Today and monthly hereafter, we shall list the latest negotiated contracts of

\$100,000 or more, placed with industry by the U. S. Air Force.

Months ago, we began publishing USAF bid invitations, and awards made after competitive bidding. Such listings, originally requested only by AVIATION WEEK, are now sent directly by Wright Field to this magazine, as well as other publications.

The negotiated contracts, however, have never been regularly publicized, and today's listings mark the culmination of a year's persistent and continuous efforts by AVIATION WEEK to clear away the mystery from these transactions.

Our first request for such information was sent to Wright Field in August, 1948. We continued our efforts both in Dayton and Washington. Editorials on the subject appeared in this magazine Nov. 22, 1948, and June 6, 1949.

Our entreaties finally were made personally to Air Force Secretary Symington, who agreed with our contention that all Air Force contracts, except a few involving secret materials or products, should be announced quickly.

Even after Mr. Symington's approval, however, his under secretary of the air force, Arthur S. Barrows, strenuously objected to such publicity on the grounds that the government would thus be unable to drive as hard a bargain with industry if individual negotiated contracts were publicized.

For four or five months Mr. Barrows and Wright Field blocked distribution of the contract information to AVIATION WEEK by a variety of delaying tactics and red tape.

The flow still is not complete, and we have yet to receive listings of contracts under \$100,000, which we have also requested for publication. These have been promised, however.

We have faith in Mr. Symington and in his determination that his orders will be carried out. We congratulate the Secretary on this revision in Air Force policy, and venture the suggestion that if the Air Force had thus subjected all of its wartime contracts to the full light of public scrutiny, the sensational Benny Meyers scandal would have been detected long before it reached the astronomical proportions that it did.

We believe that any disadvantage of the kind Mr. Barrows fears will be more than offset by the long term advantages of telling the public how its money is being spent.

We remind Mr. Barrows that it has long been the practice of this government to reveal this information. No other government agency that we know of attempts to hide from the press its routine contracts with industry, or other general expenditures.

Robert H. Wood

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- ★ **Extra comfort** — From the moment you step (not climb!) into a Beechcraft Bonanza through its wide, auto-type door and settle yourself in its uncrowded 4-place interior, you're conscious of superb comfort. Its sound-proofing is the standard of comparison!
- ★ **Extra luxury** — Skilled design and placement, with superb interior appointments, make the Beechcraft Bonanza an aerial limousine. You'll lean back and relax and enjoy air travel as never before! Its only rival for sheer luxury is the multi-engined airliner itself!

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Compare these comfort features

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