

AVIATION WEEK

A MCGRAW-HILL PUBLICATION

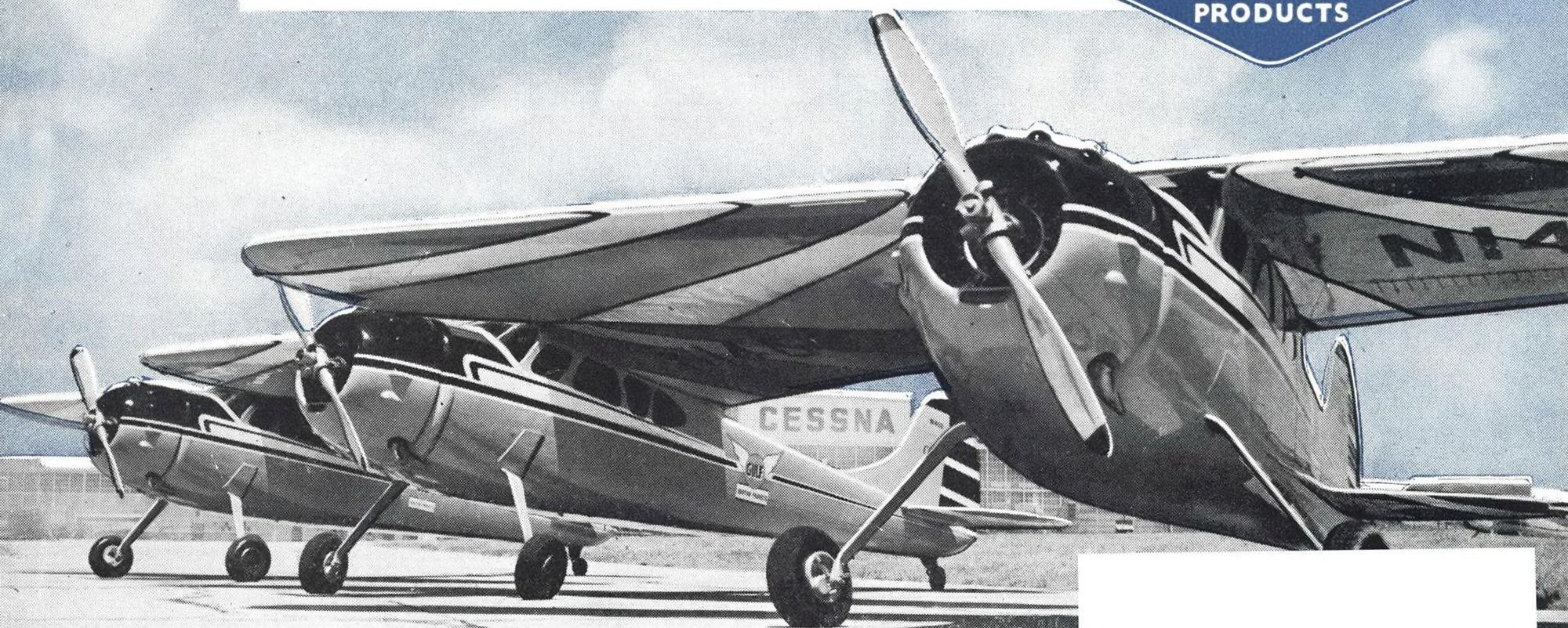
JAN. 8, 1951

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Aviation Week



Member



Volume 54

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Number 2

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January 8, 1951

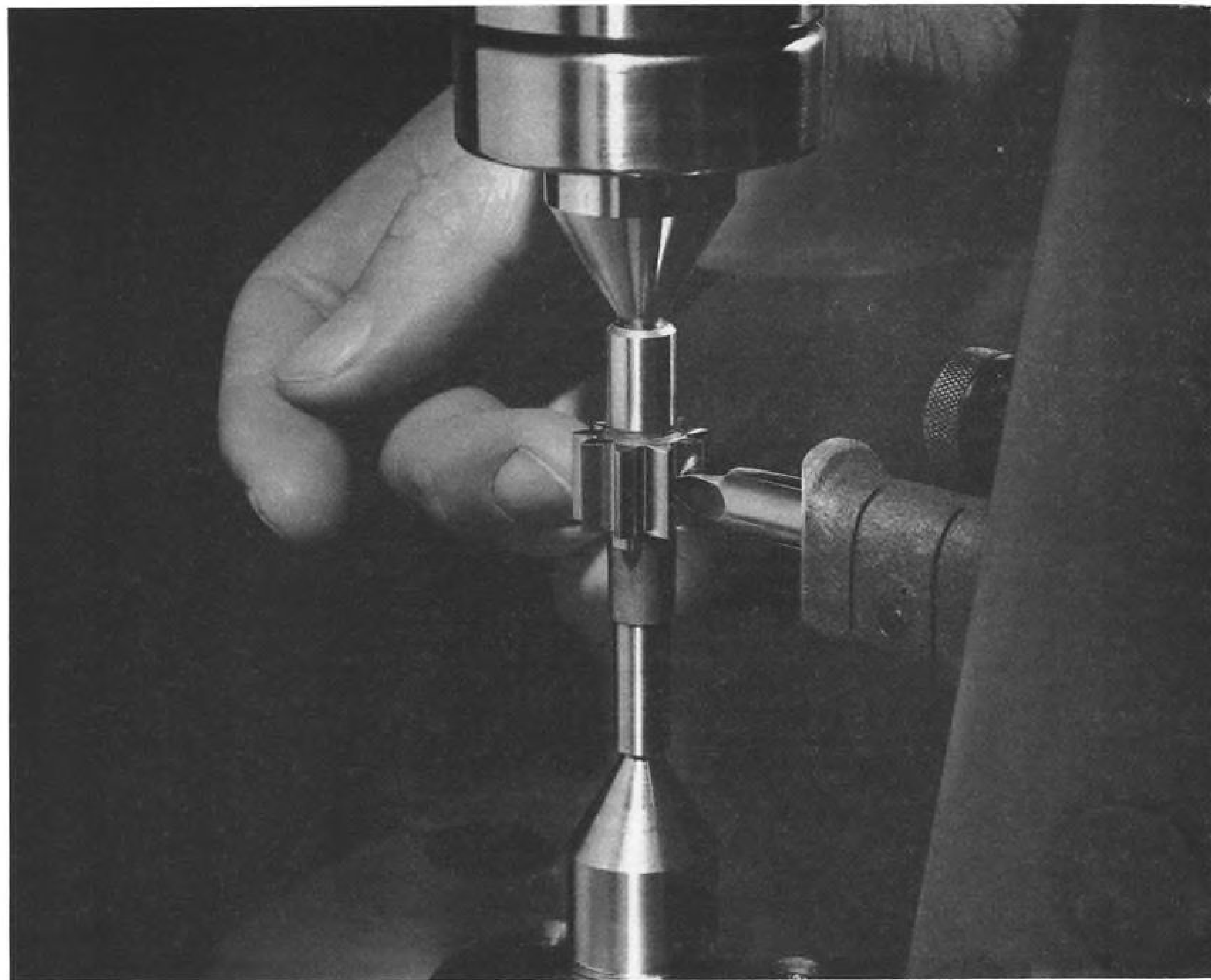
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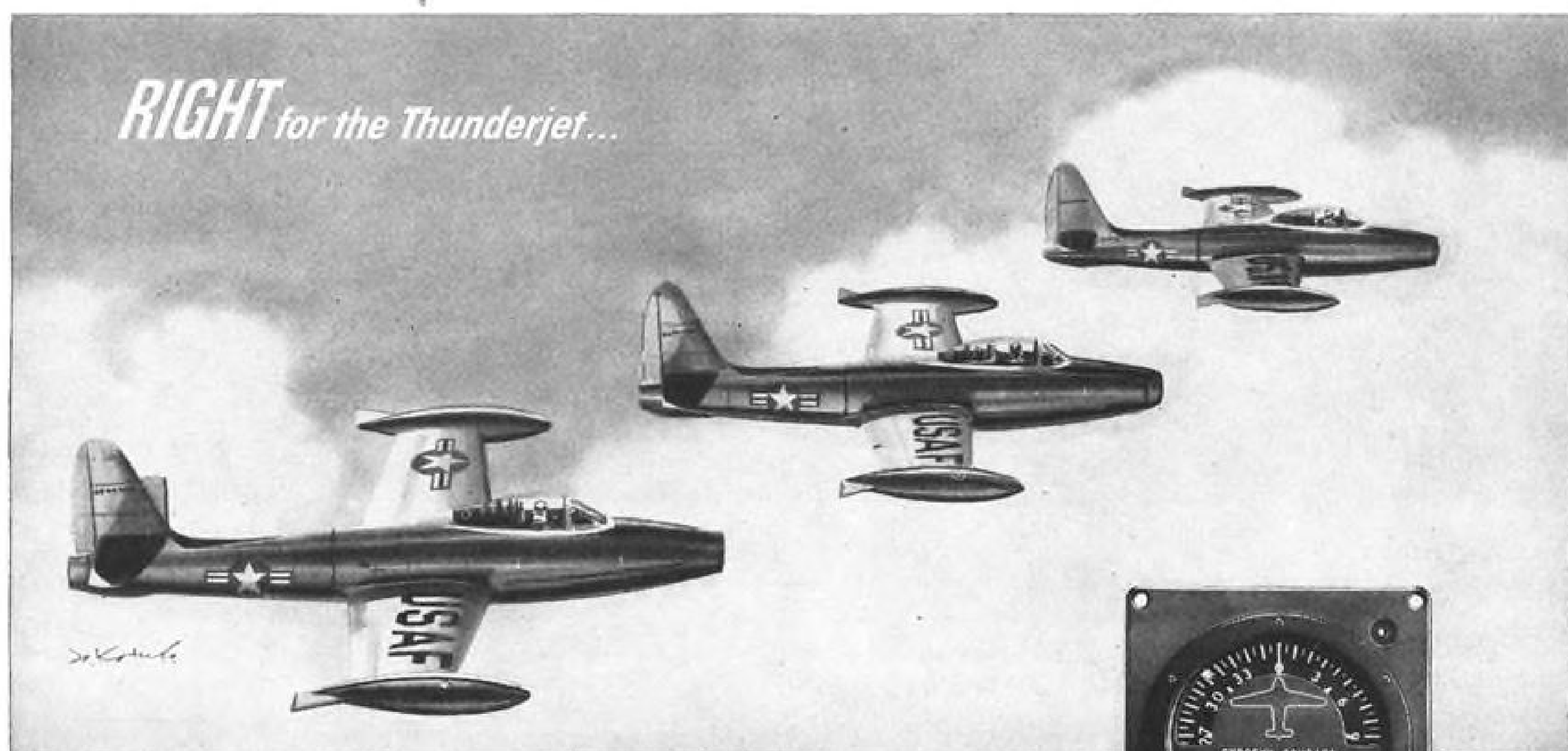
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NEWS DIGEST

DOMESTIC

First modernized B-36B, modified to D standards, has been delivered by Convair San Diego to Strategic Air Command. Added were four GE J-47 jets and other new equipment.

Shipment of 228 two- to 10-place personal and executive planes was made by 11 companies during November. Total dollar value (makers' net billing price) for the craft was \$1,428,000. In October, nine manufacturers shipped 213 planes worth \$1,276,000. During November nine companies exported 52 personal and executive planes valued at \$198,614 compared with 86 planes exported the previous month having a value of \$288,509.

Safety trophy has been established by the Marines to be awarded annually to the Organized Marine Air Reserve fighter squadron with the best safety record for the calendar year. The trophy is established in memory of the late Lt. Joseph F. Ross, Jr., USMCR.

All-weather fighter defense for New York has been activated with basing of Lockheed F-94 two-place radar-equipped planes at McGuire AFB, N. J. The planes and crews are on 24-hr. standby alert.

Boeing Aircraft launched an all-out B-47 hiring campaign by offering a total of \$500 in cash prizes to the employees responsible for the hiring of the most new skilled help during January and the first half of February.

New international altitude record for gliders, 42,000 ft., was claimed by W. S. Ivans, Jr., a Convair engineer, flying a pressurized Schweizer all-metal 1-23. Ivans utilized a standing wave in the Sierras between Bishop, Calif. and Mt. Whitney.

Air Line Pilots Association will be able to bargain for union shops with dues check-offs from salary checks under legislation Congress has completed action on. Unions coming under the Taft-Hartley act already have this right. The measure extends it to unions under the Railway Labor Act.

Maj. Gen. S. R. Brentnall, formerly chief of research and development at Wright Field, has been assigned to direct output of the Boeing B-47 Stratojet medium bomber. This marked the second time the USAF has placed a

general officer on a single plane project. The first was Gen. K. B. Wolfe's assignment during World War II to head up the Wright Field project that resulted in the first B-29 strikes on Tokyo.

Prof. Emile Allard, died recently in Belgium at the age of 67. A director of Belgian Airlines (Sabena), Prof. Allard was one of the pioneers who established airline service in the Belgian Congo and later linked Sabena-Europe with Sabena-Africa. He also had a very active technical aviation career.

Another four-star general may be added to USAF brass. The President's declaration of a national emergency lifted the legal limit on the number of top-ranking admirals and generals. Best prospect for promotion: Lt. Gen. Lauris Norstad, now commander of U. S. Air Forces in Europe and adviser to Gen. Eisenhower. Present USAF generals are Joseph McNamee, George Kenney, Hoyt Vandenberg and Nathan Twining. In line for another star by reason of seniority are Lt. Gens. John Cannon, George Stratemeyer, Dennis Whitehead, Curtis LeMay. Vice chief of Naval operations, Vice Adm. Lynde McCormick has already been promoted to full admiral.

FINANCIAL


Air Associates, Inc., sales for the fiscal year ended Sept. 30, 1950, were \$6,113,201, and operations resulted in a net profit of \$18,014 after federal income taxes.

Solar Aircraft, Inc. total revenues for the six months ended Oct. 31, 1950 were \$9,242,879, with net income of \$258,994. The firm has unfilled orders totaling about \$20 million.

INTERNATIONAL

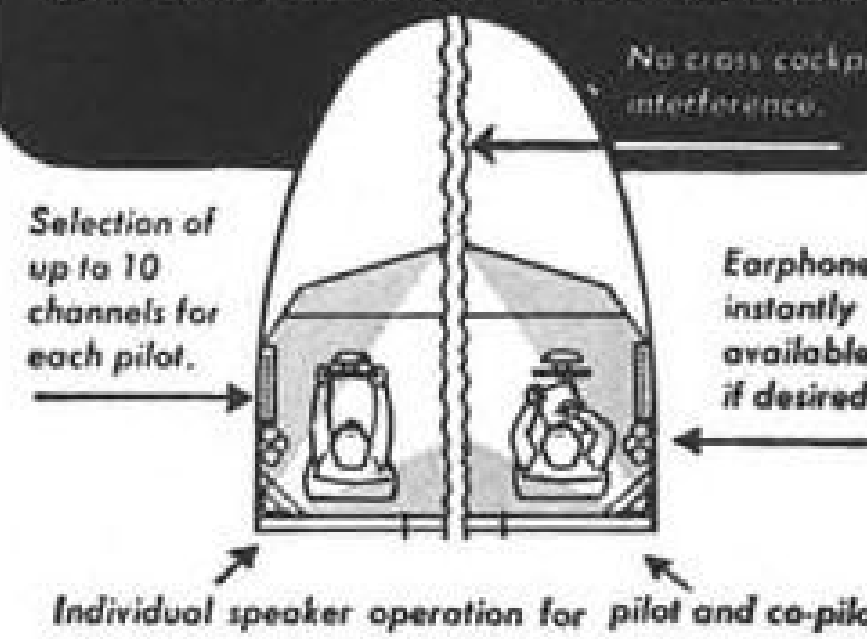
First flight of England's Bristol 173 twin-rotor helicopter is expected soon. The craft is powered by two Alvis Leonides engines, uses the same rotors as Bristol's already proven 171, and reportedly resembles the Piasecki HUP.

New Swedish jet engine will be developed by two engineering companies, STAL and Svenska Flygmotor A. B. The engine will follow the lines of STAL's earlier 3200-lb. thrust Skuten, but with at least 50 percent greater thrust. It is intended for the fighter now being designed by SAAB to succeed its J-29, of which 500 have been ordered by the Swedish air force.



THE CHANNEL ISOLATOR

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Selection of up to 10 channels for each pilot.

Individual speaker operation for pilot and co-pilot.

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- 10-channel Selection For Each Pilot
- Individual Speaker Operation

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CAATC No. 1R4-1 Weight 8 lbs.

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Dependable Electronic Equipment Since 1928

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Savings and product improvement can often be made by Lavelle's Special Engineering Staff in their continuing search for better ways to do a better job.



AIRCRAFT CORPORATION
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AVIATION CALENDAR

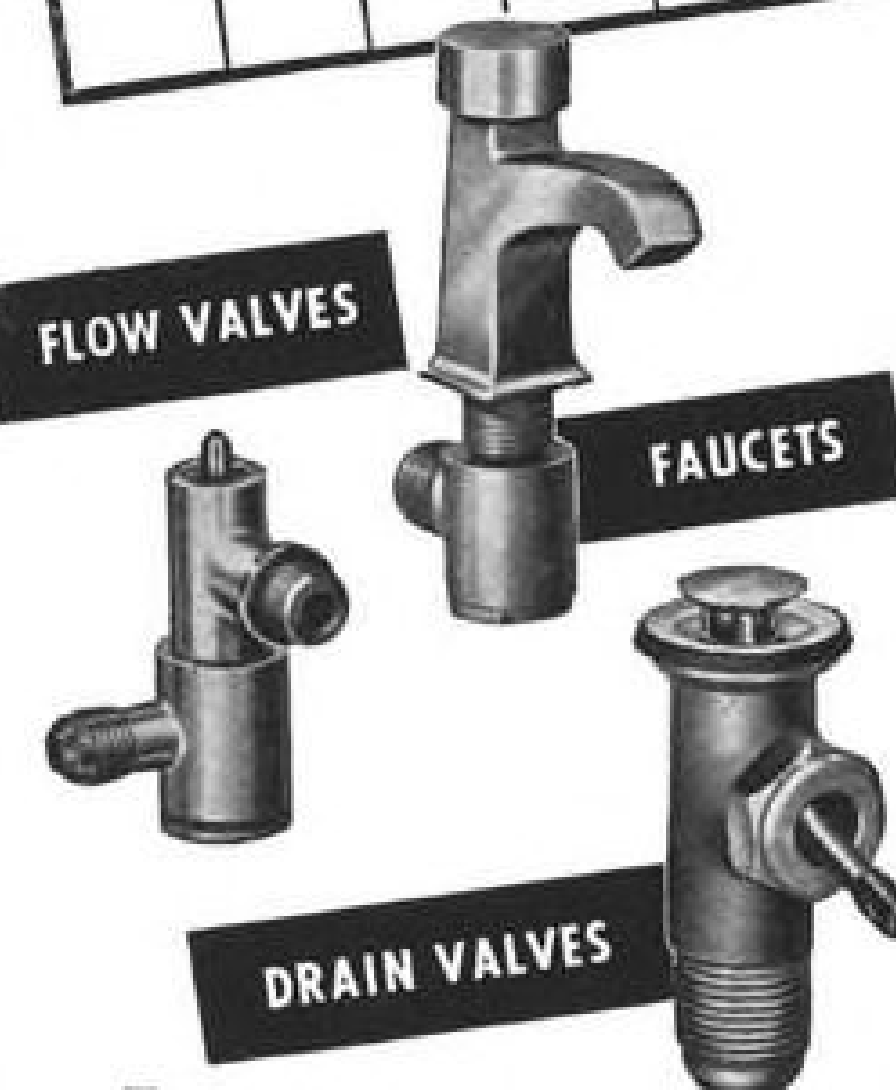
- Jan. 8-10—Eighth annual air cruise Miami-Havana, and return, of Florida Air Pilots Assn.
- Jan. 8-12—1951 annual meeting of the Society of Automotive Engineers, Hotel Book Cadillac, Detroit.
- Jan. 9-26—Third annual Institute of Industrial Transportation and Traffic, Washington, D. C.
- Jan. 13-14, 20-21—First soaring contest of the Northern California Soaring Assn., Warm Springs Airport. Write Emil Kissel, contest committee, Warm Springs Airport, Warm Springs, Calif.
- Jan. 15-16—Annual Cessna distributors meeting, Wichita, Kan.
- Jan. 15-18—Plant maintenance show and concurrent conference on plant maintenance techniques, Cleveland, Ohio.
- Jan. 21—Air education day, sponsored by the Palm Springs Junior Chamber of Commerce, Palm Springs Airport, Calif.
- Jan. 22-26—Winter general meeting, American Institute of Electrical Engineers, Hotel Statler, New York.
- Jan. 29-Feb. 1—19th annual meeting of the Institute of Aeronautical Sciences, Hotel Astor, N. Y.
- Feb. 1-2—Annual spring management conference, sponsored by the Society for Advancement of Management and Northwestern University Centennial Committee, Chicago Campus, Northwestern University, Chicago.
- Feb. 5-6—International Air Transport Assn. medical committee meeting, Cairo, Egypt.
- Feb. 14-18—Annual aviation fiesta, sponsored by aviation department, Orlando, Fla.
- Feb. 19-20—Meeting covering agricultural research as related to aviation, sponsored by the Flying Farmers of America, Memphis.
- Mar. 12-13—Short course on uses of aerial equipment in agriculture, Purdue University, West Lafayette, Ind.
- Mar. 16—Sixth annual flight propulsion meeting, Institute of Aeronautical Sciences, Hotel Carter, Cleveland.
- Mar. 19-23—Seventh Western Metal Exposition, Oakland Auditorium and Exposition Hall, Oakland, Calif.
- Apr. 16-18—Society of Automotive Engineer's national aeronautic meeting and aircraft engine display, Hotel Statler, New York.
- Apr. 24-26—ATA annual engineering and maintenance conference, Hotel Drake, Chicago.
- May 17-19—Annual convention of the Women's Aeronautical Assn. of the U. S. Little Rock, Ark.
- June 11-15—Second annual conference on industrial research, conducted by Columbia University Dept. of Industrial Engineering, New York.

PICTURE CREDITS

9—(top) Convair, (center, bottom) Howard Levy; 21—de Havilland Aircraft Co., Ltd.; 31—McGraw-Hill World News; 36—Fairchild Engine & Aircraft Corp.

SANITARY PLUMBING

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CONVAIR-LINER ROCKETS UP—One of two 41,790-lb. gross 240-s bought by Ethiopian Air Lines shows one-engine take-off (note port prop feathered) using a single Rato bottle. These Convairs have Rato as a standby when operating from high-altitude fields.

Aviation News Picture Highlights



FRENCH COMPOSITE—Breguet 960 carrier-based fighter (left), seen in artist's sketch, is now being flight tested. Plane is powered by an Armstrong Siddeley Mamba turboprop in the nose and a Rolls-Royce Nene turbojet in the fuselage. The 960 can cruise on the Mamba alone for four hours at 233 mph.; uses both engines for climb and combat. Top speed using Mamba and Nene is 600 and duration one hour. Grossing 10 tons, the new Breguet is designed to take off in 400 ft. using Rato. Note narrow intakes in wing leading edge for the Nene turbojet engine. This turboprop-plus-jet scheme was first tried out in the U. S. with the Convair XF-81, which had a GE TG-180 in the nose and a J-33 in the tail.

DUTCH JET TRAINER—Nearing completion is the Fokker S.14 2-3 place jet trainer (right) powered by a Rolls Royce Derwent 5 (AVIATION WEEK, Aug. 8, 1949). Sketch shows craft's striking resemblance to Douglas Skystreak. Two occupants sit side by side, third just behind them.



NEW BREDA TRANSPORT—Breda 471 (below) is a new 18-passenger transport being flight tested in Italy. Top speed of 286 mph. is planned with two P&W R-1830 engines of 1200 hp. each. Wing center section is of inverted gull configuration.



ALL SUCCESS TO YOUR NEW FLEET...



CHICAGO AND SOUTHERN AIRLINES

► Seventeen years ago, Pacific Seaboard Airlines—now Chicago and Southern Airlines—was flying the "milk route" from San Francisco to Los Angeles with two Whirlwind-powered Bellancas.

► Today, the Wright-powered Chicago and Southern New Luxury Constellation provides the fastest service in history between Chicago and Houston . . . 4 hours, 7 minutes northbound; 4 hours, 17 minutes southbound . . . also fastest between St. Louis and Chicago . . . and non-stop flights between St. Louis and Houston in 2 hours, 37 minutes northbound; 2 hours, 47 minutes southbound.

► On December 15th, Constellation

service by C&S was extended into the Caribbean to Cuba, Jamaica and Venezuela. Thus C&S is fully living up to its slogan . . . "More Speed—More Comfort—More Service."

► Wright Aeronautical salutes you . . . Chicago and Southern Airlines . . . for your remarkable advancement from early "shoestring" operations to one of the great airlines of the United States. From our long association with you, we know your many outstanding contributions to air progress.

THE POWER BEHIND MANY C & S "FIRSTS"

► From this progressive airline have come such important innovations as . . .

pressurized ignition harness, quick-change flight panel, magneto ventilation system, centralized radio control, oil temperature regulation mountings, run-in of complete engine nacelle, chime signals, seat-belt signs and wing lights for de-icers. During World War II, the Army Air Force got vital assistance from the C&S "tailor shop for bombers."

► Wright engines have powered Chicago and Southern Airlines' entire transport career. And Wright Aeronautical is now developing through research and engineering more and better power to help C&S and other leading airlines of the world to achieve even higher levels of performance.

WRIGHT Aeronautical Corporation, Wood-Ridge, N. J.
A DIVISION OF CURTISS-WRIGHT CORPORATION

WHO'S WHERE

In the Front Office

Charles L. Hardy has been named president of Joseph T. Ryerson & Son, Inc., steel warehouse organization. Hardy replaces Everett D. Graff, who became chairman of the executive committee. Thomas Z. Hayward was elected vice president-sales. Both Hardy and Hayward were appointed directors and members of the executive committee. Hardy came to Ryerson in 1927; Hayward joined the firm in 1917.

Warren R. Mellin has been named assistant to United Air Lines' executive vice president. He was formerly UAL's regulations manager.

Changes

Les Barnes has been appointed director of operations in Air Transport Assn.'s operations and engineering department . . . John D. Kline has been named manager of the Los Angeles zone for Allison division of General Motors, succeeding Alfred C. Steger, who has been on extended leave because of illness and will now work on special assignment.

Rear Adm. John M. Hoskins, USN, has been ordered to report as Commander, Pacific division of Military Air Transportation Service. Hoskins was in command of a Pacific Fleet carrier division. New vice commander of MATS is Rear Adm. Hugh H. Goodwin.

Revere Corp. changes: Dennison H. MacDonald has been promoted to director of research and development, Perry C. Badgley has been named sales manager, and John J. McGrath has been made manufacturing manager. . . . Joseph R. O'Connor, formerly assistant to the sales manager of Curtiss Propeller division, has been appointed purchasing agent of Facile Corp., N. J., laminated products maker.

Emil Jarz has resigned as assistant personnel director of American Airlines after five years with AOA and AA. . . . W. E. Broughton has been appointed assistant director Trans World Airlines, and Walter Menke has been named administrative assistant to the airline's director of public relations.

Honors and Elections

Richard F. Bradley, manager of the aviation division, marketing department, Standard Oil of California, has been elected chairman of the Aviation Advisory Committee of the American Petroleum Industries Committee for 1951. He succeeds John P. Knight of Gulf Oil. David H. Young of Pure Oil was elected vice chairman of the committee, succeeding Middleton DeCamp of Standard Oil of Kentucky.

Richard W. Darrow, Glenn L. Martin public relations director, has been named 1950's most outstanding young man by the Baltimore Junior Association of Commerce.

James S. Lee has been elected a director of United Aircraft Export Corp. He has been with Pratt & Whitney Aircraft and the export division for 14 years, and a vice president of the latter since 1947.

INDUSTRY OBSERVER

► Pentagon sources say Air Materiel Command headquarters, Wright-Patterson AFB, has given Glenn L. Martin Co. a letter of intent ordering production of the 500-mi. Matador guided missile. Matador, an Air Force project, originally the MX-771, is now YSSM. Project was combined with Navy's Regulus. Final production version will be the SSM weighing approximately 12,000 lb. Matador will be in service early in 1952.

► Interesting sidelight of negotiations presently under way between Republic Aviation and General Motors Corp. in licensing agreements for F-84F manufacture is the probability that GM will be installing British Armstrong-Siddeley 7200-lb.-thrust Sapphires in the fighter instead of GM's own Allison jet engines which now power earlier model F-84Es.

► McDonnell Aircraft's Little Henry ramjet helicopter was demonstrated recently to military officials and pilot trainees at USAF's helicopter school, Connolly AFB, Tex. Copter was packed aboard a Fairchild C-82 and flown to the base for the demonstration. Army and Air Force personnel were shown Little Henry's capabilities in hovering, slow forward, sideward and backward flight, takeoffs, climbs, turns, and autorotative power-off glides and emergency landings.

► Allison J-33 and J-35 turbojets have built up a flight operations total of more than 500,000 hr. in USAF and Navy planes, a recent tabulation shows. No other jet engine manufacturer in the world has achieved this much flight operational time, the GM division asserts.

► De Havilland of Canada is delivering its first Beaver to New Zealand shortly after the first of the year. It expects additional Beaver orders from that country. The versatile 450-hp. Canadian plane will be supplied with a hopper for aerial dusting and seeding, to Rural Aviation Ltd. of New Plymouth. It will be delivered at a sterling cost equivalent to approximately \$28,000.

► Airspeed, Ltd., expected to have its pre-production Ambassador prototype transport flying again about Jan. 1, following repairs after a too-hot landing which broke both engine mountings, causing both engines to be dropped from the nacelles (AVIATION WEEK Dec. 25). A gusty cross-wind resulted in a landing load 2.5 times as great as the design load maximum on the main landing gear, the manufacturer reported. Part of the excess load was passed on to the engine mounts resulting in the failure. Repairs included beefing up the mounts structures to prevent recurrence of such an accident.

► Further indication of the importance of the Boeing B-47B Stratojet bomber in the total USAF program is seen in the news that Link Aviation, Inc., has received a \$2-million USAF contract to produce trainers with cockpits and action simulating that of the B-47B. First of the trainers is to be completed late in 1951, and the initial order may be followed by call for additional trainers. The Link plant at Binghamton, N. Y., now employs about 800, compared with a World War II peak of 1300.

► Boeing-Wichita continues to step up employment for B-47 production, with a current total of 15,000, expected to be increased to 18,000 within five months. Experience indicates that the heavier materials and more complicated machining required for the jet bomber are not so readily adaptable to production by women workers as were the B-29 bombers built for World War II at Wichita.

► An expansion program to double the size of the Aeroproducts propeller plant at Vandalia, near Dayton, will cost an estimated \$10 million. Besides making hydraulically controlled propellers and developing experimental supersonic propellers, the Aeroproducts plant, a division of General Motors, also makes some turboprop engine controls, turbojet engine parts, and actuators for landing gears, flaps and other aircraft uses.

Washington Roundup

Emergency Program: When?

The new war "emergency" build-up of military might is still rolling forward only on paper. Best Washington estimation is that orders won't be placed until spring at the earliest to get it going full swing in laboratories and factories, in construction of installations.

The President's 1952 fiscal year budget which will go to Congress in mid-January will have a "one-line approximation" for the Department of Defense—a logical "guess" at what it will spend over the coming year. The reason: the Joint Chiefs of Staff haven't arrived at a "war emergency" program on which to base fund estimates. They are suffering from the perennial plague of inter-service rivalries: Navy's missions are overlapping Air Force missions, and vice versa, and Army missions are overlapping both.

The Defense Department doesn't expect to have a program in ready enough shape "much before spring" to request a third supplemental appropriation for the 1951 fiscal year and a 1952 fiscal year appropriation to implement it. Budget and congressional clearance will take at least several weeks. Then a program can get underway—a program admittedly needed since last Nov. 24 when onslaughts of Russian-equipped Chinese Communists in Korea jolted the U.S. into facing up to the prospect of a major-power war.

Meanwhile, the services are on the more modest build-up program drawn before Korean reverses. Second supplemental appropriation, approved last week, implements it.

'Partial' Mobilization Support

Gen. George Marshall wants an early public airing before a congressional committee of Defense Department's plan for "partial" mobilization. The purpose would be to quell congressional clamor for a bigger build-up, condition the country for a long-haul burden of heavy military spending and the lower standard of living that goes with it. "Partial" mobilization will put the Armed Services by 1952 at approximately one-third the strength needed for all-out war. A bigger build-up, Marshall fears, might lead to a big letdown in defense if war doesn't come.

New Key Figures

• **Sen Joseph O'Mahoney**, slated to take over the chairmanship of the Senate Appropriations Subcommittee on the Armed Services, will spur the military to move faster, and perhaps farther. He despairs at the slowness of the military in "getting going." Expenditures indicate hardware deliveries and personnel-strength increases, but O'Mahoney points out, USAF spent less than \$3 billion and BuAer less than \$350 million over the last six months. He feels that the military is setting its sights too low in its "partial" mobilization program, but is withholding final judgment on this. Strong for naval and air power, O'Mahoney fought for the 70-group USAF program when the administration wanted it trimmed down to 48.

• **William H. Harrison**, now boss of National Production Authority, is the likely prospect to head a new agency now under consideration to take over military buying as well. The contemplated agency would be patterned after

World War II's WPB. It would come under Office of Defense Mobilization, headed by Charles E. Wilson. Its job: schedule military procurement, expedite it, grant priorities.

• **Rear Adm. Thomas S. Combs** will take over as chief of Navy Bureau of Aeronautics when Rear Adm. A. M. Pride leaves for sea duty about March. Combs, commander of the carrier Yorktown in Pacific campaigns during the War, is now Chief of Staff to the Commander-in-Chief of the Atlantic Fleet.

How Much Airpower?

Although USAF now talks of a 200-group USAF, the fact is that at the present lagging rate of planning progress, it is on the side of optimism to hope for any more than an 84-group USAF in being by the end of 1952, the "target" date set by the Joint Chiefs of Staff for readiness for all-out war. The 84-group program was determined before the declaration of a war emergency.

Build-up in naval airpower between now and then will be "modest". Only a few carrier air groups, the backbone of naval power, will be added to the 13 now programmed. Naval air men aren't pushing for any more.

New Weapons

USAF and BuAer research and development programs, concentrating on projects that can be put to operational use by 1952, are giving top priority to guided missiles, radar, jet engines and photo reconnaissance equipment. The \$355 million USAF and the \$130 million BuAer already have for 1951 fiscal year will probably be doubled in the third supplemental. Here's the outlook for new weapons:

- **Short-range guided missiles** will be in large-scale military use within two years. A USAF surface-to-surface missile is farthest advanced, will probably be used by the other services. It can also be used for ground-to-air and air-to-ground firing. In the air-to-air field a Navy missile leads, will probably be procured by USAF.
- **500-mile missile.** USAF has completed development work on one. It may be ready by the end of 1952.
- **5000-mile missile.** USAF still has its eye on a missile of this range, but estimates development is five to ten years off—less optimistic than predictions of a few years back.
- **Loki rocket** being developed by Army for a 60,000 ft. altitude won't supplant interceptor fighters in air defense. It will be used for "pinpoint" strikes, but can't fill the bill for "area" defense.
- **New strategic bomber.** USAF plans to have a successor to the B-36 ready for operational use in three years, by the end of 1953. It'll be either the B-52 or the B-36F, both yet in the blueprint stage.
- **No more training planes.** USAF and Navy have agreed that trainers in storage are adequate for pilot training for the next year at least. They won't be purchasing any new ones right away.
- **Cargo plane** for MATS, which could be used in commercial operations to expand airlift, has been crossed out of USAF's research and development program.
- **Medium troop transport.** Development of a new type is being pushed by USAF.
- **Helicopters.** Navy, going all out in procurement of these machines, plans to transport them by placing a few on all ships in a convoy.

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The Airframe Industry Produced - - -

	Total	Military	Civil
1946.....	38,394,400	12,879,000	25,515,400
1947.....	29,255,400	11,402,000	17,853,400
1948.....	35,232,400	25,149,900	10,082,500
1949.....	36,500,000	29,800,000	6,700,000
1950 (estimated).....	42,900,000	37,000,000	5,900,000
(entire industry)			

With Employment of - - -

	Total (airframe, engine, propeller)	Airframe	Engine	Propeller
1946.....	196,462	163,259	33,203	N.A.
1947.....	180,262	147,131	33,131	N.A.
1948.....	213,168	166,687	38,427	8,054
1949.....	218,000	168,000	41,000	9,000
1950 (estimated).....	228,000	175,000	42,000	11,000
(average for year)				

For Sales of - - -

	Sales	Net Profits (after contingencies)
1946.....	722,896,000	L 3,009,000
1947.....	848,244,000	L 32,903,000
1948.....	1,185,893,000	P 16,814,000
1949.....	1,570,000,000	49,224,000
1950 (estimated).....	2,000,000,000	N.A.
(15 companies)		
L.—Loss P.—Profit N.A.—Not Available		

Production Step-Up Faces Rocky Road

Industry doubts it can expand five-fold in one year; triple increase is more likely.

By Alexander McSurely
Aircraft manufacturers and auto firms now getting into the field, are starting the New Year with increasing appreciation of the painfully long strides to be taken on the road back toward the production levels of World War II.

Actually, even if the five-fold production expansion target, asked for by President Truman, is achieved, the 1951 attainment will fall far below the peak aircraft production years of 1942, 1943, 1944 and 1945.

In millions of airframe pounds here is how the military aircraft production figures stack up:

- 1950 (Aircraft Industries Assn. estimate), 37.
- 1951 Truman target (5 times 1950), 185.
- 1945, 599.6.
- 1944, 1101.
- 1943, 758.8
- 1942, 314.7.

► **Optimistic Goal?**—Few realistic aviation industry analysts expect the Truman target of quintuple production to be attained in a year. A triple expansion is expected to be closer to reality.

Said Adm. DeWitt C. Ramsey, Aircraft Industries Assn. president, last week:

"Attainment of the President's goal will require expediting of placing of production contracts, provisions of scarce materials and required production tooling and the recruiting of skilled labor with all of these measures being carried out far more effectively than the Government and industry were able to do during World War II."

The triple production estimate is based on World War II experience, when the expansion program enabled industry to triple output each year, until the peak was reached in early 1944.

Availability of plants and machine tool reserves left from World War II

peak operations are advantages offset by complications of producing the 1950 type aircraft. It takes approximately four times as many man hours to build a current warplane as it did a predecessor of the same type ten years ago. There are again critical materials problems, despite materials stockpiling; and again the shortage of skilled manpower is a severely limiting factor.

► **Civil Production**—As for civil aviation production in 1951, this depends largely on whether National Production Authority provides the necessary priorities to permit continued manufacture this year.

Air transport lines and manufacturers have made a strong case for continued production of transport planes, of which some 260 are now on order, including Air Force and Navy orders for 50. Assuming that priorities are made available, deliveries of two- and four-engine airliners in 1951 will probably exceed 190, an AIA estimate indicates, compared to only 75 in 1950.

Suspension of manufacturing of per-

Obligational Authority for Aircraft Procurement

	Fiscal 1951	Fiscal 1950 ²	Fiscal 1949 ³	Fiscal 1943	Fiscal 1942	Fiscal 1941
Air Force	\$6603.4	\$1203.0	\$1962.0	*	*	*
Navy	2542.9	550.6	738.7	\$7836.9	\$17,881.4	\$873.8
Army	52.3	N.A.	N.A.	2608.7	5748.1	3423.6
MDAP	1148.5 ⁴	N.A.	N.A.	*	*	*
	10,337.0 ⁵	2700.7	1753.6	10,445.6	23,629.5	4297.4

(000,000 omitted)

* Not applicable.

¹ Includes supplemental 1948 appropriation.

² Impounded funds not shown.

³ Language used to describe MDAP procurement not comparable with that used to describe Air Force, Navy and Army procurement—i.e., procurement of aircraft and related items.

sonal planes by several makers during the national emergency is expected to curtail the small civilian planes total output in 1951 well below the 1950 level of approximately 3400 planes.

The AIA statisticians estimated that military plane production in 1950 numbered approximately 3000, on the basis of 37 million lb. of airframe production estimated for the year. The weight estimate was projected from actual deliveries for the first 10 months of 1950.

Over 100 civilian and military helicopters were turned out in 1950, with a substantial increase expected in 1951, on the basis of orders for more than 500 helicopters placed by the three military services (AVIATION WEEK Oct. 9).

► **Employment**—Employment is expected to reach 500,000 by midsummer of 1951 in the plants of basic aircraft companies and parts and components suppliers. This compares with a figure of 256,000 as of June 1950. In the event of full-scale mobilization, the job totals would go much higher.

Increased labor costs are on an industry wide basis. As of Sept. 1950, average hourly earnings for aircraft and parts workers stood at \$1.658 as compared with a 1949 average of \$1.57. Since the September average was made, plant-wide wage increases and additional overtime payments have been provided in new contracts by a number of manufacturers.

In the aircraft industry, in the fall of 1950, workers were averaging 43 hr. of work week, while aircraft engine workers were averaging nearly 45 hrs. per week. A return to the 48-hr. work week, used in the aircraft industry in 1944-1945, would require a decision by Armed Services to pay higher costs for overtime, under Federal Wage and Hour and Walsh-Healey Laws.

Generally speaking, according to the Air Force, most of the aircraft industry already has gone on a 48-hr. week. Pratt & Whitney and Hamilton Standard division of United Aircraft Corp.

are operating on that basis, as are Lockheed, Republic and Grumman. Portions of Douglas and North American personnel are on the same overtime schedule.

► **Contract Commitments**—Speed with which the military services make contract commitments for air power build-ups figures as an important factor in the timing schedules for 1951.

With passage last week by Congress of a second supplemental defense appropriation for fiscal year 1951, approximately \$10.2 billion was committed for aircraft procurement for the year. This included \$1.1 billion for aircraft and supplies committed under the Mutual Defense Assistance Program for foreign aid, plus approximately \$9.1 billion for USAF and Navy planes.

No matter how quickly these funds are committed, it will be probably nine months to a year before effects of new orders show up in increased aircraft production. So urgency in placing the orders will play an important role in getting the increased production desired.

► **Sales Volume**—Total sales volume of 15 large airframe, engine and propeller companies for 1950 is estimated at approximately \$2 billion as compared to \$1.5 billion reported by the same companies for fiscal 1949. It is anticipated that all the major aircraft manufacturers will report a profit for 1950, the first time that all have been "out of the red" together since the end of World War II.

Aggregate net profit before renegotiation and retroactive excess profits tax was expected to be considerably higher for 1950 than for 1949. The earlier year was cited as a year of low earnings for aircraft companies and a period of recovery from losses incurred in the two preceding years. Because of the uncertainties of renegotiation and the excess profits tax, no estimates are made by AIA as to profits after renegotiation and taxes.

Air Appropriations Rise \$5 Billion

An additional \$4.6 billion for Air Force and \$314 million for Naval aviation boosts funds appropriated so far by Congress for the 1951 fiscal year to \$13.9 billion for USAF and \$3.4 billion for naval air. USAF has been given \$810 million more in contract authority.

The new money is in the second defense supplemental approved by Congress last week. But with a "wink" from the administration, the services already have been obligating these funds for the past two weeks. A third supplemental now being programmed at the Pentagon will make still another increase in the 1951 fiscal budgets of USAF and BuAer.

The second supplemental also carries \$5 million for National Advisory Committee for Aeronautics to finance a step-up of military research and development programs. The measure carries \$115 million for USAF and \$37 million for BuAer research and development. This brings the totals for the 1951 fiscal year to \$355 million for USAF and \$130 million for BuAer. NACA will use \$1.8 million for rehabilitation of facilities at the Lewis Laboratory and \$3.2 million for 600 more employees, including 150 more engineers.

► **Broadening the Base**—The main objective of second supplemental funds is to broaden the industrial base for weapons production. \$410 million of the USAF funds and \$82 million of the BuAer funds are earmarked for tooling-up and expanding plant capacity.

The measure also provides:

USAF aircraft procurement, \$2.1 billion. This brings the total USAF appropriation for plane buying this year to \$6.6 billion. There are no funds for Naval aircraft procurement. BuAer has previously been appropriated \$2.2 billion.

Guided missile procurement, \$107 million. Of this \$92 million is for USAF and \$15 million for BuAer. This boosts the total allocation for 1951 fiscal

year to \$149 million for USAF and \$28 million for BuAer.

Industrial mobilization, \$69 million. Of this, \$52 million is for USAF and

\$17 million for BuAer. This brings the total allocation for this year to \$79 million for USAF and \$29 million for BuAer.



First U.S. Turboprop Transport Flies

Initial flight begins extensive test program by Convair and Allison, with hopes high for military orders.

By Thomas M. Self

San Diego—The Convair Turboliner made its first flight here amid the greatest enthusiasm yet generated for a turboprop aircraft. One Convair official told AVIATION WEEK that improved turbo-props are not only the step before jets, but will nose them out in the commercial transport field.

Part of Convair's enthusiasm stems from successful flight tests with its XP5Y-1 flying boat. Company officials speak of a "renewed interest in two-engine planes designed for medium distances." Also Convair people are happy about the easy adaptability of the Model 240 Convair-Liner to turboprop power.

As yet the company has no orders for military or commercial conversions, but officials think the military will have some T-29 trainers converted to turboprop. At least, they say, the Air Force is "very interested" in Turboprop, and the T-29 is a natural for turboprop conversion.

Meanwhile Allison and Convair will carry out extensive flight tests with the Turboliner. And Convair has several design studies for incorporating advanced T-38 engines in its Model 240-A Convair-Liner now going into production.

► **First Flight**—First flight of the Turboliner lasted 15 minutes, about twice as long as the first flight of the turboprop Douglas A2D Skyshark. The research transport built by Convair for the Allison Division of General Motors Corp. was set for a half-hour or hour flight. But pilot R. C. Loomis brought it down for a precautionary landing at the Naval Auxiliary Air Station at Miramar, 15 miles north of San Diego, when vibration appeared in the left propeller.

The vibration shook loose one of the

automatic electronic power-plant control wires. Loomis, who is also manager of inspection and flight at Convair, said the plane could easily have continued, since it is equipped with alternate control systems. And Convair's turboprop XP5Y flying boat has flown easily with propeller vibration. Vibration was the result of a slight lack of balance because of the heavy instrumentation on the left propeller blade during flight tests.

The Turboliner's first flight was scheduled for 1 PM., and the ship was in the air with two minutes to spare. The turboprop taxied from its bay on the Lindbergh Field flight line and took off after a short run-up, without making a preliminary taxi run. (Taxi tests had been run in the morning and the previous afternoon.) The Convair-Allison ship climbed effortlessly after covering 3000 ft. of the runway. Takeoff was quiet, almost silent in comparison to the piston-engine Convair-Liner which took off six minutes earlier to observe. The Turboliner was noisiest when taxiing because of the change in pitch.

Test crew reported the flight deck was quiet and free of vibration during the flight.

For starting the engines for first flight, the AiResearch self-starting system was carried in a truck alongside the plane. For succeeding flights the pneumatic system will be installed in the plane and the engines started by a push button on the instrument panel.

► **Research Program**—E. B. Newill, vice president of GMC and general manager of the Allison Division, said Allison plans to use the Turboliner in an extended flight test research program. This service test will plot and solve the specialized operating conditions applying to a turbine transport. Results and data will be made available to the

military services, aircraft manufacturers and commercial airlines.

Following successful completion of these tests, Allison may turn the Turboliner over to MATS and airlines for cargo service under actual transport operating conditions.

Even before they have any flight time to evaluate, Convair and Allison officials are whooping it up for the turboprop transport. One Convair official emphasized that the turbine engine can incorporate every improvement in jet engines, and take the added advantage of economy. He believes constantly improving turboprop engines will be the answer in the commercial transport field until atomic power comes along.

In a more modest vein, LaMotte T. Cohu, president and general manager of Convair, said that in the short and medium ranges the turboprop transport definitely promises to be more efficient than pure jet transports, and comparable in speed. He said that the fleets of Convair-Liners can be converted in a few years to use turboprop engines, added that the company's new model Convair-Liner 240A, now going into production, can be even more readily converted.

William C. Keller, Convair project engineer on the Turboliner told AVIATION WEEK "The airlines just can't afford not to use turboprops." Keller thinks the turboprop very shortly will be able to compete with piston engines in all ranges. On the economic side he points out that fuel costs are 30 percent of the operating cost of a commercial transport. Gasoline costs 20 cents a gallon, but a turbine engine works better on 12-cents-a-gallon kerosene.

There's a difference in specific fuel consumption now that favors piston engines, Keller admits, but he says it is not enough to fill the gap in fuel price. And it won't be long, he says, before

Convair-Liner vs. Turboliner

	Convair-Liner (Modified)	Turboliner
Gross weight	41,790 lb.	41,790 lb.
Maximum fuel capacity	1000 gal.	1550 gal.
Maximum range	920 statute mi.	1200-1600 statute mi. (Depending on type of fuel)
Average cruising air speed (at 16,000 ft., 75% rated power, weight 39,000 to 42,000 lb.) ..	272 mph.	310 mph.
Maximum level flight speed	347 mph.	350 mph.
Engines	P&W R-2800 CA-18	Allison 501
Maximum horsepower takeoff ...	4800	5500
Takeoff distance over 50 ft. obstacle (non-CAR)	2760 ft.	2150 ft.
Service ceiling	24,300 ft.	32,500 ft.
Sealevel rate of climb	1500 ft./min.	1940 ft./min.

turboprop specifics will be comparable to piston engines. Keller quotes Allison that turboprops in volume production will cost less than piston engines. Keller expects the Turboliner to get a maximum range of 1600 miles on kerosene or 1200 on gasoline on 1550 gallons of fuel.

Other officials from Allison, Aero-products and Convair who watched the initial flight of the first turboprop transport predicted that a great many turbine-powered transports will be flying airline routes in "a few years," providing military needs do not delay the program for developing the engine for commercial purposes. (Early 1953 is probably the earliest that turboprop engines could be made available in quantity, according to most authorities on the subject.)

► **No Orders Yet**—Convair as yet has no orders for commercial or military conversion of Convair 240s to turboprops. But an official of the company pointed out that the Air Force's T-29 navigational trainer version of the 240 is a natural for turboprop. He added that the Air Force is "very interested" in turboprops.

Enthusiasm for the turboprop runs high everywhere at Convair, however, and everyone expects the company will get conversion orders of some kind. Meanwhile Convair is designing the 240A Convair-Liner for adaptation of advanced T-38 engines. The company has some excellent studies along this line.

Allison and Aero-products likewise are anxious to push their 501 engine and the four-bladed 13½-ft. propeller to a commanding position in any transport turboprop market, and are conducting extensive development programs.

► **Convair's Third Turboprop**—The Turboliner is Consolidated's third

turboprop airplane. The highly successful XP5Y-1 flying boat is already in limited quantity production. It uses the double power section paired into a single unit turning up 5500 hp., with the Navy designation T-40 or commercial model 500.

Another Convair ship, the XP-81 made the first U. S. flight of a turboprop in 1945.

Conversion of a standard Convair-Liner Model 240 for the Allison turboprop engines posed few problems, according to Keller. Original nacelle was modified very little, and the modification of the test ship will be standard on production models. The nacelle was lengthened some, but otherwise not radically changed. Except for beefing up around the engine area, the wing and control surfaces were little changed.

Substantially the same thrust line was maintained by locating the centerline of the propeller below the turbine axis, and laying turbine and tailpipe over the wheel well and wing structure. An identical firewall was used.

This design makes possible a future program of conversion kits for airlines operating the 177 piston engine Convair-Liners.

Engine mounts at three points, two attached to the monocoque forward section of the nacelle, the third at the compressor section attaching to the firewall. Air is ducted directly to the turbine from a scoop in the top of the nacelle, while turbine exhaust is directed into the tailpipe through an aspirating connection.

Combustion heaters for wing and tail anti-icing are supplied because of low engine heat rejection. Two heaters in each nacelle get air from the oil cooler duct, while heater exhaust also goes into tailpipe.

Oil cooler air is ducted to the cooler, then dumped overboard. Major oil cooling requirements are for gear box lubrication, with only about 30 percent required for the turbine.

Larger center door in the bottom of nacelle makes engine readily accessible, with floor of the turbine compartment similarly hinged for quick access. Fluid, electric, and control lines have quick-disconnect fittings.

► **Powerplant**—Powerplant controls designed by Aero-products for Allison are primarily electronic. A single power lever in the cockpit controls each turbine. Test Turboliner also has alternate system separately controlling propeller and turbine.

The Allison Model 501 turboprop engines used in the Turboliner are the WW commercial version of the T-38, first U. S. turboprop engines to pass a military flight clearance test. They are rated at 2750 equivalent shaft hp. at takeoff. Approximately 10 percent additional thrust is obtained from the unused exhaust gas escaping from the tailpipe.

Dry weight is 1250 lb., with power-to-weight ratio of more than two to one. Weight saving is 1400 lb.

A single shaft connects the multi-stage coaxial compressor and the four-stage turbine. The single power section and propeller reduction gear housing are joined by a tubular structure. Later models will have this connection replaced by a more compact and efficient structure.

First flight experience with the Model 501 was obtained as the fifth engine in the nose of a modified Boeing B-17 (AVIATION WEEK June 6, 1949). Flight tests are now being conducted on an advanced design. The engine has also benefited from the experience accumulated in design and manufacture of nearly 10,000 J-33 and J-35 engines. Both types have been in production and operation several years with more than half a million flight hours.

The Turboliner is the first commercial transport to use the Aero-products 13½-ft. four-blade steel propeller. Clearing is 12.5:1, giving propeller rpm. of 1146 for a turbine speed of 14,300 rpm.

► **Three Sections**—Fuselage of the Convair-Liner was redesigned into a pressurized section with three compartments. A large main compartment is provided for special instrumentation and cargo during the research program. A small compartment in the forward part of the fuselage, aft of the flight deck, is furnished with eight airline-type seats.

A six-by-eight-foot cargo door, hydraulically operated, is located on the left side of the fuselage, aft of the wing. A self-contained entrance stair-

way is located at the right side of the fuselage, forward of the wing. Length of the fuselage is 74 ft. 8 in.; diameter is 9 ft. 5 in.

Flight deck is patterned after the pilot-designed Convair-Liner. Directly in front of the pilot is the main instrument panel. Another panel with dual flight instruments is located in front of the copilot. Separating the two main panels is a center panel on which engine instruments are mounted.

Within easy reach of the pilots is the overhead switch panel. Between pilot and copilot is the pedestal containing engine, autopilot and radio controls. Gust lock, which cannot be engaged when the Turboliner takes off, is also mounted on the pedestal. Pilot's enclosure has Nesa glass for windshields, which can be heated electrically for anti-icing.

► **Wing**—The Airfoil is a combination of three NACA laminar-flow sections, giving optimum performance and stalling characteristics. The primary wing structure consists of a box beam bounded by a front and rear spar located at 18 percent and 55 percent respectively throughout both center and outer panels.

The spars are Wagner beams, using 75ST aluminum-alloy webs, Z-stiffeners, and machined 75ST spar caps. Bulkheads are spaced at approximately 24-inch intervals to shape the structure and to distribute air and concentrated loads.

Outboard of the engines, the inter-spar box is designed into a gas-tight tank, and the outer wing panel also is designed as an integral fuel tank. Total fuel capacity is 1550 gal.

► **Landing Gear**—A tricycle landing gear with dual wheels and Bendix air-oil shock absorbers is installed on the Turboliner. After takeoff, the hydraulically operated main landing gear swings forward into the engine nacelles, and the nose gear into the fuselage. Gear can be lowered and locked in position by gravity or by aerodynamic action.

An auxiliary method of lowering the gear with compressed air is provided. Brakes are hydraulically operated. Main gear tire size is 34 x 9.9; nose gear is 7.50 x 14. Tread is 25 ft.

► **Pressurization System**—Pressurization is accomplished with a centrifugal compressor in the right wing, driven by a hydraulic motor. Fresh air enters a scoop located under the wing, and is compressed in a unit located in the wing. Ducts deliver the compressed air to the cabin, where it is discharged through pressure-regulators in the fore and aft sections.

Cabin is designed to hold an internal pressure of 7 psi., although the operating pressure is 3.5 psi. A sea-

level cabin pressure can be maintained to an altitude of 7300 ft.

► **Anti-Icing System**—Wing and tail surfaces are protected against icing by a thermal anti-icing system supplied by four combustion heaters, two in each nacelle.

For anti-icing, heated air is led directly to the wing, dorsal fin, and vertical and horizontal stabilizer. Leading edges are baffled span-wise to form ducts through which the heated air flows. The heated air in these ducts bleeds through small holes into chord-wise corrugations which are fastened to the leading edge skin. After leaving the leading edge corrugations, the air is bled through the wing tips.

► **Electrical System**—Engine-driven generators are the main source of electrical

power. Propellers are designed to be heated electrically. Prevention of ice on windshields is by resistive-film heating. Electrical system operates at 24 volts dc. Storage batteries are carried for extra power at peak loads. Rotary inverters supply ac. power.

► **Hydraulic System**—Two entirely separate high-pressure hydraulic systems are installed. A cabin-pressure unit operates the primary compressor for the pressurization system. A main system operates the landing gear, flaps, brakes, windshield wipers, nose gear steering mechanism, and the entrance ramp. The main system is powered by two fixed-volume, piston-type hydraulic pumps. An auxiliary electrically driven pump is employed for emergency and ground operation.

Industry Studies New EPT Law

Treasury to interpret excess profits tax measure and optional ways to calculate non-excess gains.

Congress has passed the compromise excess profits tax bill taking 77 percent of profits considered "excess." Congress also has jacked the regular corporate levy from 45 percent to 47 percent. Optional formulas for figuring non-excess profits range from the "depressed industries" formula, which many aviation manufacturers will use, to the airline formula.

Before jumping to conclusions, most aviation and airline companies must wait until the Treasury Department interprets the complicated provisions of the bill. After the President signs the bill into law, the Secretary of the Treasury must rule on who qualifies for what exemptions under the law.

Although the Aviation Industry has informal indication from Treasury officials that most aviation companies qualify as "depressed industries," there is no solid confirmation of this.

► **Basic Law**—Congress defined excess profits as profits in excess of 85 percent of average earnings the best three years out of the four postwar years, 1946, 1947, 1948, 1949. But Congress limited total income levies to 62 percent. Those two provisions show the basic thinking behind the law. Then there are numerous special options and exemptions—many of which especially apply to aviation companies.

Secretary of the Treasury is to decide how companies qualify for special consideration as "depressed." Main depressed industries are probably aircraft, shipbuilding, and machine tools. The depressed industry company determines its base-period income by multiplying average assets during the base period by 90 percent of the average rate of return 1936-49.

Depressed industry is defined as one in which the average rate of return on total assets during the 1946-49 period was less than 60 percent of the rate for the industry from 1936-1949.

► **Airlines**—The airlines are allowed a return of 7 percent on capital and they may exclude mail pay from income subject to the levy if the income less the subsidy falls below the excess profits level. In effect, this means that only American Airlines would pay an excess profits tax on 1950 earnings. But this year could conceivably see Eastern and United paying EPT if they improve earnings greatly.

The airlines may count only 75 percent of their debt in with invested capital for purposes of figuring investment return. Thus, capital is defined as assets less liabilities plus 75 percent of long-term debt.

► **Other Options**—Another optional method allows a return before taxes of 12 percent on the first \$5 million of invested capital; 10 percent on the next \$5 million; and 8 percent on capital over \$10 million. Here again, debt counts only 75 percent with capital. And 25 percent of interest payments on the debt and preferred are deductible from income subject to EPT.

Fast-growing corporations may use the so-called growth formula. Base period income is on either the last 24 months of 1946-49 or the last 12 months of the base period; or on the basis of 50 percent of earnings in 1950 and 40 percent of 1949. To qualify, the company payroll for the last half of the base period must be at least 130 percent of the first half, or gross revenue for the last half must be 150 percent of the first half.

A new corporation can compute excess profits credit by using its industry average rate of return in the base period.

► **Special Exemptions**—Some important special provisions in the bill are:

- **Worst year** in the base period can be eliminated in figuring the base period average net.
- **Deficit** in any remaining base period year, can be treated as zero income.
- **5-year carry-forward** and one-year

carry-back for net operating losses may be substituted for the two-year carry-forward and two-year carry-back permitted in World War II.

- **Operating loss** incurred in the base period can be carried over to 1950 and 1951 if it has not been used to offset income of other years.
- **Increase the average** base period net income for capital additions during the latter part of the base period.

USAF Calls in More Auto Firms

And aircraft manufacturers grumble over sidetracking of plans which would have expanded their output first.

By Ben S. Lee

Air Force program of reopening reserve plants and calling in segments of the automotive industry to augment programmed aircraft expansion continued last week.

The aircraft manufacturers who had suffered in immediate orders because of the introduction of new contractors—auto manufacturers—were licking their wounds and were not exactly happy about the way the program was turning out. But the more outspoken of them had already heard about their outspokenness from the Defense Department. And nobody was saying much for publication.

• **Studebaker Corp.** confirmed (AVIATION WEEK Dec. 25) that negotiations were under way between that corporation and General Electric for the manufacture of the GE J-47. That engine is used as powerplant for the Boeing B-47, North American F-86 and in wingtip pods of the Convair B-36.

• **Lockheed**, according to Air Materiel Command, has been asked to occupy a small section of the Bell-Marietta, Ga., plant for modification of Boeing B-29 Bombers now being withdrawn from storage. But the Marietta plant will remain mainly a machine tools storage facility for the time being, Air Force officials declared. USAF officials previously declared the facility was being held for major production of a heavy bomber (AVIATION WEEK Dec. 25).

• **General Motors Corp.** confirmed an earlier AVIATION WEEK story that it would build a jet fighter. Plane is the Republic F-84F Thunderjet which is slated as USAF's major contribution to nations allied under the North Atlantic Treaty's Mutual Defense Assistance Program.

• **General Electric** has announced that it is expanding its own jet engine production program at its Lockland, O., facility. GE officials state that it plans to triple its space there, by "purchase, lease, and new construction."

► **Bruised Feelings**—Probably the principal cause for bruised feelings among

aircraft manufacturers was President Truman's Dec. 18 declaration of a state of National Emergency. Leisurely expansion of this nation's Armed Forces "according to plan" was tossed aside.

Originally, expansion plans geared to lessons learned in World War II provided two phases of mobilization. Industrial mobilization planning of the Air Force had been built around the now famous "Stanford study."

This study outlined a program of planned expansion which would see:

- **An initial stage of expansion** in which aircraft companies would be ordered to occupy plants built during the War and held by the Air Force in reserve status.
- **Secondly**, mobilization of the automotive industry and conversion to aircraft manufacture.

But President Truman's declaration ordered a cutback in normal commercial manufacture of automobiles, refrigerators, television and radio sets; placed curbs on various metals and restricted manufacture of virtually all items for civilian consumption. As a result, the Department of Defense ordered defense contracts spread out to take up the slack in industries facing cutbacks because of materials shortages.

Meanwhile, the aircraft manufacturers, already principally in defense production, are left to sit and wait until the next round of business is awarded. And the original industrial mobilization planning is still as good as new, still waiting to be used.

Boeing, P&W Test DOs

National Production Authority is not ready to admit that its DO priority system is not okay the way it stands. But just the same, last week it gave Boeing Aircraft and Pratt & Whitney the first crack at testing the extension of DO priorities to some specific maintenance repair and operating supplies (MRO supplies). To aircraft manufac-

turers one of the worst bottlenecks in the defense production picture has been the fact that no priorities have been allowed on these supplies heretofore by NPA.

The NPA authorization to Boeing and Pratt & Whitney enables them to claim priority on certain drill bits and other minor items, if they make out voluminous reports on how they use the DOs. But the test operation does nothing for them about needed new machine tools, or about the 25 percent limitation on Defense Order materials, or about shortages of laboratory and test materials.

And the DO test operation for the two companies on MRO supplies is far from an automatic greenlight to get supplies that they need.

Meanwhile NPA is countering requests of the Munitions Board and the Aviation Industry for extendable DOs by saying that NPA does not want to "dilute" the present rating procedure.

Along with the MRO test, the NPA and some other government agencies took several other actions to tighten up civilian use of various materials in relatively short supply, and thereby to make them more available for military defense production.

IAS to Hear State Department Official

Nineteenth annual meeting of the Institute of the Aeronautical Sciences is to be held Jan. 29-Feb. 1 at the Hotel Astor, New York City.

Broader coverage of the aeronautical field is evident in the program of scheduled papers.

Organizations participating in the annual meeting include, in addition to the IAS, the American Helicopter Society, American Meteorological Society, the Daniel and Florence Guggenheim Aviation Safety Center at Cornell University, Institute of Radio Engineers and the Institute of Navigation.

Undersecretary of State James E. Webb will be the guest of honor and principal speaker at the Honors Night dinner Jan. 29.

Adams Named to State Dept. Post

Civil Aeronautics Board member Russell B. Adams, whose term as member expired Dec. 31, has been named by President Truman to the post of special assistant to the Secretary of State.

Adams expects to take up his new State Department job about mid-January. He will be associated with Ambassador-at-Large Philip C. Jessup, negotiating multilateral international agreements on various subjects, including aviation.

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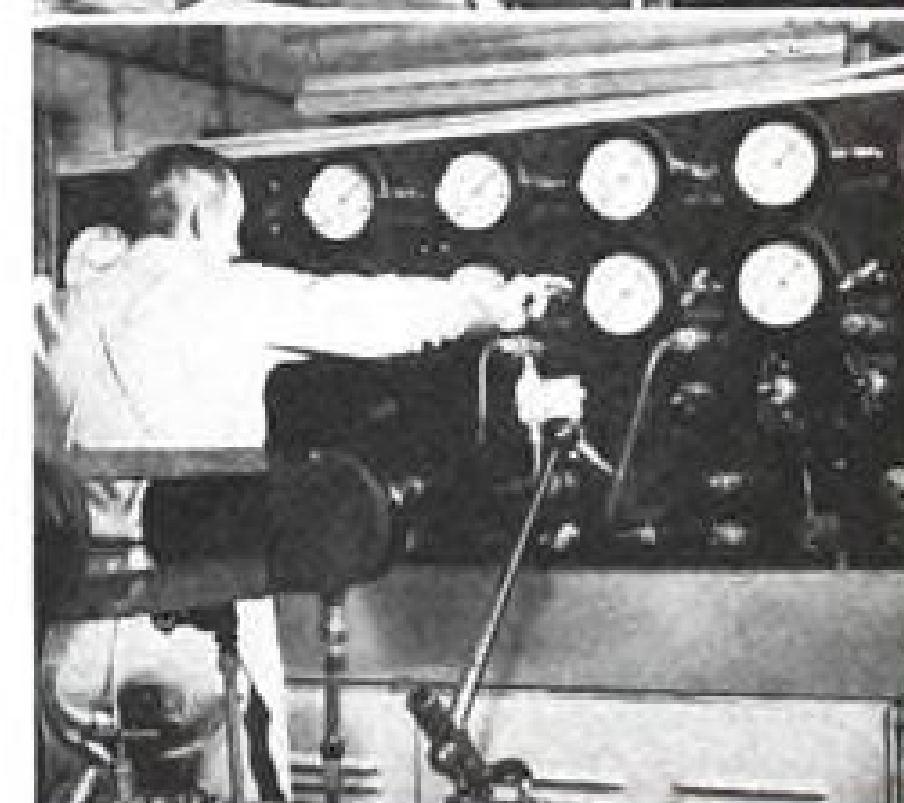
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Servicing private planes

is an important part of the Skyport's operations. The active schedule supervised by President Joseph Schwarz (right) and Flight School Director Fred Miller includes instruction, aerial photography, and charter flights. All planes using this busy skyport are serviced and refueled with quality Esso Aviation Products.

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AERONAUTICAL ENGINEERING



Heron Suggested as Best Shorthaul Bet

Four-engined feeder-liner seats 14-17, is Dove development.

While U. S. feederline operators only recently have begun to draw up specifications for the shorthaul plane they would like to have by 1955 (AVIATION WEEK Nov. 20), the British have already come up with an actuality which, they feel, fits the bill right now.

It is the de Havilland Heron—first flown at Hatfield, England, on May 10. ► **Now Considered—True**, a Boeing 24-passenger design, Model 498, closely approaches the projected feederline requirements (also 24-passenger), but getting this plane off the drawing board and into production might run to \$30 million in the face of a slim market. Also, it would have turboprops, whereas the feeder operators initially want piston power.

In casting about for a logical, immediate replacement for the obsolete DC-3, feeling in the U. S. is that these craft might do the job: 31-passenger Douglas Super DC-3, and British de Havilland Dove and Percival Prince, both 11-passenger planes. But, the Super DC-3 may be too big, the Dove and the Prince too small.

► **Best Answer?**—Best bet for meeting feederline operators' present and immediate future requirements, according to thinking in de Havilland circles, has been overlooked—the Heron.

While the Heron falls short of the 24-passenger, 1500-lb. cargo conception which U. S. feederline operators are now contemplating, proponents of the English craft feel that with present passenger revenues—or even with the optimistic hope of volume increase in the immediate future—the prospects will not be very bright for getting the government to spend money on the type of prototype desired or to consider the mailpay subsidies required to operate it should it ever be built.

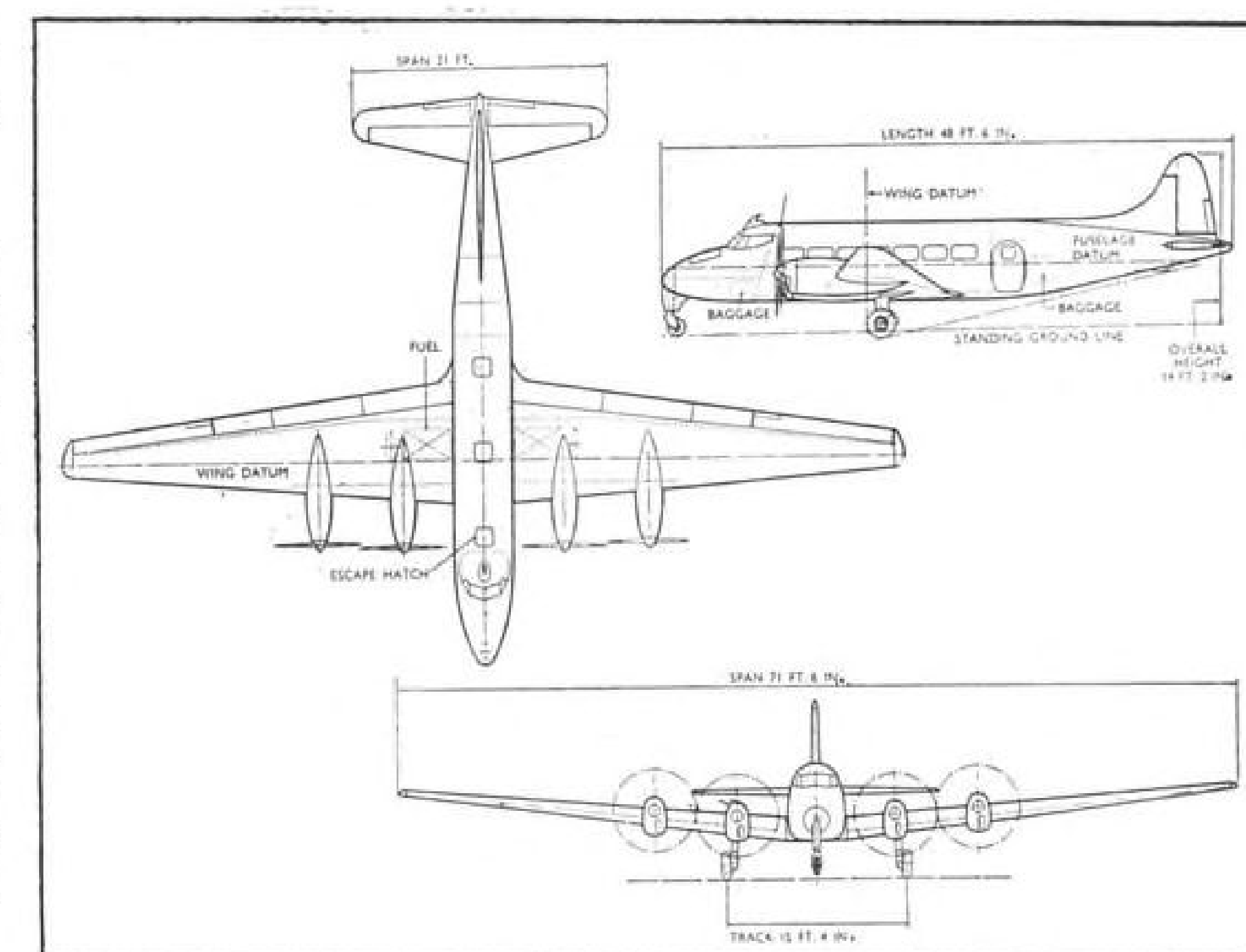
They feel that the Heron's 14-to 17-passenger capacity should be ample to handle even peak load requirements on American feederlines for a good many years to come.

They bolster their contentions with

these Heron highlights:

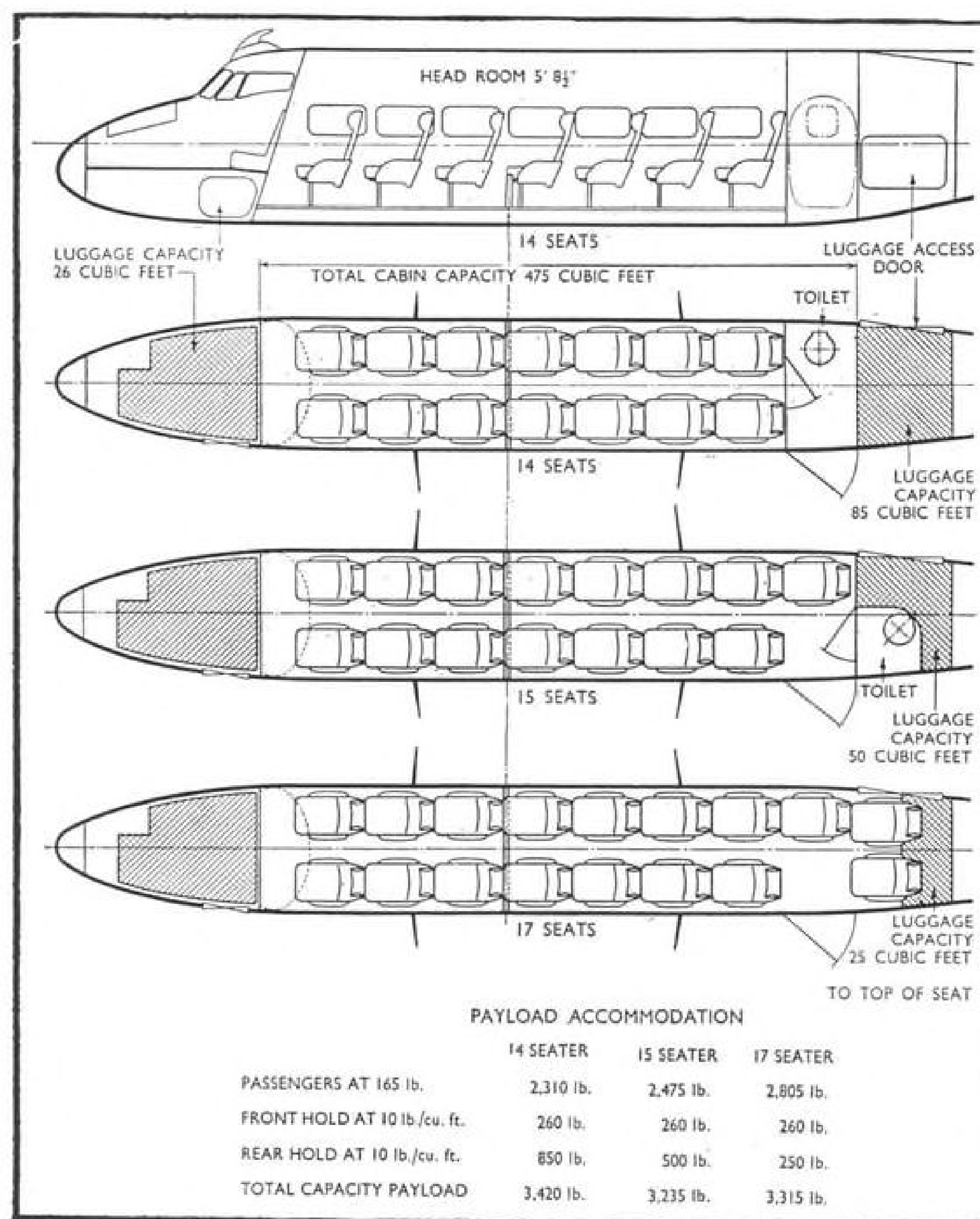
- **Four-engine reliability.**
- **Takeoff** from a grassy runway in 2100 ft. to clear a 50-ft. obstacle at full gross load, zero wind.
- **One-engine-out takeoff** to clear a 50-ft. obstacle in 2400 ft.
- **Maintenance simplicity** afforded by ungeared, unsupercharged engines, the non-feathering propellers, and fixed landing gear (retractable gear available).

► **Dove Components Used**—Another important feature of the Heron is its built-in economy. In this \$98,000 plane (\$6160 more with standard radio) are many components found in the de Havilland Dove, 300 of which have been built.





HERON AT HATFIELD receives its port inboard engine in de Havilland's shop.



This adoption of Dove parts saves the cost of considerable new tooling, speeds the production schedule, capitalizes on use-experience from four years of Dove operation, and gives interchangeability to reduce spare parts stocking for operators.

The entire Dove wing has been incorporated, with the root extended to carry the inboard engine. Stabilizer and fin are adapted with a similar extension. Control surfaces are essentially Dove units and the aileron is identical.

Fuselage has the Dove cockpit (with

minor alterations) and tail stub, but the enlarged main body has longer side panels and keel, higher and longer roof structure. Numerous fittings in the two craft also are the same.

And lessons learned with the Dove maintenance-wise have influenced Heron design.

► **Fuselage Accommodations**—Fuselage has an oval cross-section affording 5 ft. 8½ in. headroom and 4½-ft. width throughout the length of the cabin.

For the 14-passenger arrangement, there is a window for each seat. By rearrangement of the toilet facilities, 15 seats can be accommodated. Elimination of the toilet compartment and cutting the size of the rear luggage room will give a 17-passenger version of the Heron.

Chairs (also Dove-type) are fitted at 32-in. pitch, have no rear legs, so giving unobstructed leg room. Aisle space between seat arms is 9 in.

Cabin entrance door is aft of the wing, on port side. In the roof are three emergency exits.

► **Body Construction**—Fuselage's monocoque makeup has skin reinforced by rings and stringers of V-section sheet. Cabin portion has two main longerons above the window line, one main longeron below.

Nose section, encompassing the cockpit and forward baggage compartment (under cockpit floor) is separated from the cabin by a bulkhead forming part of the main fuselage structure. Another structural bulkhead partitions the aft end of baggage space, with a removable panel for access to the tailcone. Two other bulkheads in the rear of the fuselage carry the tail attachment fittings.

The wing center section spar, a built-up box structure, crosses the bottom of the fuselage and is integral with it.

Cabin floor has sandwich construction, extends from either side of the center section spar and is supported by light alloy transverse members.

► **Landing Gear**—This is of the tricycle, fixed type. Main units are interchangeable rubber sprung, and are removable by loosening a single nut on top of wing.

Nose wheel has an oleo shock absorber and is fully castering.

Pneumatic wheel brakes are operated by thumb lever on the control column in usual British fashion.

► **Wing**—Airfoil incorporates a main I-section spar, a built-up, light alloy false spar to carry flaps and ailerons, and a forward false spar (extending from the root to the far side of the outboard nacelle) to carry the engine mounts.

Flaps and ailerons (also elevator and rudder) are fabric covered.

A portion of the wing leading edge is hinged upward for access to lines,

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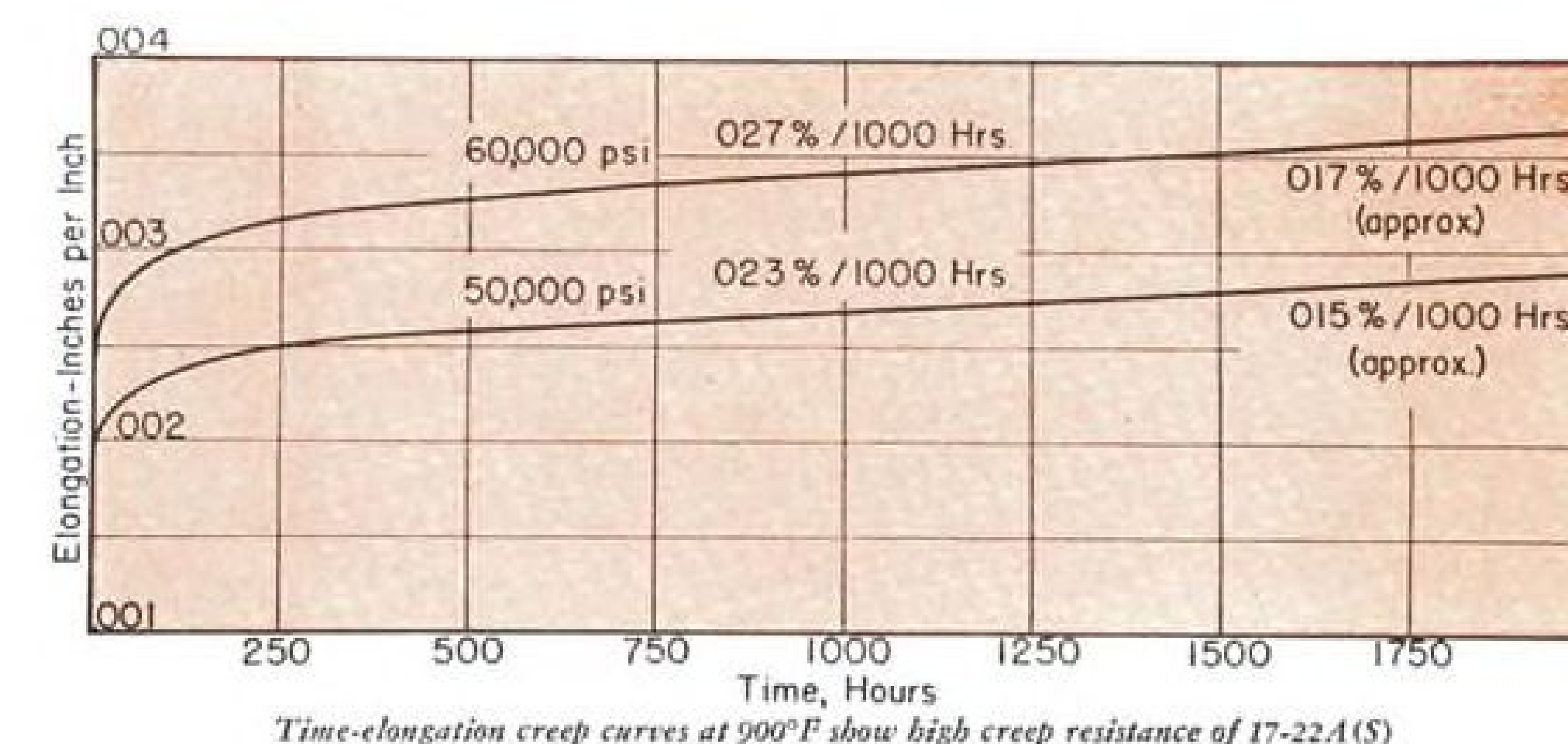
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mum resistance to heat checking and thermal cracking. It is readily workable up to 2300°F. It is easy to machine and weld. Its high temperature properties can be developed to their maximum by simple, air-cooling heat treatment, holding possible distortion and quench cracking to a minimum.

For complete information on 17-22A(S), and its companion analysis, 17-22A, write for Technical Bulletin Number 36. And for help with your high temperature problem, call upon our Technical Staff. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, O. Cable address: "TIMROSCO".

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How to cut costs when drafting revisions are necessary



* A case history based on the experience of the Virginia Department of Highways

TODAY the State of Virginia is engaged in a long-range Highway Zoning Program which necessitates changing thousands of drawings to include proposed right of ways.

How to do the job most economically was an important question: Retracing was ruled out—too slow, too expensive. The use of intermediate prints was considered next. They had to be long-lasting . . . easy to make . . . easy to revise.

Here's why Kodagraph Autopositive Paper was chosen for the job:



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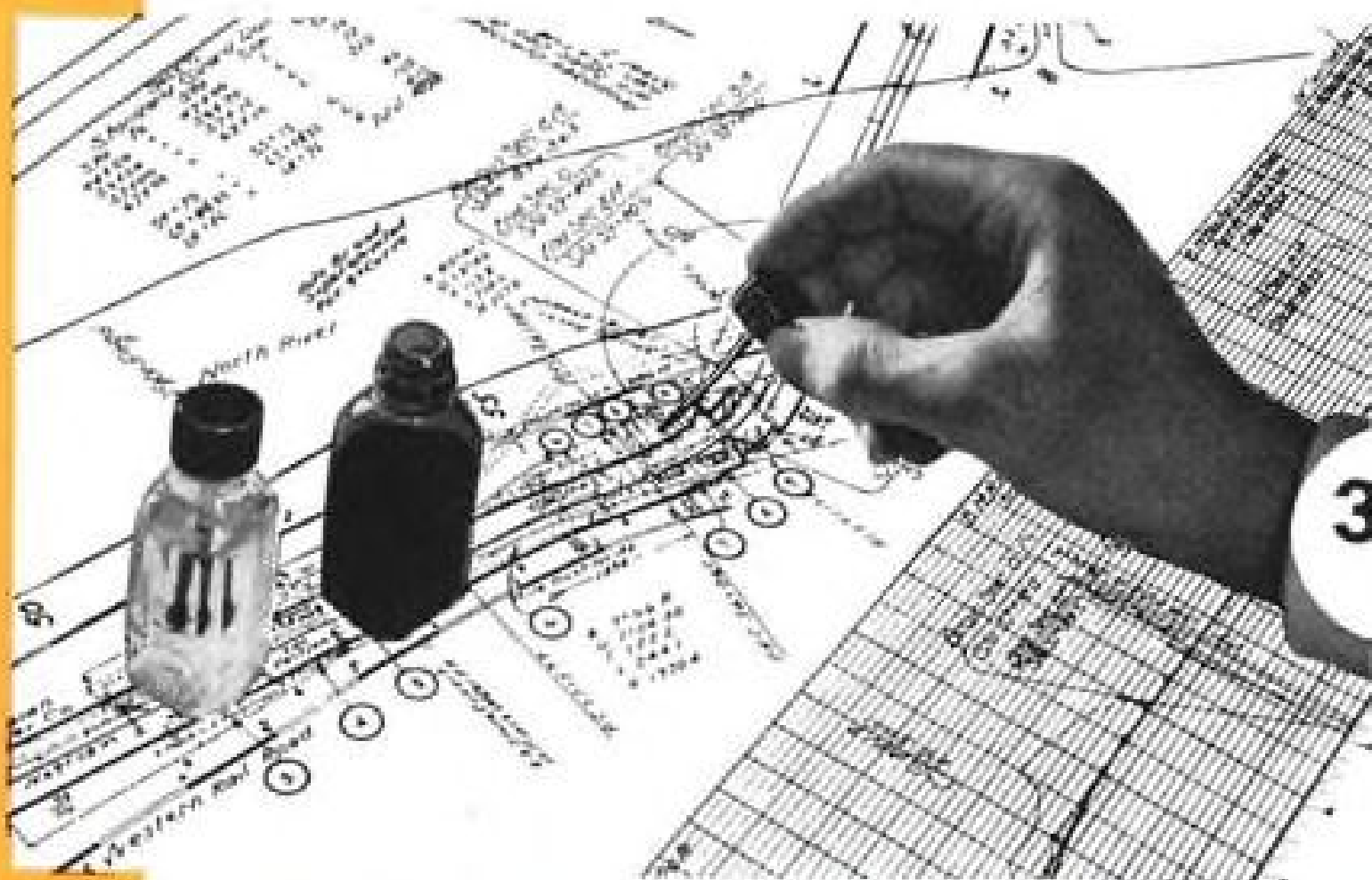
Long-lasting intermediates are assured. In a "permanence test" made by the Virginia Dept. of Highways, an Autopositive print was left on a roof top for 36 days. During this time this photographic intermediate was exposed to 200 hours of sunlight . . . 6.88 inches of rain. Despite all of this abuse it was declared "good as new."

Proof, indeed, that "Autopositives" will stand up under less trying, normal conditions . . . will remain intact in the files year after year . . . ready to produce sharp, clean blueprints whenever needed.



2

Photographic intermediates are produced at a new low cost. When "Autopositive" is used, positive photographic intermediates are produced *directly* without a negative step, without darkroom handling. Maximum efficiency is realized by the Virginia Dept. of Highways because its "Autopositives" are turned out automatically . . . in a continuous blueprint machine, which can be converted readily for Autopositive production.



3

Drafting revisions are easily made. Unwanted details—such as existing right of ways—are removed quickly from "Autopositives" with corrector fluid. Then the proposed right of ways are drawn in with pencil or ink. Thus, new masters—prepared without costly redrafting—are ready to turn out the blueprints needed for county supervisors and resident engineers.

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DH Heron

Performance Data

(At 12,500 lb. gross, standard atmospheric conditions)

Recommended cruising speed (at 8000 ft., 60 percent takeoff power) . . . 160 mph.
Corresponding fuel consumption . . . 46.8 gal./hr.
Corresponding air-miles per gal. . . 3.46
Rate of climb, sea level . . . 1200 fpm.
Rate of climb with one engine out, remaining engines at max. continuous power, inoperative prop in high pitch . . . 340 fpm.
Service ceiling . . . 18,500 ft.
Takeoff distance to clear 50 ft., in still air, from dry grass surface . . . 2100 ft.
Takeoff distance to clear 50 ft., one engine out at safety speed, in still air, from dry grass surface . . . 2400 ft.
Landing distance from 50 ft., in still air, on to dry grass surface . . . 1350 ft.

controls, pneumatics and miscellaneous installations.

Wing tips are interchangeable.

► **Powerplants**—Engines are four 250-hp, direct-drive, unsupercharged, de Havilland Gipsy Queen 30s, also used in the RAF's standard trainer, the Prentice.

Heron's engine mounts are interchangeable.

Propellers are DH 7-ft.-diameter constant-speed units with controls connected to the engine throttles. There is a positive high-pitch setting for emergency engine shutdown.

► **Fuel System**—Bladder-type fuel cells (240 or 360 gal., according to requirements) are contained inboard of the inboard engines and house submerged fuel pumps.

A crossfeed control in the cockpit directs the fuel for any combination of engines.

► **Air Systems, Radio**—Goodrich boot-type de-icers are used on airfoil surfaces and are fed by air from the pressure side of two vacuum pumps on the inboard engines.

These pumps also deliver de-icing fluid to the propellers. The vacuum lines drive blind-flying instruments and the gyros of the automatic pilot, if this is installed.

Compressors supplying air to bottles in the nose for brake and flap operation are mounted on the two outboard Heron engines.

There is provision for fitting normal IIF and MF communication transmitter-receiver, together with radio com-

pass and VHF radio telephone. (These or other types of radio equipment are optional and are not included in the cost figure.)

► **Weights, Range**—Gross weight of the Heron is 12,500 lb. Carrying 14 passengers at 165 lb. each (2310 lb.) and baggage at 10 lb. per cu. ft. in the 111 cu. ft. of available space (1110 lb.), the capacity payload is 3420 lb.

At this figure, the still-air range is approximately 400 mi. Corresponding practical stage length is 150 mi. with SBAC allowances which include flight to alternate (230 mi. or stage distance) and total standoff time of 45 min. After flying the 150-mi. stage with

capacity payload, about 60 gal. of fuel remains.

With payload dropped to 2750 lb., still air range is about 700 mi. and practical stage is about 400 mi. with SBAC allowances.

With full tankage of 300 gal. and 1750 lb. of payload, maximum still-air range is 1250 mi. Practical stage, with SBAC allowances, at this loading is approximately 850 mi.

With fixed landing gear version, recommended cruising speed is 160 mph. with 60 percent of takeoff power at 8000 ft.

With retractable gear version, cruising speed is boosted to 175 mph.

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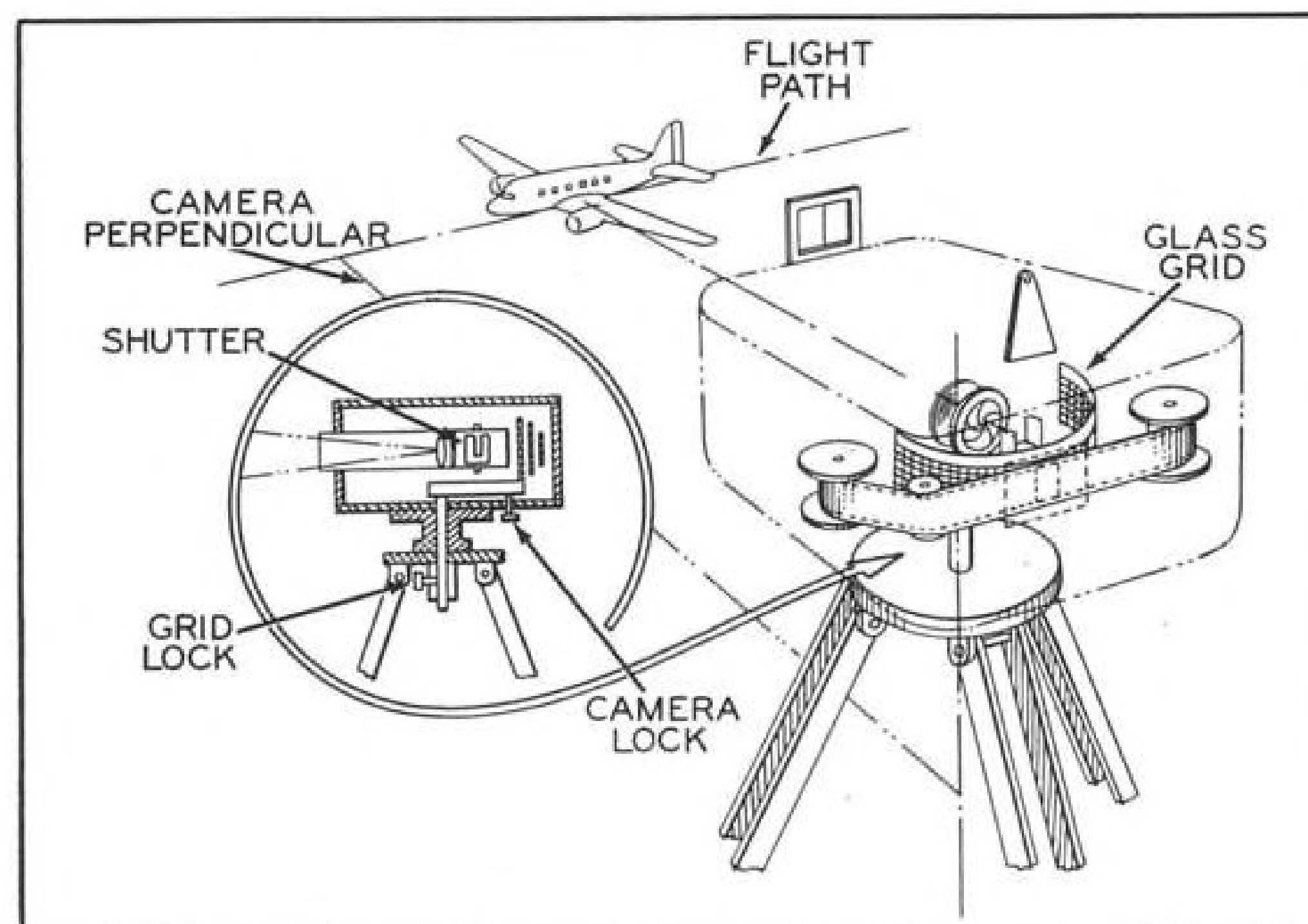
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taken in all directions from an "ideal" centerpoint—to represent line-of-vision due to head movements alone.

Descriptions of these tailor-made cameras, in the interests of the relatively new science of photographic engineering, are given in an illustrated article, "Four Cameras for Research in the Aeronautical Field"—in *Photographic Engineering*, July 1950. The author is Jean St. Thomas, Chief, Technical Photography Div., CAA.

Tail Wags Plane

But NACA studies show designers how to avoid flight instability.

An airplane with a wagging tail may be an interesting phenomenon to aerodynamicists, but to the military it's a nuisance.

Snaking or fishtailing in flight makes for a very unsteady gun platform, and there have been many military airplanes recently which have had these undesirable characteristics.

These yawing motions are typified generally by either constant-amplitude oscillations or by poor damping in conjunction with a short period.

Source of these motions has been investigated in some detail by the Ames Aeronautical Laboratory of the National Advisory Committee for Aeronautics, and the results of their studies have been recently published in NACA Tech. Note 2195 ("A Flight Investigation and Analysis of the Lateral-Oscillation Characteristics of an Airplane," by Carl J. Stough and William M. Kaufmann.)

► **Skyraider Tests**—NACA conducted its flight tests on a Douglas Skyraider, an aircraft reported to have undesirable oscillatory habits at high speed.

Three rudder configurations were tested in addition to the original design. One of these was basically the original rudder, but a trailing-edge bulb has been added to the trim tab. Another removed the horn balance from the rudder. Third version was the original configuration with a de-boost tab which was rigged to give a de-boost motion of 1 deg. on the tab per 2 deg. of rudder deflection.

As adjuncts to the flight tests, wind-tunnel studies were made at Ames of the test airplane in the 40- x 80-ft. tunnel, and of a 0.17 powered model in the 7- x 10-ft. tunnel.

► **Fixed or Free**—First problem considered was whether the undesirable characteristics were due to static-stability derivatives (control fixed), control surface hinge-moment parameters (control free) or to random separations.



PILOT'S VIEW of the plane's cockpit is... RECORDED by camera rigged in seat.



Cameras Aid in Flight Testing

Specialized uses for photographic techniques help CAA reduce time, increase accuracy in collecting data.

Civil Aeronautics Administration engineers in the Flight Test branch have worked out a more accurate and faster means of gathering data through the development of four special cameras.

• **An aircraft takeoff and landing camera** assists in space-time studies. It makes a record of the length, acceleration and duration of a takeoff run and the length, deceleration and duration of a landing.

This is a fast-sequence, still camera that exposes two 16-mm. frames simultaneously. The upper frame receives the aircraft image. Lower frame records simultaneously readings of a stop watch, azimuth scale, wind velocity, test identification card and film footage counter.

• **A second special camera** makes an in-

termittent photographic tabulation of aircraft instrument readings inside the cockpit at one-sec. intervals for a record of extended flight-tests.

• **For approach zone study** another camera is mounted on a transit tripod and reduces tedious land-surveying to determine obstacles that might affect the glide-path and climb-angle of a given runway.

Five horizontal lines engraved on a thin glass screen, mounted in front of the focal plane, represent the horizon and glide-angle ratios.

• **Visibility from the cockpit** of an airplane is gaged by yet another modified camera created to cover wide angles. It is placed in the pilot's seat, with the lens at average eye-level, and photos are



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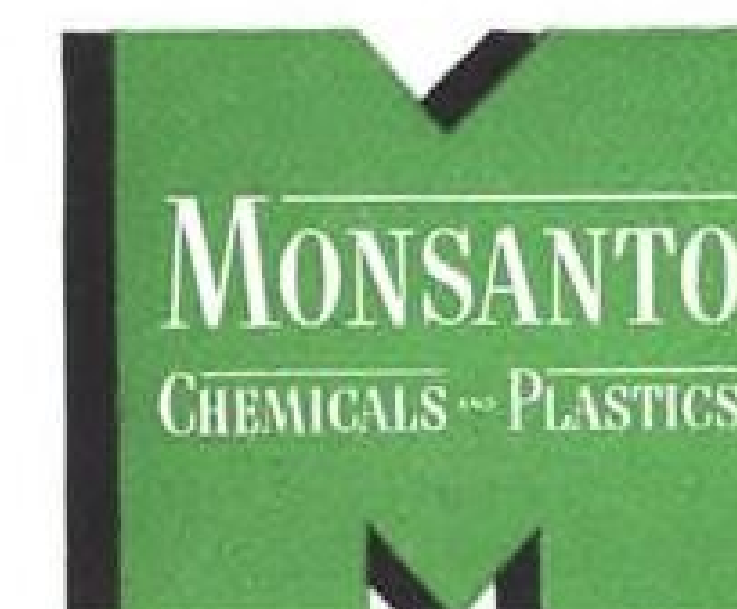


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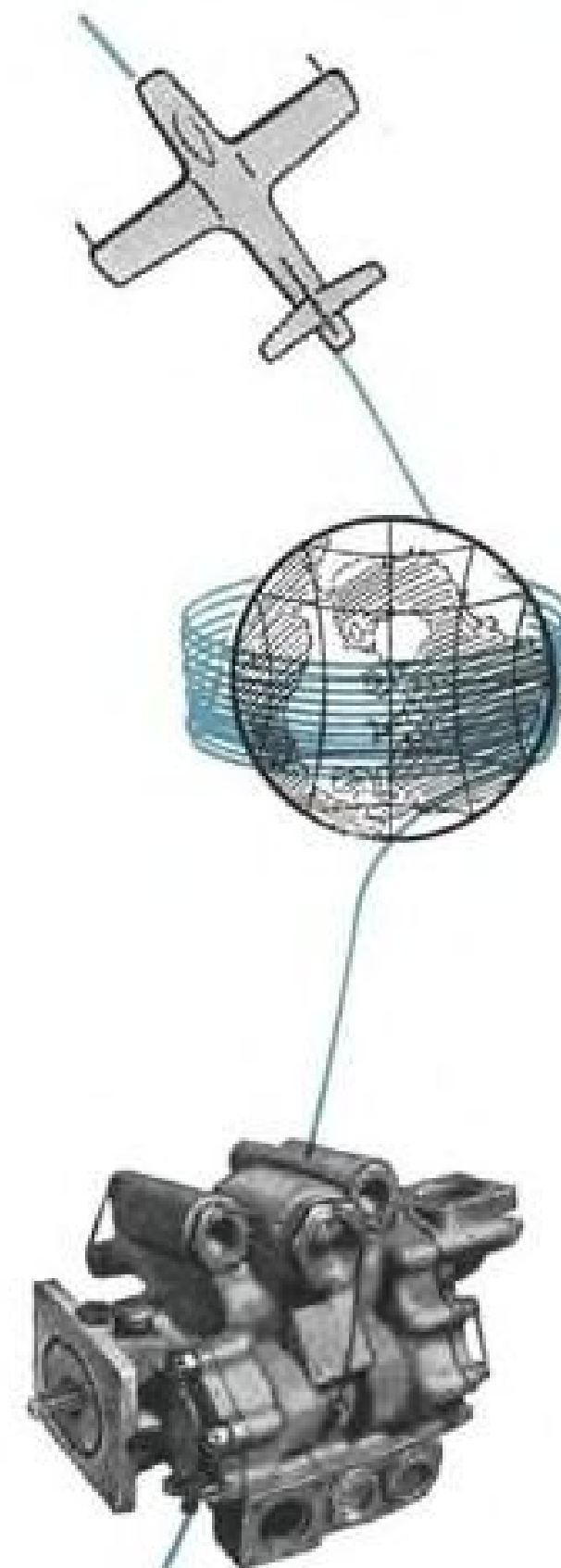
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Pesco research methods and precision manufacturing can produce products for you that will help your aircraft . . . reciprocating or jet . . . to operate more efficiently, more safely, over a longer period of time. Why not get the full story? Write today.

This plumber's nightmare is Pesco's endurance test bench for aircraft fuel pumps. Two 50-hp. and three variable-speed drives, with separate controls for each, and separate 165-gallon fuel tanks that can be pressurized or evacuated as desired, make it possible to simulate any kind of flight condition.



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Consequently, rudder-fixed dynamic stability qualities had to be determined to isolate the effect of rudder freedom on the aircraft.

This effect was considered an additional factor which might modify the basic rudder-fixed characteristics of the aircraft.

Basic results of the rudder-fixed flight test phase showed excellent correspondence between observed points and a calculated curve based on the assumption of constant values of the stability derivatives throughout the speed range. It was therefore concluded that there were no unaccounted factors affecting oscillation characteristics with rudder fixed, and that the poor damping qualities of the test airplane were probably due to the rudder hinge-moment characteristics.

► **Rudder-Free Flights**—The second phase of flight testing—with rudder free—brought out the importance of the tab setting.

In one tested case, the cycles required to damp to half amplitude were increased by 50 percent when the tab setting was changed from +4 deg. to -4 deg.

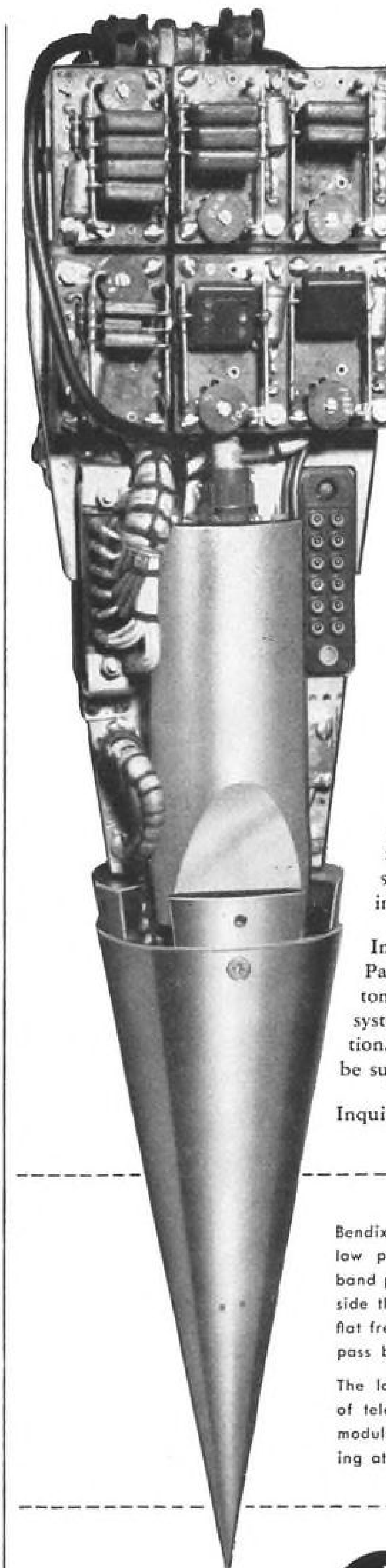
Although no quantitative data were available for the de-boost tab or de-horned rudder, it is known that both these changes move the rudder into the better damping range. Flight results were in conformity with this knowledge.

With the exception of the dehorned rudder, all of the modifications caused a deterioration of the damping of the plane with speed. Since this was found not to be a function of control-fixed parameters, it was inferred that the deterioration was due to changes in rudder hinge-moment parameters with Mach number. This trend has been observed in high Mach number tests of other control surfaces as well.

NACA says that current trends in design practice invite increasing amplitude or poorly damped oscillations. The designer is accused by NACA of intentionally selecting a low rate of change of rudder hinge-moment coefficient with rudder deflection and a negative rate of change of rudder hinge-moment coefficient with angle of sideslip.

► **Prevention and Cure**—What should the designer do about it? He should design with a margin for the expected changes, with tab setting, in hinge-moment coefficient slope with rudder deflection. And he should select his low-speed hinge-moment parameters carefully, knowing that their values will not remain constant with Mach number.

And in spite of this, if he does get a rudder design which makes the airplane unstable, he could specify a de-boost tab as an expedient.



BENDIX-PACIFIC TELEMETERING EQUIPMENT PROVIDES COMPLETE INSTRUMENTATION

Bendix-Pacific standard telemetering components can be combined into a compact, highly efficient assembly to meet *exactly* your specified requirements. This extreme flexibility has been accomplished through the use of the building-block principle which permits the purchaser to assemble readily an instrumentation system exactly suited to his specific needs—thus effecting the utmost economy in volume, weight and cost.

In addition to its standard components Bendix-Pacific provides application engineering and custom system design, fabrication and test of complete systems, installation and field test and data reduction. Complete receiving station facilities can also be supplied.

Inquiries are invited.

Bendix-Pacific has recently developed new band pass and low pass filters for telemetering receiving stations. The band pass filters are characterized by high attenuation outside the pass-band by low insertion loss and by extremely flat frequency response and constant phase-shift within the pass band.

The low pass filters are designed to improve the quality of telemetering recordings through the reduction of intermodulation noise and by providing ideal electrical dampening at the input of the recording galvanometer.



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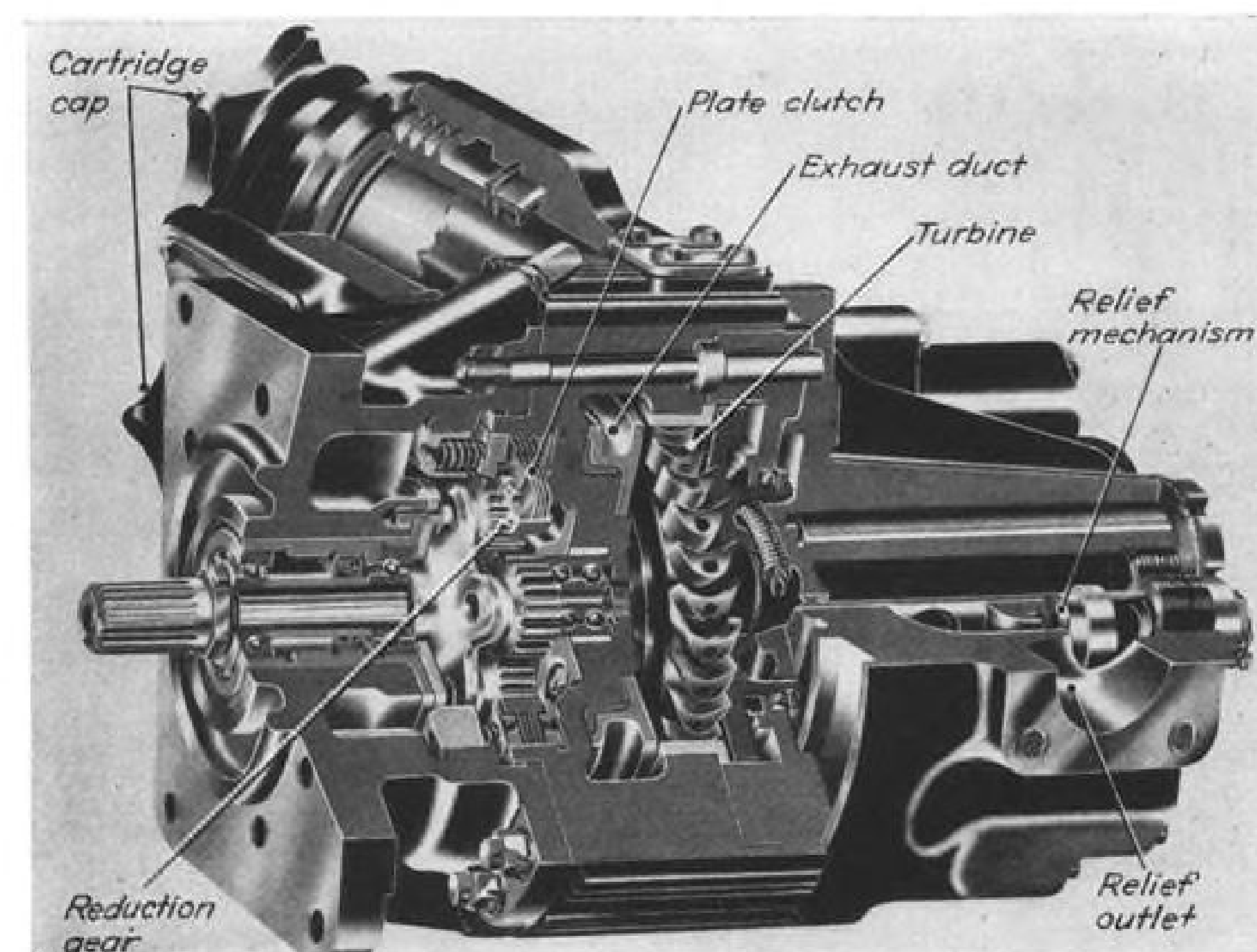
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* BASED ON 23 INDEPENDENT READER PREFERENCE STUDIES

* Source: Aviation Week Research



New 'Muscle' for British Jets

Rotax Ltd. cartridge starter for jets was originally developed for de H Ghost, is production accessory.

(McGraw-Hill World News)

Starter was developed by Rotax Ltd., British accessory manufacturers.

Initially designed for the de Havilland Ghost and slated as an accessory for the DH Venom interceptor, Britain's new production starter for jets (AVIATION WEEK Dec. 25) is a compact, 60-lb. turbo unit measuring about 22 x 12 x 8½ in.

Each of the two cordite cartridges (one for start, the other a spare) has a 2 to 3-sec. burning time, according to ambient temperature. The aluminum alloy cartridge barrels are fin-cooled and have screw-in loading caps carrying firing contacts which become "live" only during the final few degrees of cap movement.

Gas from the ignited cartridge is ported through four nozzles to the starter's turbine, then exhausted to atmosphere. A blowout disk is incorporated to safety the unit if excessive pressure is developed, as in nozzle blockage.

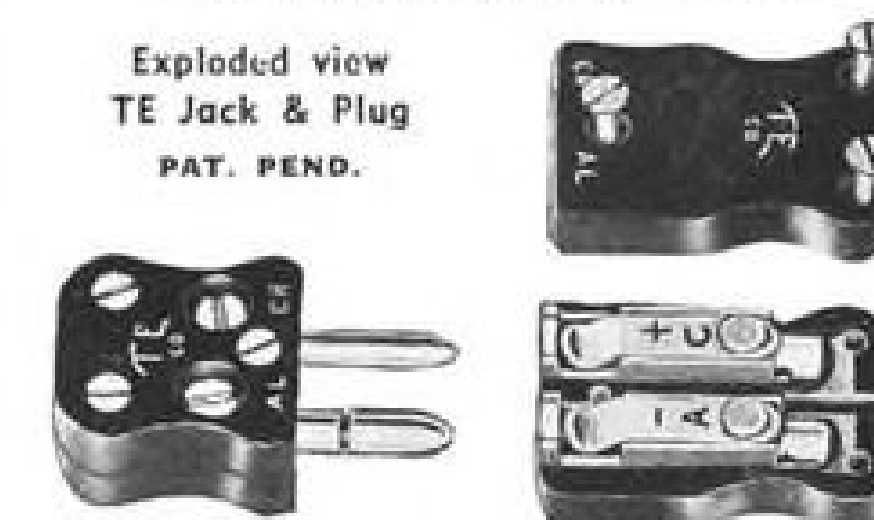
Drive is through a single-stage epicyclic gear train (5:1 reduction) to a splined output shaft. Reduction gear annulus is anchored by a multiple-plate overload clutch to absorb the shock of driving-dog engagement. Clutch break-away setting is 180 lb.-ft.

Output speed is 9000 rpm., output torque 100 lb.-ft. Maximum hp. at 17 C. is 170.

An overspeed device is set to operate between 10,500-12,000 rpm. of the output shaft.

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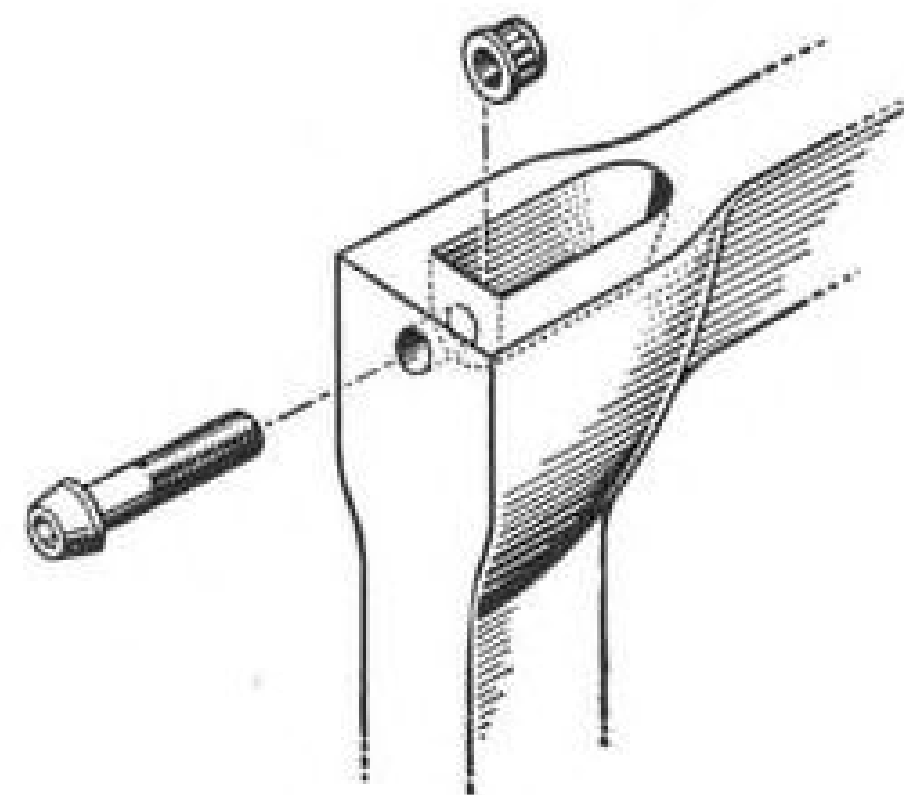
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(ADVERTISEMENT)

Fastener Problem of the Month

JANUARY, 1951



PROBLEM—Simplification of the illustrated North American Aviation wing beam joint to provide easier assembly and to reduce weight.

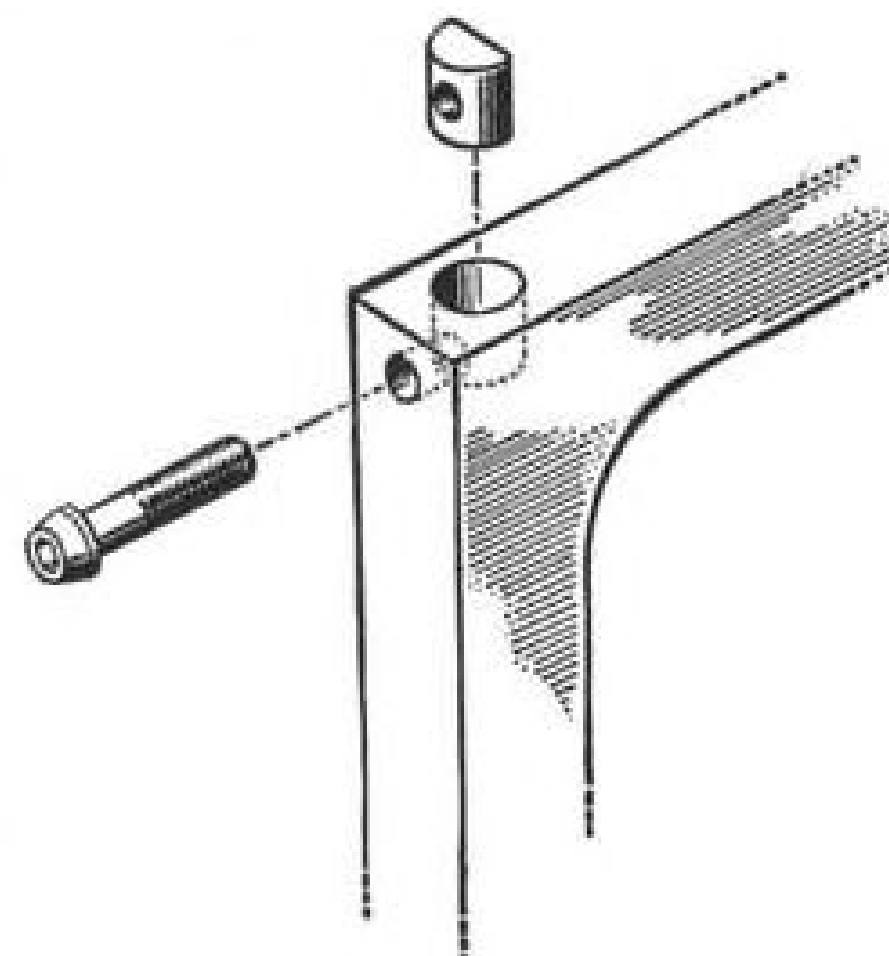
This joint was designed to accommodate a standard fastener—bolt and external wrenching type of self-locking nut. To provide sufficient wrenching area, it was necessary to mill and back spot-face the access hole; and the joint itself had to be built up around access hole for proper structural strength.

The manufacturer could not redesign this joint without a change in fasteners. But no fastener was available that would meet these specific problems.

SOLUTION—The special "Barrel" nut ESNA Part No. S-1452 designed by North American and ESNA engineers resulted in a new wing assembly which met all original design objectives.

The barrel nut fits into a simple, drilled hole. By avoiding the need for wrenching, expensive machining operations for the access hole are eliminated. The elimination of wrenching area permitted clean structure design for the wing beam and because it becomes part of the structure, the barrel nut actually adds strength to the assembly. Complete with the famous Red Elastic Collar which locks the nut in place, this simple barrel nut design is saving assembly time eliminating complicated forging dies, precluding the use of awkward safety wire, and saving weight.

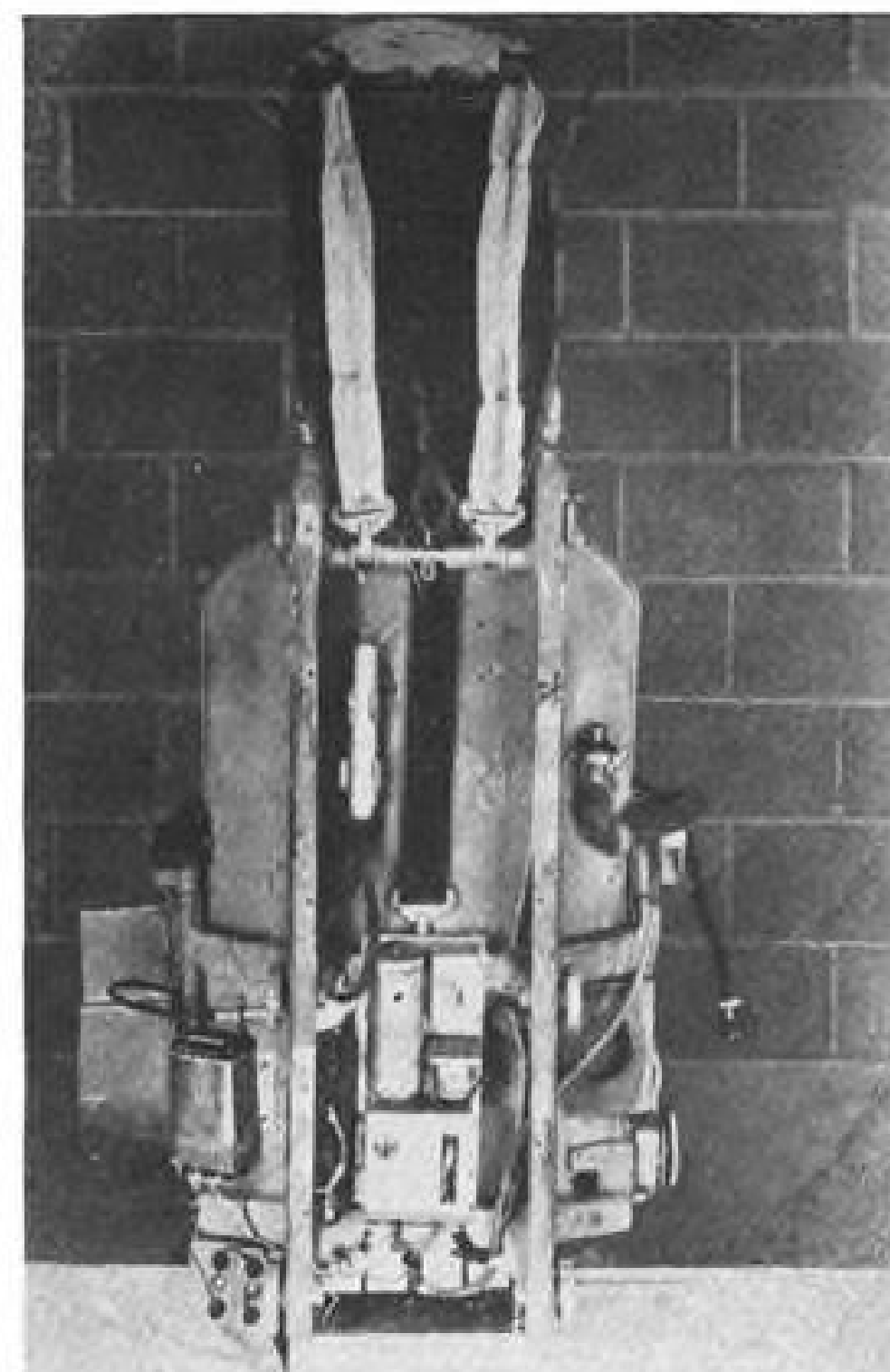
If you have a problem of this type you'll find this barrel nut, Elastic Stop Nut S-1452, is available as follows: SAE fine thread series in sizes 1/4-28 through 1-1/8-12; nylon locking inserts assure extended re-usability; all type S-1452 parts develop 185,000 psi min. in NAS high strength bolts.



S-1452

YOUR PROBLEM—If you have a tough fastening assignment, the solution may be found in one of the 3011 Elastic Stop Nuts available in a wide range of sizes and designs. These self-locking hex nuts and other types of aircraft fittings are readily identified by the famous Red Elastic Collar, the only self-locking principle which provides for (1) accurately pre-stressing bolts to assure proper load distribution (2) maintaining exact spring-loaded adjustments (3) withstanding severe vibration and shock (4) protecting internal bolt threads against corrosion (5) sealing against spiral seepage of liquids.

YOUR SOLUTION—Elastic Stop Nut Corporation of America will gladly go to work on your problem. Perhaps it can be solved with one of the many items now in stock. Or, if it requires a completely new design job, ESNA's fastener specialists will take on the assignment. Send your problem to ESNA, or write asking for a call from an ESNA engineer. Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, New Jersey.



TELEMETER for high altitude bailout procedure is attached to rear of ejection seat's lower section.

Drop Data

New way to get pilot's reactions to high-altitude ejection seat bailout.

Case history of the pilot's physical reactions plus drop data in ejection-seat bailout from altitude is now being obtained with lightweight, recoverable telemetering equipment for analysis by the Air Materiel Command's aeromedical laboratory.

The portable, ruggedized AN/AKT-3 telemetering system, designed by Pacific division of Bendix Aviation Corp., was used in a series of 14 jumps from altitudes as high as 42,176 ft. in tests at Holloman AFB. (Checks were also made of a new device preset to open a parachute automatically when the chutist drops to an altitude where sufficient oxygen is present.)

Ruggedness of the Bendix FM/FM telemeter was a prime requisite to cope with service conditions. For example, in the 42,176-ft. jump by AF's Capt. Vincent Mazza, he left the ejection seat, which had the telemeter strapped to the back of it, at an altitude of 15,000 ft.

The equipment was miniaturized to weigh less than 10 lb. To provide maximum flexibility and adaptability, the transmitting unit was fabricated in three hinged sections of approximately equal size and weight.

Provisions were made for using an external power supply during warmup, checkout and calibration. A lightweight

power supply was used during the bailout and drop.

A Bendix-designed oscillator was associated with each pickup which, under applied stimulus, governed the frequency of the oscillator. Thus, each oscillator frequency was a function of the magnitude measured.

Output voltages of the six sub-carrier oscillators were combined and fed to the reactance modulator stage of a Bendix-designed TXV-4 frequency modulated transmitter. The modulated r-f signal from the transmitter was received, decoded and recorded by a FM/FM ground station designed for use with an AN/AKT-3 telemeter.

Temperature measurements, respiration, heart rate, altitude and acceleration have been recorded.



Concrete Throat

An inexpensive, reinforced-concrete wind tunnel throat has been fabricated by students at the Northrop Aeronautical Institute, Hawthorne, Calif.

Built for less than \$100, the unit was erected to finish an incomplete tunnel donated by Northrop Aircraft, Inc., for use in the Institute to test models at 350-mph. speeds and for instruction purposes.

The throat is faced on the inside with a mixture of casting plaster and Hydrocal, and on the outside with plaster cement and Hydrocal. The inner surface is reported to give a smoothness not attainable with sheet metal or wood.

Reinforcing structure consists of rings and vertical members wired in place and tackwelded.

Shell of the throat is 2 1/2 in. thick, opening diameter is 48 in. narrowing to 16 in. Weight is between 800 and 900 lb.

from **-65° F.** to **+160° F.**

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FLEXIBLE SHAFTS
retain their
smooth operating
characteristics!

Here's what Barber-Colman Company of Rockford, Illinois, says about the S.S. White flexible shaft used in their Remote Adjustable Thermostat unit shown above:

"Test results indicate that the operation of the S.S. White remote control flexible shaft is satisfactory at temperatures ranging from -65°F to $+160^{\circ}\text{F}$. There is virtually no measurable variation in torque required to turn the shaft, or in torsional deflection required to initiate cam movement over the temperature range."

The reason—S.S. White flexible shafts of both power drive and remote types are subjected to exhaustive tests in S.S. White research laboratories to assure premium performance under all prevailing flight conditions.



WRITE FOR NEW BULLETIN 5008

It contains the latest information and data on flexible shafts and their application. Write for a copy today.



THE S.S. White INDUSTRIAL DIVISION
DENTAL MFG. CO. Dept. V, 10 East 40th St.
NEW YORK 16, N. Y.

Pionair: BEA's New Version of the DC-3

Carrier expects to add 5 years to transport's life with new design.

London—The prototype Pionair, British European Airways' modernized version of the DC-3, has made its bow. BEA is studying the prototype before freezing the design and converting its entire Dakota fleet to the new version. **►No Dollars Needed**—Neither BEA nor Scottish Aviation Ltd., which is doing the reworking at its Prestwick factory, will disclose the cost of the job. But it's safe to assume that it's below the \$200,000-plus cost of a Super DC-3. And best of all, from the foreign exchange view, it isn't costing a single dollar.

The modernization will not increase the aircraft's gross weight above the present 28,000-lb. maximum, and consequently no increase in power is called for. The changes are entirely within the fuselage, and are designed to give a maximum of 6400 lb. of payload, with seating accommodation for 32 passengers (in eight rows of four seats each) for the shorter hops where no galley or steward-service is required, or for 28 passengers when the quickly installed or removed galley is carried.

This has been achieved mainly by resort to two weight-saving measures: **•Radio operator's position** has been removed and the plane will revert to a two-man flight-crew basis.

•Heavy floor structure of the original C-47 (from which these were converted at the end of the war) has been replaced by a lighter floor, saving 400 lb.

Removing the radio operator's compartment just behind the flight deck has given space for an additional row of four seats just forward of the previous front row of the six in the existing cabin arrangements. Full-size windows have been cut in the fuselage.

BEA has 26 passenger and 6 freighter Dakotas. All 32 of these will get the face-lifting treatment, according to Peter Masefield, BEA's chief executive. And BEA is shopping around for 4 more DC-3s, to give the same transformation. (Schedule calls for five conversions per month during this winter, so that they'll all have the "new look" by next summer.)

►Five Years More—BEA confidently expects that it will get a full five years of additional life (at least) out of the tried and dependable Douglas airframes.

Reason for this further modification



EASIER LOADING is provided by drop-down steps and up-swinging cargo door, and . . .

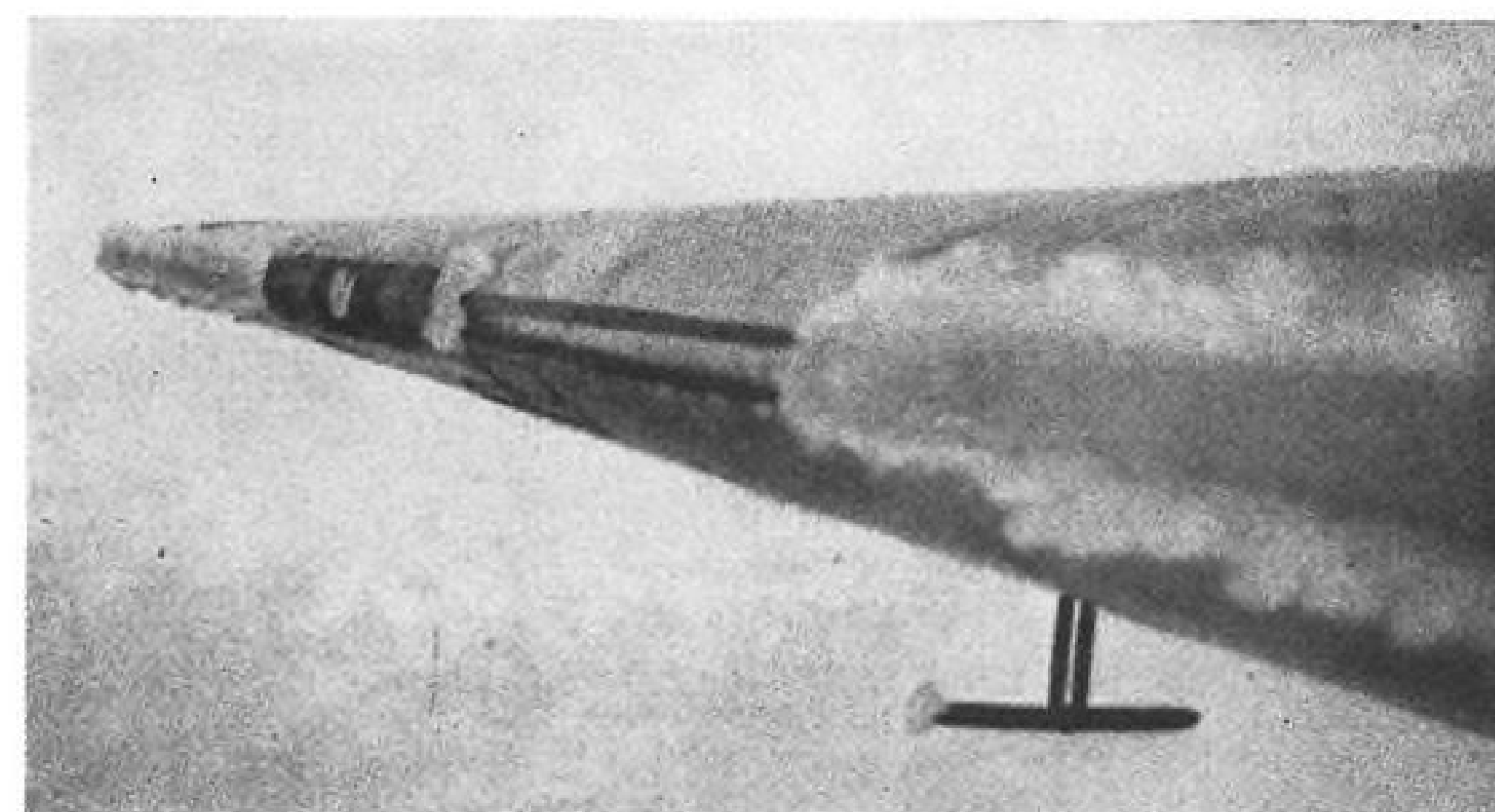


EASIER RIDING should result from widening seats 2½ in. (by reducing aisle width).

of the Dakotas is that there are a number of airports used by BEA on its internal services (within the U.K.) where for various limiting reasons neither the Vikings nor the new Ambassadors or Viscounts can be operated. And yet the passenger potential is such, BEA is convinced, that larger-seating capacity

in its planes is required.

Apart from this, however, the Dakota is still the cheapest airplane to operate in BEA's fleet. For an organization striving to balance its budget, this is no light matter. BEA estimates that modernization of its Dakotas should save the corporation \$280,000 a year.



"POROSINT" panels keep ice from the starboard stabilizer leading edge of a BEA Viking. Two types are being tested—solid distributor panel (left) and parallel strips (right).



INTERESTING ice accretion completely blocking the carburetor air intake scoop which occurred during one of the test flights conducted to test the efficiency of Porosint units.

Porous Panel Anti-Icing System

British firm develops sintered bronze strips to seep fluid on leading edges; say it is effective.

Newest ice-fighting wrinkle developed by the British is de-icing of wing and empennage leading edges by oozing anti-icing fluid through porous metal strips.

A 100-hr. flight test program, begun in January of this year under the sponsorship of The British Ministry of Supply and implemented by British European Airways and T.K.S. (Aircraft De-icing) Ltd., has just been successfully completed. Test aircraft was a special Short Nose Viking.

T.K.S. says it has received an inquiry for 200 sets of "Porosint" from the USAF.

Five and a half ft. sections of Porosint were installed in the leading edges

of right- and left-hand stabilizers. The inboard half was the standard T.K.S. double element, the outboard half was an entirely new Porosint panel distributor (see cut). Porosint, a porous metal recently developed by T.K.S., is a seemingly smooth, solid piece of sintered bronze. Actually, the metal contains millions of minute pores through which British-developed "Kilfroast" de-icing fluid sweats. Panels of Porosint built into the leading edges of wing and empennage effectively prevent the formation of ice, the recently conducted tests showed. Already formed ice may also be removed since its adhesion to Porosint is rapidly broken when attacked by Kilfroast. However, the porous panel

system serves better as an anti-icer than it does as a de-icer.

►Miserly Metering—Of 27 flights made, 14 encountered icing conditions varying from moderate to severe. De-icing tests of the Porosint panels revealed its low consumption of Kilfroast. Instead of pumping 1 pint/hr./sq.ft. of frontal area to the wings and 2 pints/hr./sq.ft. for the tail surfaces, engineers determined that 0.66 pint/hr./sq.ft. would suffice for both wing and empennage. (In each case, the frontal area is measured at the maximum thickness ordinate of the airfoil.)

Savings resulting from this reduction in de-icing fluid consumption will amount to 346 lb. per plane and a reduction in operating costs of £8000 (\$22,400) per year on BEA's present fleet of 42 Vikings.

The test crew noted that Porosint reached maximum effectiveness when the surface was barely wetted. Increased fluid flow above this point gave no increase in de-icing efficiency.

Second interesting point observed was that Porosint panels were capable of preventing any ice accretion whatsoever under certain conditions—usually when temperatures ranged from 0 to -3 deg. C. At lower temperatures, ice tended to form in cycles—a small amount would accumulate then become loosened and blow off.

►Test Flight—The two test sections of Porosint were fed from separate tanks mounted in the cabin (see cut).

Laboratory-calibrated pumps supplying the Kilfroast were capable of giving flow rates of from 4 pints/hr./sq.ft. to ½ pint/hr./sq.ft.

Three rotating, coaxial cylinders ½, 1, and 2 in. in diameter were projected into the airstream to measure cloud water content and drop size. After a two-min. exposure to the airstream each individual cylinder was removed and placed in a separate airtight container. Difference in weight of containers and cylinders before and after exposure gave a reasonably accurate indication of water content and droplet size.

Design of the instrument and methods of computation were based on mathematical investigation of water droplet trajectories conducted by Irving Langmuir and Katherine Blodgett of General Electric.

In order to make the system immediately operative, the de-icing lines were primed as soon as practicable after take-off—a recommended procedure.

►Porosint Properties—Porosity of Porosint being 35 percent, de-icing fluid

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Utilizing the Wittek Floating Bridge, the FBSS has been tested and proved for dependable service on all types of aircraft applications.

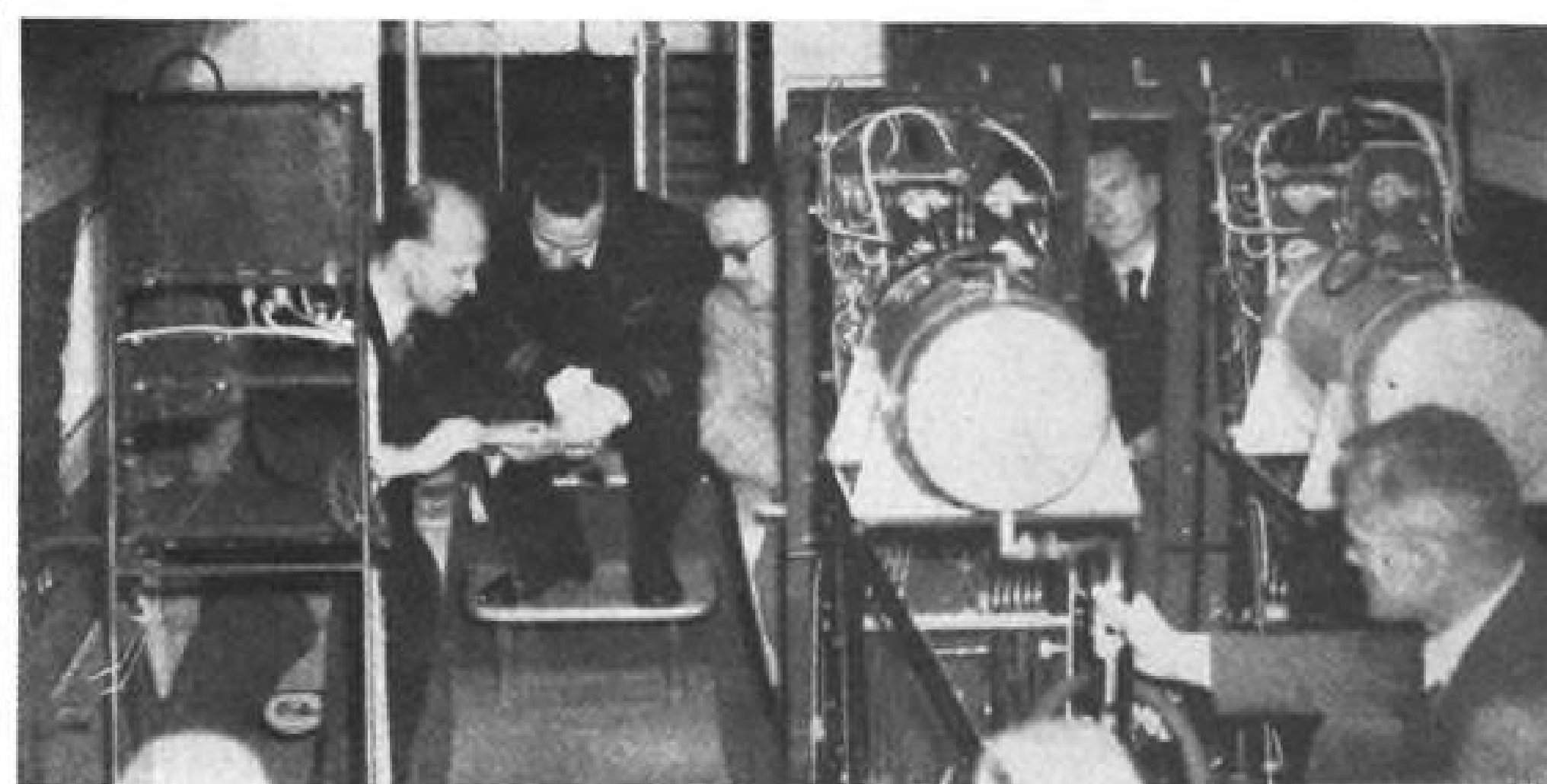


The Wittek Type WWD Aviation HOSE CLAMP

Available in all standard aircraft sizes, the WWD is also furnished in large diameters up to 12" for duct and other special applications. Permits easy installation when hose is in place.

Meet current AN specifications
and have C.A.A. approval.

WITTEK *Aviation*
HOSE CLAMPS 
MANUFACTURING CO.
4308 W. 24th Place, Chicago 23, Ill.



ELABORATE equipment carried aboard the test aircraft is shown in the photograph above. Individual tanks supplying "Kilfro" to the two types of panels may be seen at the right.

flows through it too fast. So the manufacturer built restrictions in the form of bronze strip mats placed between the Porosint and a corrugated backing plate. Fluid pumped through the backing plate is evenly distributed by the corrugations whence it seeps through fine channels in the bronze strip mat to reach the rear surface of the Porosint panel. Local blockage caused by spot welding panels together does not cause uneven distribution because the spots are small and capillary action causes the fluid to flow over the obstructions.

Porosint panels are now made in 6 in. widths but 12 in. width can be provided. Individual 12 in. long panels are

assembled in six-foot lengths which can readily be fed by a single input line.

The distributor panels, being only 0.11 in. thick, do not change the aerodynamic characteristics of the wing, according to the manufacturer. Attachment is by the very simple method of marginal strips. If incorporated into an original design, Porosint is tough enough to give a resistance equal to that of the surrounding structure, T.K.S. says. A final, but important point, it adds is that maintenance of Porosint is "negligible."

It was not revealed whether BEA intended to equip their entire fleet with this new de-icing equipment.



Device Checks Heater Switches

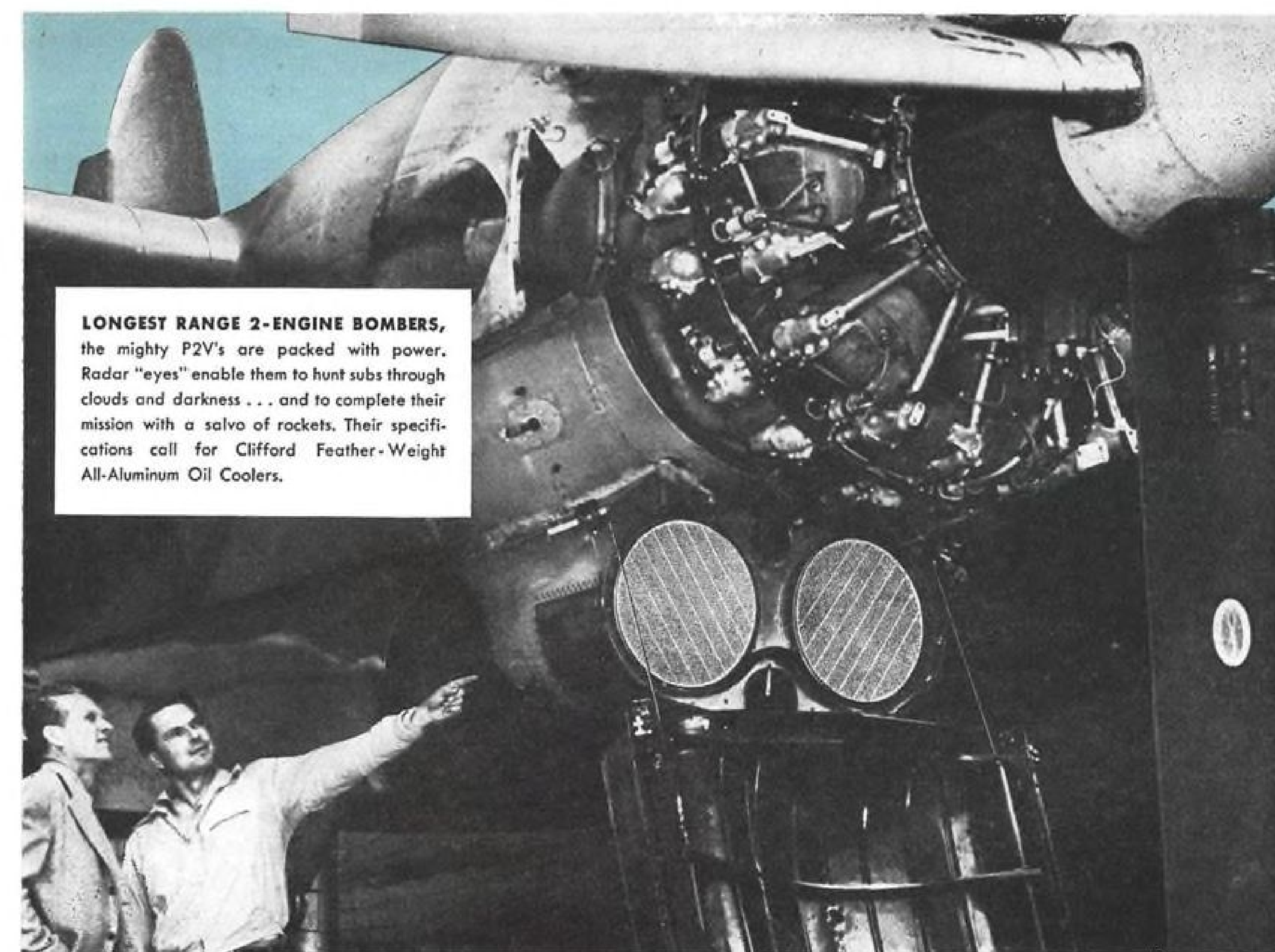
"Thermostatograph" is a new device developed by the Fairchild Aircraft division to test operation of heater switches.

The unit provides a quick, inexpensive method of checking the cut-in and cut-out points of low temperature cut-off and heater cycling and overheat switches.

The Thermostatograph consists of a

thermostatically controlled oven, the heat of which is cycled between the high and low tolerance temperatures of the switches. A recording tape and flashing lights permit instant observation of the performance of each switch in the oven.

A separate circuit, traces a line to control the operational exactness of the switches.



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ALL-ALUMINUM OIL COOLERS
FOR AIRCRAFT ENGINES

HYDRAULICALLY - FORMED BELLOWS
AND BELLOWS ASSEMBLIES



NEW AVIATION PRODUCTS



Kills Metal Fires

A pressurized extinguishing agent developed specifically for fighting metal fires is being marketed by Ansul Chemical Co., Marinette, Wis.

The product, Met-L-X Dry Powder, is designed to smother fires by forming a crust over the burning metal. It reportedly is effective on magnesium, sodium, potassium, zinc, powdered aluminum and other materials.

To permit use of the agent in gas-pressure extinguishers, Ansul's engineers concocted a powder of small particle size.

According to this company, Met-L-X is the first extinguisher of the gas-pressure type designed specifically for metal fires. In addition, says the firm, it is moisture-repellent, free-flowing and does not conduct electricity or deteriorate under normal conditions. The product also is non-toxic, will not corrode and is non-abrasive.

Extinguishers carrying the new agent are available in 30, 150 and 300-lb. sizes.

The manufacturer emphasizes that Met-L-X is "in no way similar to the well-known Ansul Dry Chemical."

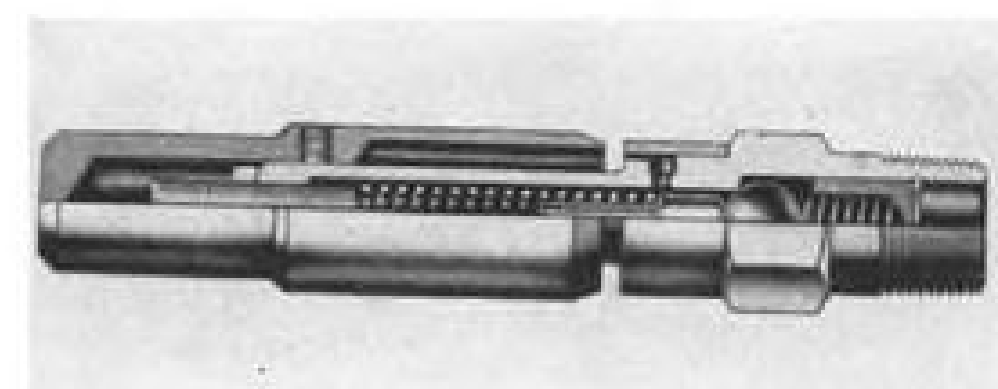
De-Glares Missiles

A new type of plastic finish, developed primarily to eliminate glare of stainless steel surfaces on guided missiles and other aviation apparatus, has been announced by United Lacquer Mfg. Corp.

The finish, VB 248, "licks the problem of providing an effective coating that would adhere to the highly polished stainless steel used in various aircraft devices," says the maker. Because

of its good adhesion qualities, United Lacquer expects it will find other applications where elimination of glare is not the primary objective.

The material takes a baking temperature of 275 F. for one hour. It is available in all colors, in a semi-gloss or gloss finish. Address: 1001 W. Elizabeth Ave., Linden, N. J.



Air System Alarm

A lightweight, compact and low cost air pressure warning device which can be attached to any compressed air system to whistle an alarm when the pressure drops below that required, is being marketed by Airlarm, Houston, Tex.

Designed for use with air chucks, clamping fixtures, instrument or control air systems and many other applications, the device is fully mechanical, automatic and completely self-contained, according to the maker. It says the unit is not readily susceptible to clogging and to assure proper functioning, requires no more than ordinary measures usually employed to keep foreign matter out of air systems.

Installed at almost any convenient location, the adjustable device automatically stops sounding when pressure is restored. While alarm is quite loud, the amount of air consumed is small, reports the maker. Only restricting orifice is a small annular clearance between the piston and body. Address: PO Box 13034, Houston 19.

ALSO ON THE MARKET

Wales Multiple Hole Punching System with new, interchangeable punch and die units permits arrangement of virtually unlimited hole-punching patterns. For speed and ease, system permits entire set-ups to be made outside the stamping press or press brake. Made by Wales-Strippitt Corp., 345 Payne Ave., N. Tonawanda, N. Y.

Gearshift drive combining 5-hp. integrally mounted motor and four-speed sliding gear transmission will drive machinery requiring low range of selective

operating speeds and high radial load capacity. Made by Lima Electric Motor Co., Lima, Ohio.

Hand tachometer, Model ATH 10, with dual ranges of 0 to 1000 and 0 to 5000 rpm. and accuracy of 0.5 of one percent over entire scale, has torque of only 0.40 oz. in. on lowest range. Made by Equipoise Controls, Inc., 100 Stevens Ave., Mt. Vernon, N. Y.

Electronic thickness gage for accurate and speedy measurement of tin coatings on ferrous stock has been developed by the Research and Control Instrument division of the North American Philips Co., 750 S. Fulton Ave., Mt. Vernon, N. Y.

Multi-purpose grease, developed for use in wet, dry or cold applications, is oxidation-inhibited and non-separating. Called Cosmolube, it's designed to simplify lubrication problems and is offered by E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33.

Spray gun spurting reportedly is prevented by using Mogul Powerflo pump, 20 to 175-psi. air-powered unit designed to handle heavy industrial coatings. Special device in pump controls flow so that surfaces can be coated evenly to rigid specifications. Made by Gray Co., Inc., Graco Sq., Minneapolis 13.

"Lo Friction" universal joints, developed primarily for applications where friction heat or kinetic energy must be dissipated rapidly, are available in single or double joint form. Parts come in sizes of 1/4-in. o.d. or larger, with solid or bored hubs and round, keyed or splined shafts. They are made by Curtis Universal Joint Co., Inc., Springfield, Mass.

Hydraulic grinder with universal wheel-head which swivels 180 deg. and mounts internal and external spindles, will eliminate need for dual work set-ups for internal and external grinding, says maker, Rivett Lathe & Grinder Inc., Brighton 35, Boston.

Working ranges of Anchor Steel & Conveyor Co.'s cut-out couplings described in this column Dec. 11 are 10 to 2000 in. lb. torque, instead of 20 to 10,000 in. lb. torque as originally listed on the basis of erroneous information from a company announcement.

Drive rates of the Electrical Engineering & Mfg. Co. dual-motor actuator described on this page Nov. 27 are 6/100 and 7/10 in. per second. The latter speed originally was listed as 7/100 in. per second on the basis of erroneous information from a company announcement.

PRODUCTION

Lightplane Producers Eye Future

With 1950 possibly shading 1949, market for personal planes looks strong—if priorities are available.

Advance year-end indications are that 1950 U.S. light business and personal plane production will probably equal, and may exceed slightly, the 1949 figures.

An unofficial tabulation of planes produced through November showed an 11-month total of 3133, compared to a 1949 total of 3358 planes shipped by manufacturers. This left only 225 planes to be shipped in December to equal the 1949 totals. Dollar totals were expected to be considerably higher than in 1949, due to price increases on planes.

Analysis of the indicated 1950 production indicate a healthy prospect for the surviving personal plane manufacturers, since it was achieved in the face of strong handicaps in material and accessory and equipment shortages.

But whether the small plane manufacturers will be able to continue to build them now depends largely on the National Production Authority, and/or its successor under the Office of Defense Mobilization.

Handicaps—So strong were the material and equipment handicaps that at least three of the manufacturers have already terminated their personal plane production lines for duration of the emergency, while a fourth company will terminate its line as soon as existing orders are filled early in 1951. Ercoupe, Tempo and Luscombe have already announced closing of their lines. Ryan expects to wind up production of its four-place business plane, the Super Navion, with the completion of 150 orders now on the books. These probably will be completed by February or March at the latest.

Cessna and Piper, strongest quantity producers in 1950, and in 1949 and 1948, are continuing their production of civil planes, as are Beech and Aeronca. But Cessna is discontinuing the production of some models because of material shortages.

With a limited steady demand for business planes for executives and sales personnel and for other industrial uses, and with a continuing requirement for agricultural planes, indications now are that the market for these types of planes, plus trainers and air taxis, will be a healthy small business for the aircraft manufacturers who can continue in it.

Priorities Claims—Joseph T. Geuting Jr., manager of the Personal Aircraft Council of Aircraft Industries Assn., recently made application to CAA in behalf of the manufacturers to act as a claimant agency for necessary priorities for manufacturers to continue in business building planes needed for executive transport and industrial and agricultural uses. CAA is preparing an updated study of aircraft uses to determine how many such planes would be required. With completion of this study, application is to be made to NPA for the priorities.

National Production Authority's battling average, so far as priorities for aircraft production of any kind go, has thus far been remarkably low. The small plane manufacturers can expect a rough road to travel before they can get even reasonable priorities, if the experience of transport and military plane manufacturers is any guide.

With civilian defense accepting the light airplane as a valuable emergency transportation adjunct, there still remains a strong question as to whether the un-airminded National Production Authority will go along, realistic Washington observers say.



PLATE LIFTER

Lifting bar in use at Consolidated Vultee's San Diego plant moves these 350-lb. plates faster and more safely than with car loaders

or overhead crane slings. Device is adjustable, has shackles for attachment to overhead cranes, eliminates plate slipping.

Sound Labor Plan Pays Off at Boeing

A "sounder, healthier labor-management relationship" which "permits supervisors to place emphasis on individual ability and accomplishment" has enabled the Boeing Airplane Co. to cut costs on its military airplane production program approximately \$45 million in the past two years, according to William M. Allen, company president.

The cost reduction has been passed back to the government in the form of price reductions in contracts for C-97s and B-50s. Total price reductions amount to more than 15 percent of the total of the four contracts involved for these two planes, Allen said. They amount to \$37.5 million on the B-50 and \$7.5 million on the C-97.

The labor-management relationship to which Allen refers dates back to a strike of the Aeronautical Mechanics Union. The strike, declared illegal, relieved the company of a labor contract with strong seniority provisions.

PRODUCTION BRIEFING

Aeroproducts division of General Motors, Dayton, has signed contracts with Boeing-Wichita to build B-47 actuator gear box assemblies.

Grand Central Aircraft, Glendale, Calif., has finished reconditioning and modifying the first group of a number of F-51 and B-29s at Glendale and Tucson.

Capital Airlines Specifies **VICKERS PUMPS** for its fleet of **SUPER DC-3's**



REASON:

"The performance and exceptionally low overhaul costs of Vickers Pumps on our fleet of DC-4's" —Capital Airlines



Vickers Model PF17-3911 Constant Displacement Piston Type Pump

The superior performance record of Vickers Constant Displacement Piston Type Pumps on their twenty-five DC-4's is the reason why Capital Airlines specified these Vickers Pumps for their new fleet of Super DC-3's.

Important among the characteristics of these Vickers Pumps are: (1) exceptionally high volumetric and over-

all efficiency, (2) very low weight per horsepower, (3) outstanding dependability and unusually long life. Other significant considerations were the importance of standardization and low overhaul costs.

Ask for Bulletin 49-53, "The Most Complete Line of Hydraulic Equipment for Aircraft."

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Division of The Sperry Corporation

4136

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

Negotiated Contracts

Hoffman Radio Corp., Los Angeles, has received awards totaling \$2,761,725 for radio equipment, as reported in the USAF list of negotiated contracts for the week ending Dec. 22, 1950. Total awards for the period \$5,371,234.

Air Speed Tool Co., Los Angeles, drill, pneumatic, Cl. 17A, \$90,000.

Aluminum Co. of America, Washington, D. C., aluminum alloy tubing, Cl. 23A, \$94,431.

American Marsh Pumps, Inc., Battle Creek, Mich., repair kits and pump assemblies, Cl. 19A, \$37,215.

American Phenolic Corp., Chicago, steel-covered copper wire with plastic insulation, Cl. 16E, \$30,000.

Aro Equipment Corp., Trevitt & Enterprise, Bryan, O., drill, pneumatic, Cl. 17A, \$138,020.

Max Blau & Sons, Newark, N. J., type-writer stands, steel, Cl. 40, \$26,701.

Cleco div., Reed Roller Bit Co., Houston, drill, pneumatic, Cl. 17A, \$42,350.

Cleveland Steel Barrel Co., Cleveland, steel containers, Cl. 43, \$49,400.

Denison Engineering Co., Columbus, O., kits, Cl. 17C, \$264,105.

Douglas Tool Co., Detroit, automatic profile shaping machine, \$112,475.

Eclipse-Pioneer div., Bendix Aviation Corp., Teterboro, N. J., engine pressure instruments for replacement on Air Force aircraft, Cl. 05D, \$26,900.

Eltron, Inc., Jackson, Mich., mixer amplifier and mounting plates, Cl. 17A, \$145,849.

Fairchild Aircraft div., Fairchild Engine & Airplane Corp., Hagerstown, Md., kits for aircraft, Cl. 01R, \$100,000.

General Electric Co., Dayton, gasoline driven air welders, Cl. 17A, \$91,875.

General Electric Co., Schenectady, generator, tachometer, Cl. 05D, \$26,900; ball bearings, Cl. 04D, \$65,760.

Hallcrafters Co., Chicago, panoramic adapters, Cl. 16A, \$30,857.

Hartzell Propeller Co., Piqua, O., propeller blades, Cl. 03A, \$26,013.

Hoffman Radio Corp., Los Angeles, radio receiver transmitters, Cl. 16A, \$2,761,725.

Kelly-Koett Instrument Co., Cincinnati, radiac set, Cl. 39C, \$42,423.

Walter Kidde & Co., Inc., Belleville, N. J., cylinder and valve, fire extinguisher, Cl. 03F, \$57,200.

Lord Mfg. Co., Erie, Pa., spare parts for engine mounts, Cl. 03J, \$44,974.

Metal Industries, Inc., Indianapolis, metal containers, Cl. 43, \$58,430.

North American Aviation, Inc., Los Angeles, airplane modification kits, \$100,000.

Pesco Products div., Borg-Warner Corp., Bedford, O., maintenance parts for aircraft fuel and hydraulic pumps, Cl. 03I, \$96,782.

Sprague Engineering & Sales, Gardena, Calif., blower, Cl. 19A, \$97,465.

U. S. Rubber Co., Mishawaka, Ind., bag airplane lifting pneu., Cl. 19A, \$72,700.

Welded Construction Co., Cleveland, dolly assembly, Cl. 19A, \$146,074.

Westinghouse Electric Corp., Dayton, rectifier type arc welders, Cl. 17A, \$56,250.

Yale & Towne Mfg. Co., Stamford, Conn., spare parts for fuel servicing trailers, Cl. 19C, \$32,151.

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AMS 7276 Fuel Service O-Rings

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AN 6290 Fitting Baskets

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USAF Awards

Air Materiel Command Procurement Division makes available to AVIATION WEEK latest bid awards, shown on this page. Requests for further information should be addressed to Contracting Officer, AMC, Wright-Patterson AFB, Dayton, Ohio, attention: MOPPSX72.

ABSTRACTS

For accelerometers (51-364):
Eclipse-Pioneer div., Bendix Aviation Corp., Teterboro, N. J., on a bid of \$118,472.42.

For typewriter stands (51-483):
Companies sharing: Max Blau & Sons, Newark, N. J., on a bid of \$26,701.40; Engineering Mfg. Co., Sheboygan, Wis., on a bid of \$7780.50, and Saxson Drafting Equipment Corp., Elizabeth, N. J., on a bid of \$2448.

For 36 intervalometers (51-595):
Abrams Instrument Corp., Lansing, Mich., on a bid of \$11,118.

For 1500 rheostats (51-688):
Clarostat Mfg. Co., Inc., Dover, N. H., on a bid of \$2925.

For adaptors (51-802):
White Tuning Corp., New York, on a bid of \$4220.

For cylinder and valve assemblies (51-833):
Walter Klöde & Co., Inc., Belleville, N. J., on a bid of \$57,200.

AF 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 write local field office, stating 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

Brackets, 4398 each, bid invitation No. 51-1348, issue date 26 Dec., delivery 1000 per month starting within 105 days after date of award.

Photographic supplies, 1-6 items, bid invitation No. 51-1354, issue date 26 Dec., delivery production samples within 120 days, production quantities to be delivered in 90 days after approval of samples.

Compressor, air, 1-9 items, bid invitation No. 51-1356, issue date 26 Dec., delivery within 150 days after date of award.

Shackle assembly, 13,512 each, bid invitation No. 51-1357, issue date 28 Dec., delivery to start within 90 days at rate of 1250 per month until complete.

Rack, bomb, 1-2 items, bid invitation No. 51-1362, issue date 28 Dec., delivery of 500 per month starting within 90 days after date of award.

Test set adapter, 71 each, bid invitation No. 51-1365, issue date 29 Dec., delivery of first article in 45 days, production delivery within 60 to 90 days after approval of first article.

Amplifier, tuning drive, control panel mounting, 1-11 items, bid invitation No. 51-1369, issue date 29 Dec., delivery schedule not listed.

Dummy load, 71 each, bid invitation No. 51-1371, issue date 29 Dec., delivery of 3 each first articles within 60 days, balance within 60 days after approval of first articles.

LETTERS

Sneering at Cargo

You should be highly commended for your editorial policy on the defense of Transocean and Seaboard & Western's fight for a certificate. Your stand in the Slick and Flying Tiger case is remembered with deep appreciation and you are even more right now than then.

It seems like something significant has been missed here. Slick and the Tigers were certificated a year ago August, they had a mighty and powerful opponent in the subsidized carriers. They had little capital and less experience and yet a year later Slick has ordered three DC-6s and the Tigers 18 more C-46s. By hard work and hard work alone they managed to sell their services and build a reputable and now profitable business all with no drain on the federal treasury. Show us some of the passenger carriers that can match the above.

Surely the CAB must be tired of the constant bickering, the reversal of opinions and "facts" that the mail carriers always confront them with. We know and they know that eventually the truth and hard work of people like Slick and Prescott, Transocean and Seaboard & Western and editorial policies like yours will prove to be a wonderful and powerful thing for the U. S. and free enterprise.

There has started what is going to be a

revolution in the aviation and transportation industry, it is progress and you cannot stop it.

FRANK B. LYNOTT
Captain, Slick Airways
7400 Roe
Mission, Kan.

Praise

Thanks for the splendid article on Capital's Super DC-3s on Oct. 9. Many of our employee-subscribers to AVIATION WEEK have taken the trouble to call our attention to the piece and I want you to know how well it has been received around these parts. A. M. ROCHLEN, Director Public Relations div.

Douglas Aircraft Co., Inc.
Santa Monica, Calif.

A Woman's View

So much has been "batted about" on the small 190 cubic inch racing planes and air racing versus safety in aviation, that I may as well add a woman's viewpoint. Yes, we are boosters of aviation, naturally, being in the business. We also want to see new developments in planes, engines, equipment, progress in general, and right here a bouquet to your magazine which does a good job of keeping us informed on this subject.

James Vosyka, who lost his life at Detroit Aug. 11 (to quote here your so very true editorial "Risking Death for Thrills") was one of our own local boys. He started flying here while only 15, week after week trudging out with money for an hour of dual, money he earned as a bus boy after school. He flew dual until 16 when he soloed and continued on. Yes, he was a little boy, who "grew up" here with us, year by year earning his own way to an instructor's rating.

He went to work here too, putting in more than 1200 hours of well-delivered instruction, all of it in Piper J5A Cruisers, which had been converted to 90-hp. Continental engines. Think of it, 1200 hours without an accident, speaks well for the Continental engine doesn't it!

Our boy was finally tempted to race, and to once again quote you, "Lady Luck turned fickle." Why was he tempted? First of all money, secondly, perhaps glory, why else? One couldn't put into words the feelings of the students, pilots and entire group here. And there were many among the fellows who blew their noses when they read the newspapers and heard the news that he had been killed.

Perhaps these foolhardy "burned up" gentlemen who protest your editorial campaign can offer an explanation to this lad's mother, who still is asking "Why and what does it prove?" His brokenhearted mother has a real understanding of aviation. She, as well as we, can appreciate the wealth of knowledge aviation gains when test pilots put new planes through their paces, when pilots fly supersonic flights. Yes, it proves

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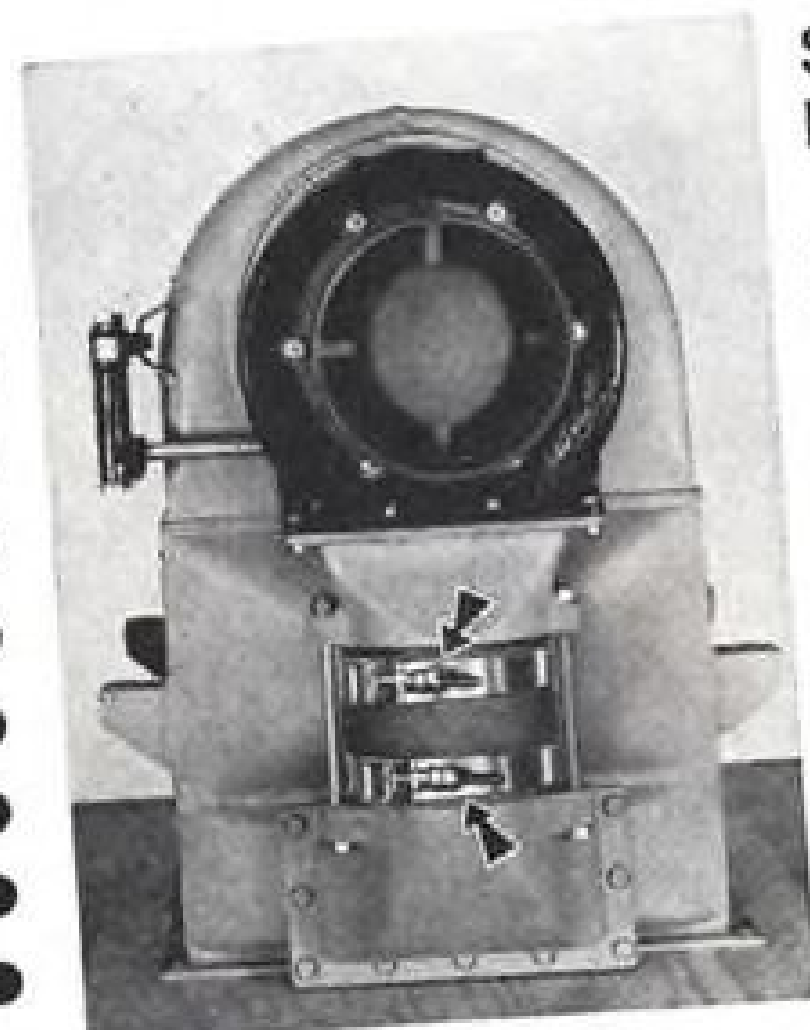


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Wheel Replacement Type Skis	Clamp-on Skis
	Tail Skis
	Tricycle Gear Skis

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ENGINEER'S NOTEBOOK



Standard Design Clamp Saves Production and Design Time

The application of a Standard Marman Quick Coupler Clamp on hose connecting heat exchanger and turbine in a Strato Air Cooling Unit for aircraft, illustrates one of many uses for this versatile clamp. It is particularly suitable for removable equipment or accessories and ducts because of the unique design of the latch which provides instant removal and fast assembly.

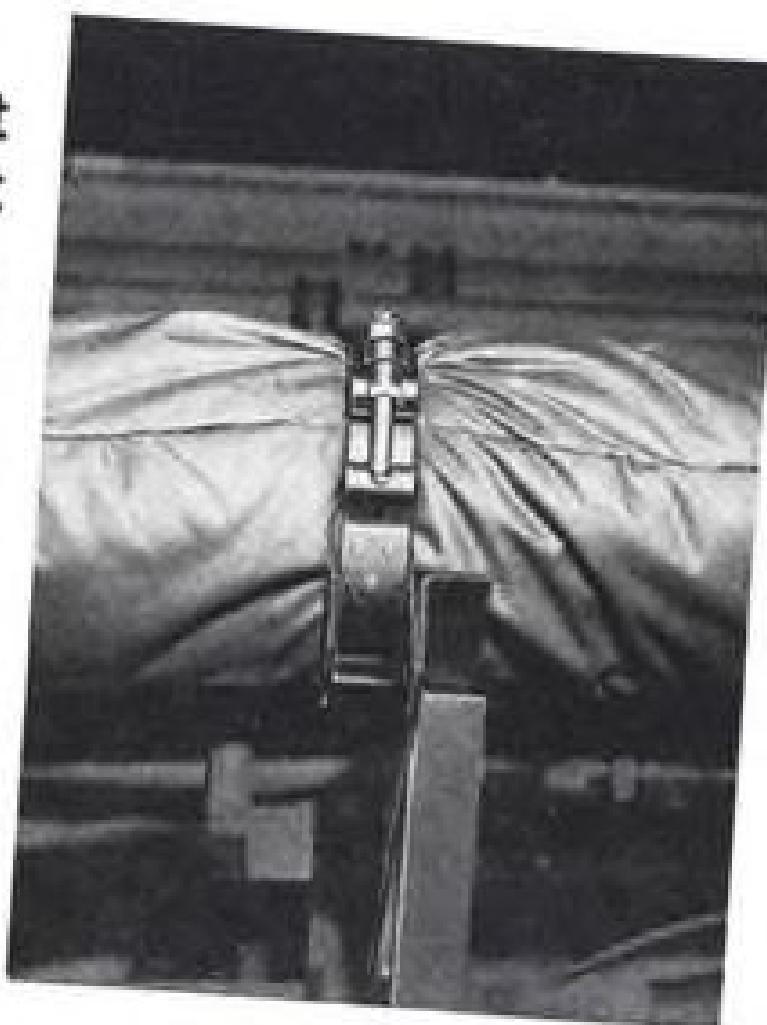
For information, write Dept. W-1

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Simplified Attachment for Starter Duct

Standard design Marman T-Bolt Clamp with integral attaching angle provides an efficient means of anchoring duct to wing leading edge. Exclusive design features of Marman T-Bolt Clamps provide even circumferential take up and assure an efficient seal for all types of hose and duct connections.



Save cost and design time with Marman...
Standardized Clamps for Specialized Applications

something doesn't it! Aviation gains a world of knowledge.

Yes, I suppose there will be more such air shows and races. Other pilots will lose their lives racing, and there will be more broken hearts, and perhaps these neck-breaking enthusiasts will continue to gloat over the black contribution these thrill-show deaths have added to aviation.

MRS. ELINOR SCHUMACHER,
Asst. Airport Manager
Southtown Aviation Corp.
Harlem Airport
8900 S. Harlem Ave.
Oak Lawn, Ill.

Congratulations!

It was my privilege and honor to receive one of the AVIATION WEEK Air Safety Awards at the Flight Safety Foundation Seminar in Denver.

I wish to express to you my personal thanks and appreciation for making possible this award. I can assure you it will be a great inspiration and encouragement to the staff of the Pennsylvania Aeronautics Commission who have worked for the last five years on accident investigation and the promotion of flight safety in Pennsylvania.

Your support of the excellent work being done by Flight Safety Foundation and Crash Injury Research will be recognized and appreciated by the entire aviation industry.

WILLIAM L. ANDERSON, Executive Director
Pennsylvania Aeronautics Commission
Harrisburg State Airport
New Cumberland, Pa.

Stretching 5%

Thank you for the mention you gave our agency's TWA and American coach ads in your editorial, "Smart Advertising," in the Nov. 6 issue.

You are quite right. We do pay for it 100 percent and it does both American and TWA more good than us. However, I do believe it is paying for itself, although it takes a lot of coach tickets at 5% to pay advertising and office expense.

Again, I thank you, and I do hope the right people read it.

GODFREY KING
National Travel Service
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Los Angeles 17.

Security Confusion

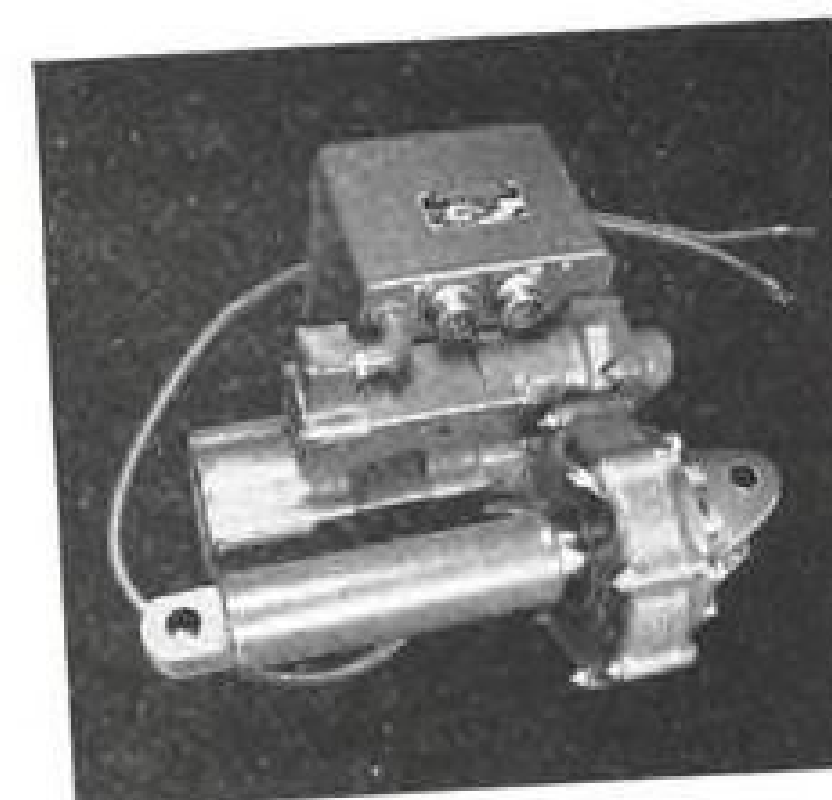
Your editorial, "End the Security Confusion," Oct. 23, was read with great interest. . . .

I . . . appreciate one of your conclusions, namely that "every aircraft public relations director we have seen is more than willing to subordinate publicity for his company to the national interest." Our only wish is that more people in other fields would adopt this same attitude toward the national security problem.

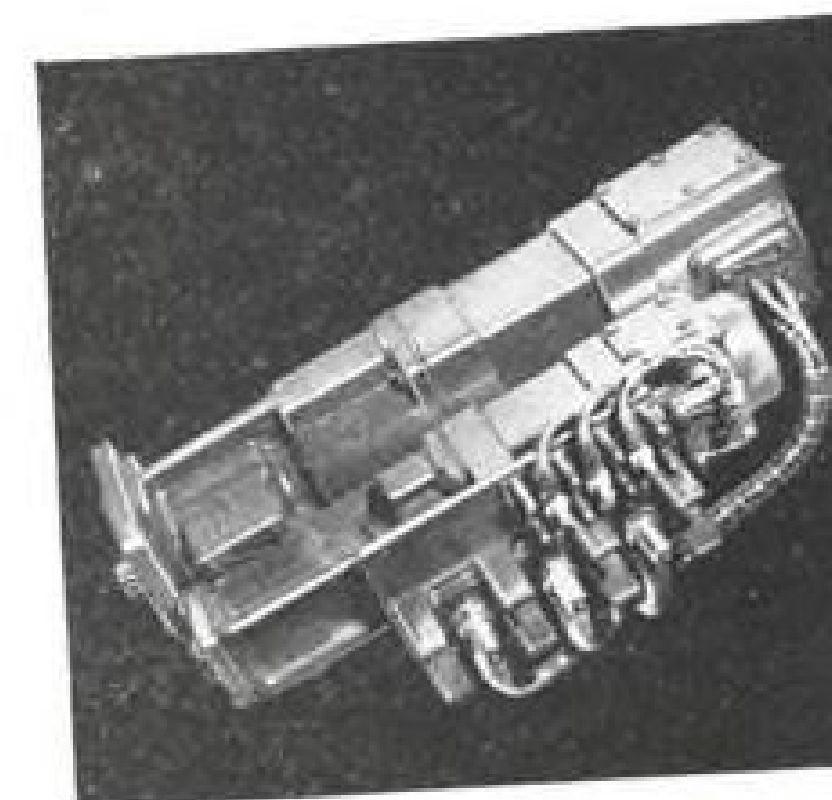
REX M. HARLOW, Public Relations Manager
Boeing Airplane Co.
Wichita division
Wichita 1, Kan.

EEMCO technical bulletin

New Electric Power Units Foretell Era of Pushbutton Flight . . . Faster aircraft and busier pilots are pushing automatic flight devices into the forefront. The development of versatile fool-proof power units to actuate control surfaces in conjunction with automatic pilots is a primary factor in achieving pushbutton flight. Such units are being produced by EEMCO in close cooperation with the designers and builders of tomorrow's aircraft.



Stabilizer Actuator for Large Jet Fighters . . . One such "radical" advance is the motor actuator used on a new jet fighter. This unit incorporates two motors of different size, driving into individual gear reductions to operate the screw jack. Each fulfills a particular need and is not to be considered a standby. The small motor of 1/10 h.p. output operates practically continuously under control of the automatic pilot and provides a rate of travel to jack of 6/100" per sec. The large intermittent duty 3.3 h.p. motor provides manual operation of screw jack by pilot for maneuvering and extreme situations with a rate of travel of 7/10" per sec. Normal operating load of unit 11,000 lbs. . . . 28 volt operation. Equipment includes overload and travel limit switches, radio noise filters, position indicator and non-jamming stops.



Double Motor Power Unit for Horizontal Stabilizer . . . A similarly unconventional motor arrangement operates the horizontal stabilizer actuator on a turbo-prop aircraft of recent design. A small continuous duty motor of 1/15th h.p. operating through a gear reduction is used for automatic flight and a large intermittent duty 3-1/2 h.p. with direct drive of 12,000 rpm is used for manual operation. The unique feature again is that it provides a large power source for maneuvering and a smaller unit for trimming in flight in small increments through the automatic pilot.

EEMCO Design and Testing Service Solves Difficult Actuator and Motor Design Problems . . . Tell us your requirements on current motor or actuator design problems. Include preliminary data on type of unit, specific function, special requirements, operating conditions, motor and actuator specifications and any available drawings, diagrams and tables.

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Executives and engineering and design personnel making request on Company letterhead will be placed on mailing list for performance and design drawings of EEMCO designs for file and reference.



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- The widespread use of triple-alloy steels containing Nickel, chromium and molybdenum is based on extensive experience in widely divergent engineering fields.

It has been found that they can be counted on for consistent performance. The depth to which full hardness is developed is comparable to that attained by other alloy steels. Their response to heat treatment is dependably uniform.

Moreover, the wide range of compositions available, makes it possible to select *accurately* suitable alloy steels for a broad range of applications.

Inquiries regarding the selection and uses of triple-alloy steels containing Nickel are invited.

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SALES & SERVICE



PIPER TRI-PACER shows off its new tricycle landing gear. All wheels are the same size.

Specifications and Performance

PA-22 Tri-Pacer

	125	135
Engine	Lyc. 0-290-D.....	Lyc. 0-290-D
Power and rpm.....	125/2600	125/2600
Gross weight, lb.....	1800	1800
Empty weight, lb.....	1000	1020
Span, ft.....	29.3	29.3
Wing area, sq. ft.....	147.5	147.5
Length, ft.	20.4	20.4
Height	8 ft. 4 in.....	8 ft. 4 in.
Baggage capacity, lb.....	50	50
Fuel capacity, gal.....	36	36
Top speed, mph.....	133	133
Cruising speed, mph.....	123	132*
Rate of climb, fpm.....	810	850
Cruising range, mi.....	580	580
Service ceiling, ft.....	14,250	15,500
Absolute ceiling, ft.....	16,250	16,250
Fuel consumption, gph.....	7.7	7.7

* At 5000 ft. at 75 percent power.

Piper Offers Tri-Geared Pacer

Piper Aircraft, one of the few remaining personal plane makers still working hard on civilian orders, introduced another 1951 model at the Miami Air Races—the tricycle-geared Tri-Pacer. (The other new Pacers were described in AVIATION WEEK Nov. 27, the new Super Cubs in the Dec. 11 issue.)

Production of the new model is scheduled for March. Depending upon orders received—which will determine production rate—the plane will sell for between \$200-\$300 more than the conventional models (which range from \$4295 to \$5225.39).

Piper has been experimenting quietly at Lock Haven, Pa., with tricycle land-

ing gear for a number of years—but apparently only recently has the company foreseen a reasonable market paying the extra cost of such an installation.

The Tri-Pacer's nose wheel is hooked up to the rudder pedals permitting positive ground steering control. The rudder is interconnected with the ailerons allowing use of rudder or wheel alone in normal flight. This linkage is by means of springs.

Tests run on prototype Tri-Pacers alone covered more than 4000 landings and 3000 mi. of taxiing, with most of the workouts being handled in a rough "out-of-bounds" area of the field. Taxiing speeds of 70 mph. were attained

without revealing weaknesses in the gear. To provide ample stability in sharp turns at high speeds on the ground, the main gear tread has been widened 12 in. compared with that of the standard Pacer. The tricycle gear cannot be fitted to Pacers with conventional wheels.

► **Performance Still High**—The extra wheel makes for very little sacrifice in payload or performance. Empty weight is up 30 lb. The 125 (125-hp. Lycoming) cruises at 123 mph. sealevel; the 135 (125-hp. Lycoming fitted with controllable pitch prop) cruises at 133 at 5000 ft. at 75 percent power.

The planes are covered with the Duraclad butyrate plastic non-flammable finish, as are all 1951 Pipers.

CAB Reports on Private Crash

Loss of control of a Convair BT-15 while flying into an overcast is given as the probable reason by Civil Aeronautic Board investigators for an accident which took the lives of both occupants and resulted in impact and fire damage to a private home in Pasadena, Calif., last April. There was no evidence of mechanical failure to the plane prior to the crash.

Before taking off from East Los Angeles Airport, pilot-owner Nelson Lowry filed a flight plan under Visual Flight Rules, and had been advised by the airport manager to get a weather check because of dense overcast conditions in the vicinity of the field. Twelve minutes after takeoff, witnesses reported that the airplane had been observed spinning just below a 2500-ft. overcast. The airplane apparently recovered from the spin about 400 ft. up, but then appeared to stall and crashed into the dwelling.

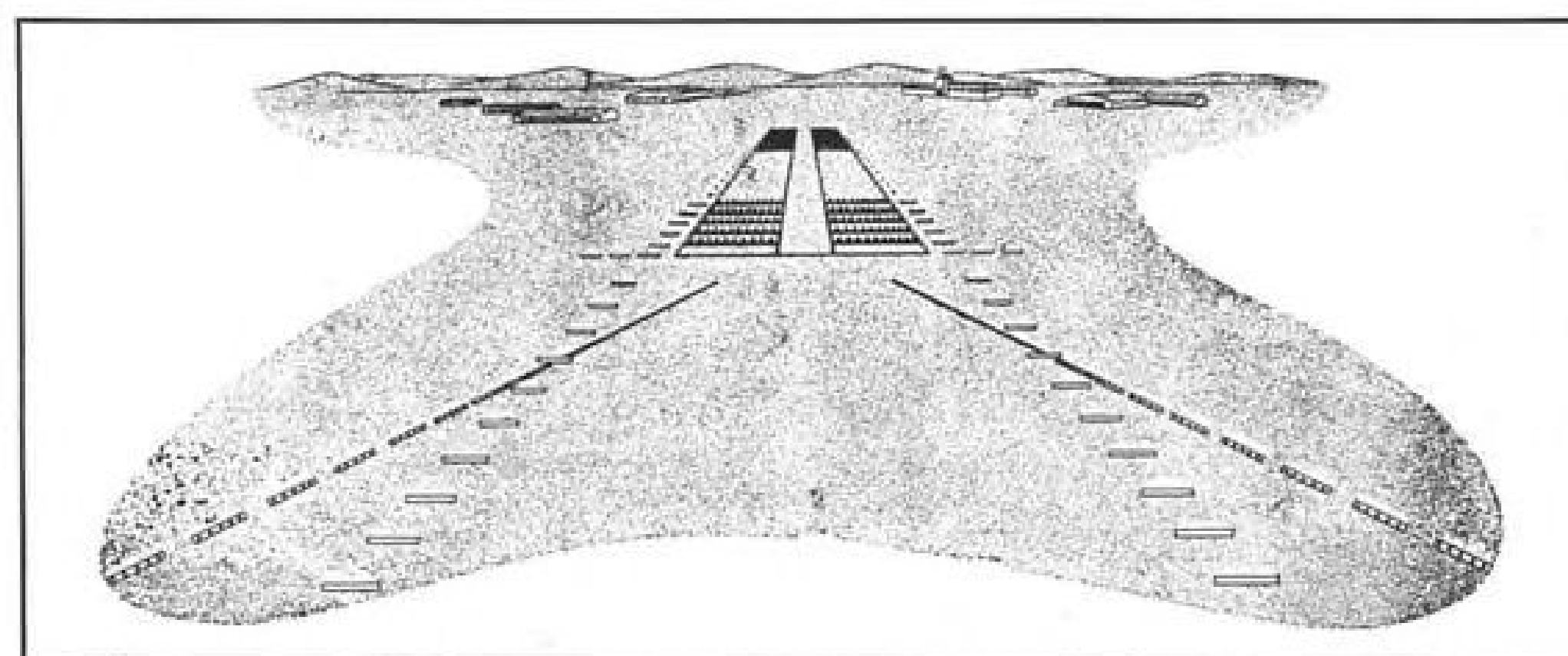
Examination of the pilot's record disclosed that he had about 300 hr. in light aircraft and had no instrument rating, although the majority of his experience was in cross-country flying.

BRIEFING FOR DEALERS AND DISTRIBUTORS

► **Air Markers**—Connecticut leads all other states in use of air markers, having a marker for each 39.2 sq. mi., compared with the average for the country of one for each 364.7 sq. mi. The leader has a total of 152 signs.

► **New Parks Project**—Parks College of St. Louis University has been appointed to conduct a study of West Virginia's future aviation program. Surveyed will be the state's needs for improved airline service, additional feeder line and trunk lines, and airport expansion.

AIR TRANSPORT



APPROACH LIGHT COMPROMISE attempts to meet Air Force demand for 1000-ft. clear zone, pilot objection to slopline. This combination, proposed by Lt. Col. K. H. Kalberer, has never been tested.

100-Ft. Minimums Now in Sight

Combination of approach light system and electronic aids make lower ceilings practical, RTCA claims.

By F. Lee Moore

In Kalberer's system, the color of the CAA slopline portion is white; the parallel rows in the approachway are red; the threshold bars and touchdown area bars are green; the middle section of runway lights is white and the caution zone section of runway lights is amber. Runway markings are black on white or white on black.

Although Kalberer's suggestion has never been flight tested, G. S. Calvert tried it out on his "cyclorama"—a device simulating actual flight phenomena. Calvert, speaking for his fellow British technicians, says: "We cannot help treating the part of the runway with the green bars as part of the approach lighting system. Also, the four rows are rather messy. . . . In fact, we agree with all your arguments but think that they lead straight to a (center) line and bar system."

Once again, all of this points up that no one system satisfies everyone, but only the Air Force clear zone directive is irreconcilable with every system there is. While some people have blamed CAA for the lack of a standard system after all these years, the actual brake on approach light progress thus seems to be the Air Force.

► **CAA Dilemma**—CAA has been caught in the middle, with pilots demanding the centerline system and the Air Force safety people insisting on an absolute clear zone 1000 feet out from each end of the runway—whether that runway be 4000 feet long or 10,000 feet long.

Air Force records show a high proportion of accidents would have been avoided if such a clear zone had existed. What they cannot judge is how the knowledge of a clear zone's existence will make pilots count on it, thereby perhaps largely nullifying the safety feature that the clear zone presents in theory.

Because CAA had to go ahead with some kind of system, and it couldn't resolve the airline pilot-Air Force logjam, CAA chose the one system nobody had ever objected to—the single left-hand row system. For many years the left-hand row has been used by airline pilots as a guide to the runway. But that was with low-intensity neon lights, which are little use in poor weather.

CAA is putting high-intensity lights on the same old brackets. This system, while not perfect, is better than none, and the Air Force cannot complain, since the left-hand row barely infringes on the clear zone.

► **Automatic Landing**—Meanwhile, automatic approach gear has become operational with the Air Force, but it still operated on a test basis by the airlines. Full usefulness of automatic approach gear awaits installation of a good standard approach light configuration. The transition from instrument flight to visual approach and landing demands such a system.

Completely automatic landing is still at least two years away for routine military operation. And automatic landing gear is even further away for airlines. So the combination of automatic approach and visual reference to a good

approach light system is indispensable for lowering of present airline minimums and improving schedule reliability.

A twin path to routine airline operations through 100-ft. ceiling weather was opened to the carriers recently, but official reaction has been slow to follow it.

• **Airborne automatic approach equipment** has at last proved itself definitely reliable for 100-ft. ceiling operation. It offers the surest step toward the 100-percent operating factor ideal. The Radio Technical Commission for Aeronautics committee evaluating automatic approach gear recommends a 100-ft. ceiling operation for the airline that has the gear and wants a low minimum (AVIATION WEEK Jan. 1).

• **One approach lighting system** is at last picked by international authority for universal installation. The Flight Technical Group of International Air Transport Assn. has named the centerline high-intensity approach light system as the best, and recommended its installation everywhere (AVIATION WEEK Dec. 11).

► **Both Systems Needed**—While automatic approach gear such as United Air Lines has in its DC-4s and some DC-6s is the surest step to top performance, there must also be a standard system of approach lights on the ground. The lights are not only a double check on the automatic approach; the pilot needs them for orientation and peace of mind.

(Approaching the ground through impenetrable fog, the pilot reaches an "emotional threshold." Beyond it, he fears to go on unless he can see the ground, or a believable representation of it.

Although the pilot knows the automatic equipment is reliable, he may be upset by the thought he is rushing straight at the ground while guided only by the electronics and servo mechanisms of a small mysterious robot in his plane.

Most thorough report on this tie-in between automatic approach, visual approach, and flight instrumentation is by Lt. Col. K. H. Kalberer, a former chairman of the Air Force-Navy-Civil Subcommittee on Visual Aids to Air Navigation.

Although military pilots naturally can take more risks than airline pilots, Col. Kalberer makes a strong case for the approach light tie-in with electronics for any pilot.

Kalberer's extensive study of the approach light need received acclaim from such experts as Britain's G. S. Calvert, founder of the centerline system, now standard in the United Kingdom.

► **Conclusions of Study**—Here are Kalberer's conclusions, pointing to the

need of both civil and military purchase of a uniform approach light system, as well as airborne automatic approach gear.

• **Emotional threshold of fear of the pilot** must not be disregarded.

• **Visual aids must accompany electronic aids**, since certain of the basic informational requirements cannot be met by foreseeable electronic developments.

• **Transition from electronic to visual control demands visual aids prior to that transition.**

• **"Critical time-space relationships"** in modern swift airplane approaches means the visual aids must look as much like actual clear-weather picture as possible, to avoid uncertainty and too much going back and forth between instrument and visual orientation.

• **Flight instruments must be well integrated with electronic and visual aids.** Cockpit displays should adhere to the "earth reference presentation principle and afford maximum precision at approach speeds and attitudes."

• **Pilots must be trained to switch back and forth both easily and rapidly be-**

tween visual and instrument approach.

• **Configuration of lights is now the only visual aids problem.**

Kalberer's report states that enough testing has been done to reach a final conclusion on a standard approach light configuration. Such a solution, without further exhaustive testing, is justified by the critical demand for lights.

Certain compromises are necessary, however, to give impetus to the installation of approach light systems. It may be necessary to adjust obstruction criteria relating to clear zones (Air Force requirement) and slopes.

► **New Configuration**—To meet the Air Force requirement of a 1000-ft. clear zone at each end of the runway, Kalberer proposes a new combination of lighting systems.

Since the centerline sticks into the clear zone, Kalberer rejects it. He keeps the CAA slopline system to give the pilot his glide path indication. But to offset the optical illusions of slopline, Kalberer suggests a double row of short crossbars making a lane to the runway the same width as the runway itself.



"AIR EVAC" C-54M can be converted from cargo plane to carry 32 patients in comfort.

Comfort For Flying Wounded

Special C-54M modification designed for convenience of patients, has features adaptable to commercial use.

Military Air Transport Service has unveiled the first one of 30 "Air Evac" DC-4s being modified by Texas Engineering and Mfg. Co. for efficient air evacuation of wounded soldiers. The new Air Evac plane, designated C-54M, has several improvements worth commercial airline attention.

Contract for the modification of the 30 DC-4s to MATS specifications was let last May. Deliveries should be completed by the end of March.

Patients now being evacuated by the Pacific Airlift travel in litters with almost no appropriate conveniences.

Chief Air Evac modifications on the 30 DC-4s are:

• **New heating and ventilating system** is individually controllable from each litter. In each plane there are 32 litters stacked four high, 16 to a side. System can be hooked up with ground unit supplying either heated or cooled air.

• **Experimental white paint for fuselage top**, supplied by Pittsburgh Plate Glass, has special solar heat resisting qualities. Company has also furnished about six panes of experimental window glass giving solar heat resistance.

• **New stretcher suspension system al-**

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allows a minimum of 18 inches between stretchers, vs. 14-inch maximum in the present planes.

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- De-bugging system is built into the plane, guaranteed to rid the ship of insects at the flip of a switch in the cockpit. System reaches all compartments, including wheel wells.

- Toilet is enclosed along with a special aluminum locker for bed pans.
- New insulation by Fiberglas batts, covered by Skyfelt surfacing, absorbs sound, body odors, and moisture. Interior of cabin is painted hospital green.
- Auxiliary power plant is moved forward and under the cockpit, to reduce cabin noise while plane is on ground.

CAB Starts Special Operations Bureau

Civil Aeronautics Board Chairman Delos Rentzel has decided to shake up his staff organization some more by setting up a new Bureau of Air Operations and liquidating the Bureau of Economic Regulation.

The Bureau of Air Operations will handle all economic operating activities, including rates, routes, carrier agreements, reports and statistics. Part of the Office of General Counsel staff will go over to the new bureau.

Under the new plan, recommended by the private management consulting firm Booz, Allen and Hamilton, single teams of CAB staffers will handle the complete development, analyses, and presentation of each case. Rentzel hopes this streamlined system will eliminate substantial duplication and unnecessary cross-referencing and checking.

And the Office of General Counsel will now be freed from operating routine of case handling. It will now devote more time to its primary function of counseling the CAB on legal policy.

Earlier staff changes made by Rentzel following the management study report include appointment of James M. Verner as acting executive director of the Board to Supervise Staff Operation, and the naming of William Burt to full time work with the personnel of the management consulting firm.



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BOAC 1950 Record Indicates Busy 1951

More and more competition ahead for American flag carriers shows up clearly in the 1950 roundup of British Overseas Airways Corp. progress.

Here are some of the 1950 accomplishments of the nationalized international carrier:

- All planes are postwar and pressurized, following completion of fleet conversion in 1950.
- First operating profit occurred in September, when BOAC set a one-month record for passenger volume on North Atlantic routes, almost triple 1949 volume. With the government footing many of the bills, operating profits may be enough to encourage further expansion of operations.
- New services established in 1950 are: London to Santiago, Chile, via South America's east coast; London to Johannesburg via Africa's west coast; schedule frequency increases on routes from London to Tokyo, Cairo and Sydney; direct Stratocruiser service, New York to Nassau; New York-London nonstop flights begun once a week in June, 1950, were boosted to four a week by September.

Regular jet service starts this year or early next year with de Havilland Comets. Fourteen Comets and three 105-passenger Princesses are on order.

Present equipment is: New York-London, Stratocruiser; London-South America-Far East, Argonaut; London-Africa, Hermes.

Freight traffic the first nine months of 1950 increased from 11 tons daily in 1949 to 12.7 tons daily in 1950.

AA Starts Daily N. Y. Mexico Run

American Airlines this week started operating its new New York-Mexico City daytime DC-6 flight—the "New York Toltec."

Even before this flight was added, American was carrying three quarters or more of the direct traffic from north-eastern U. S. to Mexico City. In the CAB official traffic surveys March, 1949 saw American hauling 1457 passengers New York-Mexico City, while the Eastern Air Lines and Pan American combination carried 294. In Sept., 1949, American carried 1256 passengers while the Eastern-Pan American combo carried 468.

The new flight leaves New York 7:45 am est and arrives Mexico City 6:30 est via Washington and Dallas. Return flight leaves Mexico City 7:55 am and arrives New York 9:00 pm.



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ILS Snow Plow

When blinding snow and smog balked attempts of scraper crews trying to shovel a straight landing strip at Allegheny County Airport one day last month, an airline pilot turned up with a new, effective solution.

Capt. William H. Riley, regional chief pilot of Capital Airlines, taxied an airliner out on the field "on instruments" (visibility was less than 100 feet). Watching the localizer needle on his ILS, he, taxied slowly down the length of the runway—on center.

The snowplow followed the airplane wheel tracks.

PAA Sets Low Fare On Alaska Cargo Run

Fighting back at competing nonskeds, Pan American World Airways has set a special passenger fare of \$75 southbound from Fairbanks, Alaska, to Seattle, Wash., on its cargo run.

Regular PanAm flights Fairbanks-Seattle cost \$105. Nonskeds charge \$65 and do good business.

PanAm's original plan was to charge \$75 on regular passenger planes for seats that would otherwise go empty at flight time. Air Transport Associates, Inc., a nonsked, fought the PanAm plan. The nonsked asked the Civil Aeronautics Board to veto PanAm's proposed special "when available" fare as below cost of operation. The nonskeds planned to file a \$78 fare if CAB stayed PanAm's cut rate.

But when PanAm offered the \$75 fare on its cargo plane only, CAB dismissed the nonsked complaint.

PanAm figures that many who now pay \$65 in nonsked C-46s may ride its DC-4 for \$10 more.

PanAm's freighter is almost empty on its southbound trips from Alaska. So the \$75 passenger fare on this dead-head flight would be clear, after paying the stewardess' wage plus cost of installing portable upholstered seats.

Braniff's DC-6s

Braniff International Airways has ordered three new DC-6, at a cost of about \$3 million. These are standard DC-6 aircraft, with a few recent trimmings added.

Powerplants are four 2100-hp. Pratt & Whitney Wasps with jet-thrust exhaust stacks. Payload at 3000-mi. range is 52 passengers, crew of six, plus about 7350 lbs. of airmail and cargo.

Airline Income

Estimated 1950 total is
nearly \$67 million for
scheduled carriers.

Net operating profits of the scheduled airlines in 1950 are estimated at \$51,039,244 for the 16 domestic trunklines, \$476,680 for the 12 local service airlines, and \$15,281,858 for 13 international and overseas airlines, according to Air Transport Assn.'s director of research, Dr. Lewis Sorrell.

The Industry gained an estimated 17 percent in passenger miles over 1949. 12 percent in mail ton-miles, and 20 percent in cargo services. Total revenue ton miles were 17 percent over 1949 record totals, while operating revenues were up 8 percent. (Sorrell's 12-month estimates are based on 10 months' complete traffic data, 9 month's financial.)

With revenues up 8 percent and expenses only 5 percent, net operating income jumped 47 percent, thus demonstrating the great leverage in airline income and expense accounts. But the 47 percent increase in profits still raised return on air carriage investment to a modest 5 percent or less (based on net assets used in and necessary to performance of the carrying functions).

► **Trunklines**—The 16 domestic trunklines earned their \$51 million on operating revenues of \$523,932,082. The income increase over 1949 was 107 percent, or more than double, while revenues gained 14 percent.

The operating ratio (expenses divided by revenues) in 1950 was down to 90.26 percent, compared with 94.64 percent the year before.

Higher utilization and better equipment helped the airlines reduce revenue ton mile expenses from 54.29 cents in 1949 to 49.41 cents in 1950.

Mail pay average dropped to about \$1.04 a ton mile, compared to \$1.10 in 1949.

Passenger revenues increased 14 percent to \$429,226,160, while mail pay gained only 7 percent to \$48,164,484. Express revenues went up 34 percent to \$11,959,307, while air freight gained 19 percent to \$21,874,347. Passenger mile receipts were down to 5½ cents a mile, compared to 5.76 cents a mile in 1949. This shows the effect of coach services, as well as family fares and other factors. In fact, although all classes of ton mile receipts declined, operating income jumped almost 50 percent, perhaps pointing to chances of success in lowering tariffs to get to the mass market in air coach and air freight.

► **International**—The 13 international and overseas airlines' profit of \$15 million was on total operating revenues of \$262,092,731. Income was down 28

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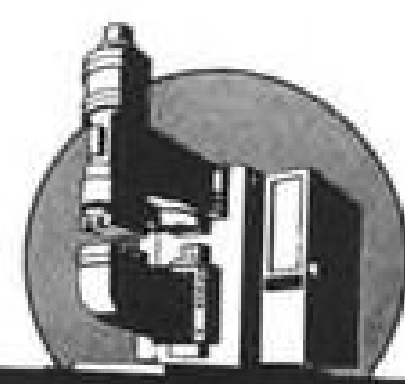
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percent on a revenue decline of 4 percent.

Unit rates have undergone considerable reduction, especially in passenger, express and freight traffic. Passenger volume increased rapidly after the Korea War outbreak, and U.S. mail gained steadily throughout 1950. Foreign mail volume declined slowly.

► **Express, Freight**—Express and freight statistics have behaved erratically. Dr. Sorrell says "There is some reason to believe that part of this tendency may be attributable to divergent statistical practices of the carriers as regards assignment of cargo to one or the other of these classes."

Recurrent difficulty encountered in temporary mail rate establishment continued to plague the carriers. For 1949, CAB reports carrier estimates at over \$75 million, but a footnote to the CAB report indicates that the adjusted sum would be \$55,772,860. Says Dr. Sorrell of this: "Should the latter become the final sum for 1949, it is evident that most of the estimated profit for that year would disappear. A similar finding for 1950 would wipe out most of the estimated profit of 15 million."

► **Feeder Airlines**—The 12 feeders, or local service airlines, earned nearly half a million dollars this year, compared with a net loss of \$441,086 in 1949. Total operating revenues in 1950 came to \$27,180,795, an increase of 24 percent over 1949 revenues.

Encouraging sign for the feeder supporters was a substantial decline in mail pay dependence. Mail pay dropped from \$32.87 a ton mile in 1949 to an estimated average of \$28.12 a ton mile in 1950. Meanwhile, total operating revenues gained 34 percent to \$9,894,323, while mail revenues gained only 10 percent to \$15,415,665. But mail pay still accounted for more than half of total revenues.

Avianca Claims Air Freight Leadership

Avianca, the Colombian airline, claims to be the greatest air freight hauler. It transported 69,380,914 lb. of air freight during the first nine months of 1950, a 73 percent increase over 1949.

To facilitate freight and express handling, the airline uses large, flat-bed Corey farm wagons for moving cargo at airports.

At Barranquilla, Avianca's main base, the airline is installing a Loadair loading dock manufactured by the Whiting Corp.

The Loadair system will allow planes to be moved sideways on rails from ramp to warehouse loading platform to accept or discharge pre-packaged cargo. Observers say this will greatly speed the loading and unloading process.

NAL Moves to Drop Pan Am Stock Pact

National Airlines President G. T. Baker has notified Pan American World Airways that his line "hereby cancels" the stock purchase option agreement made in the spring of 1949. But in a reply letter to Baker Pan Am President J. T. Trippe says Pan Am sees no legal way for Baker to cancel this contract unilaterally.

In his letter, Trippe writes Baker as follows:

"Our directors were astonished to learn of the position which your company has taken. They are quite at a loss to understand how you believe that National is in a position by unilateral action to terminate the contracts made by National, Panagra, W. R. Grace & Co., and Pan American, in the spring of 1949, which the four companies have united in presenting to the CAB for approval and which the board has recognized as all inter-dependent."

Under the agreement, Pan Am and Grace would acquire 48 percent of National.

If Baker sticks on his decision not to go along on the contract, Pan Am will probably appeal to the CAB. But right now, Pan Am is waiting for an answer from Baker on the legal grounds for his action.

SHORTLINES

► **Air Express**—Revenue from air express shipments in and out of New York, Dec. 1-7, was \$142,690, 18 percent over last year. Number of shipments was up 6 percent to 29,971-20,915 outbound, 9056 inbound.

► **Air Line Dispatchers Assn.**—Group is doing well in its negotiations with airlines to get dispatcher salaries raised before wage controls may freeze the scale. Results of scales so negotiated, months ahead of contract reopening dates, are (using second year of service as yardstick): Capital, \$25 a month raise across the board, \$450 per month; United, new scale second year service, \$475; Trans-World, \$25 across the board, \$475 per month; Chicago & Southern, \$450 in third six months' service, \$475 in fourth.

► **Canadian Pacific**—Canadian DC-3 crashlanded 1500 feet from top of 5500-ft. Mount Okanagan. Fifteen passengers and pilot survived but both pilot and co-pilot lost their lives in crumpled nose section.

► **Capital Airlines**—Company will buy no new planes this year despite fact it could use more Constellations and



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Super DC-3s. Capital says that contrary to earlier reports, it has no definite buying plans for after 1951. . . . company starts 3-hour non-stop Constellation service Atlanta-New York Jan. 10.

► Continental Air Lines—Carrier is supplying a Royal portable typewriter on all Constellation flights for use by passengers for a trial period. Passenger holds machine on his lap to type.

► KLM Royal Dutch Airlines—Carrier is dismissing 10 percent of its 8000 Dutch personnel in economy move by

Dutch government. . . . Cooperating with KLM, Argentine Airlines is opening regular service, Buenos Aires-Amsterdam.

► Military Air Transport Service—MATS has cut 24 hours from Manila, P. I., to Dhahran, Saudi Arabia, by staging a relief flight crew at New Delhi, India.

► New York Port Authority—Authority expects a big increase in bonded air cargo volume when Idlewild's new general order warehouse is completed, probably this month. Port Authority is



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leasing space to the Manhattan Storage and Warehouse Co. for one year at \$5220 rent, and 12 airlines are negotiating leases for space in the building.

► Northwest Airlines—Carrier has switched its regular Korea flights from Seoul to Pusan.

► Pacific Northern Airlines—Alaska lines' Nov. 1950 passenger miles were 48 percent over year ago; load factor of \$1.5 percent compares with 49.2 percent for Nov. 1949. Passenger miles for 11 months 1950 are up 18 percent to 10,191,000; cargo up 35 percent to 1,290,394 lb.; mail up 44 percent to 119,546 ton miles.

► Resort Airlines—Feeder has bought two DC-4s from Chicago & Southern Air Lines. Final sale of the DC-4s to Resort awaits delivery to C&S of its new Constellations.

► Slick Airways—Freight carrier estimates November profit at \$170,000 on 5,445,587 ton miles carriage. Profit for last several months rose as follows: May, \$5145; June, \$3929; July, \$110,878; August, \$131,079; September, \$150,943; October, \$171,575; November, \$170,000.

► State Department—Office of Transport and Communications Policy of State Department has agreed with the French Foreign Office to manage "future closer consultation and collaboration on mutual problems" and to amend the disputes article of the bilateral air transport agreement. . . . French are reported very worried about TWA and Pan American competition, now that both operate into Paris. Talks on this and other matters will be resumed later in the month.

► Teterboro Motor Transportation Inc.—Teterboro Air Travel offers a new package air travel service to Army and Navy families and friends. Package tour service includes limousine travel to airport, hotel accommodations, and airplane ticket for visits or one-way trips to military posts.

► United Air Lines—UAL President W. A. Patterson predicts higher traffic volume this year than 1950's all-time record. Basic reasons: increased industrial activity and capacity; further gains in public acceptance of air travel; rising consumer incomes; stability of fares despite rising costs. Company estimate for full 1950 passenger miles is 1,490,200,000—11 percent over 1949, with only a 1 percent rise in plane miles. . . . Company estimates total 1950 expense per revenue ton mile at 45.7 cents, compared with 50.3 cents in 1949 and 54.6 cents in 1948.

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(Herr Doktor Von Flugen's first column Dec. 11 was a howling success. Several readers are still howling about it. Herewith is his second effort—R. H. W.)

ANTI-CLIMAX—L. V. Krugrid wants to improve on **George Haldeman's** proposal to install Mach meters "to indicate at all times that the aircraft is within its safe design limits." Krugrid suggests we require that a red line be painted on the indicator dial so the aircraft CAN'T exceed its maximum design Mach number.

* * *

MOST SENSIBLE STATEMENT OF THE WEEK—Warren T. Dickenson, assistant to the chief engineer at Douglas, while discussing traffic control problems related to jet transports: "People should bear in mind the fact that the jet doesn't operate efficiently and economically BECAUSE it travels fast; it HAS to travel fast in order to operate efficiently or economically."

* * *

THINGS ARE TOUGH ALL OVER—When a large number of Lockheed employees recently moved over to Factory B (the old Lockheed plant), that wellknown segment of management commonly known as "Mahogany Row" was left behind at Factory A (the former Vega plant). The boys at Factory B now refer to their own line of private offices as "Soft Pine Row."

* * *

A SLIP OF THE TONGUE—A superintendent of operations in Ft. Worth swears this happened. It seems a certain very exacting Air Force general was an observer on a B-36 check flight. The intercom key had inadvertently been left open so that everyone aboard was able to hear the conversations at all stations. As far as the pilot's compartment was concerned, everything was routine. However, someone aft was apparently having his troubles because a loud clear voice was suddenly exclaiming over the intercom, "Geez, now I'm all screwed up." A moment of strained silence in the pilot's compartment, then the general seized the phone and bellowed, "This is General Boomer. Whoever made that last transmission identify yourself immediately." Without hesitation came back the same loud clear voice, "Aw no, General. I ain't THAT screwed up."

* * *

FOLLOW ME—Ben Mayhugh, the well known engineering service representative, was formerly a flight instructor at Falcon Field, Ariz. He tells us he had a standard reply for nervous students who inquired how they were to know just when to "hit the silk." Ben told them, "If the occasion ever arises, I'll say 'JUMP.' And that's one order you'd better obey promptly because, when I say it, I'll be at least twenty feet below the airplane."

* * *

"THEY CAN'T DO THIS TO US"—What group of Air Force Reserve Officers in what U. S. Department of Commerce aviation agency is all broken up? They have just learned that if their agency requests their deferment from active duty, they can no longer collect their military reserve pay in addition to their civilian salaries.

* * *

BLESS THE OLD FASHIONED TELEPHONE—Bill Gray, the former NACA test pilot, tells about the time he was flying an SB2C at about 18,000 feet over Langley Field. A hydraulic line burst, spewing hydraulic fluid all over the pilot's compartment and Bill immediately initiated emergency procedures. As he descended as rapidly as possible, he tried to contact the Langley tower to declare his emergency but couldn't make contact. Frantically, he called the tower every few seconds; no response. To his amazement, however, the field had been cleared, the firefighters were ready, and all emergency precautions had been taken when he came in. It seems the radio had been pretty busy all day, and in the confusion someone had tuned down the band Bill was using. Phone calls from Navy Norfolk, Washington National and Norfolk Municipal had informed Langley tower of his plight, however.

* * *

SOUNDS CORNEY TO US—Paul "Doc" Koger is a wit. The Lockheed functional test engineer went around the other day telling his buddies they'd better keep their eyes open next Friday. The Standard reaction was an inquiry as to what's special about next Friday. "Nothing," Doc replies. "But you'll look like a darn fool walking around with 'em closed."

* * *

OUT OF THE FRYING PAN—Bert Bantle, the test pilot, recently resigned his position with CAA to become chief engineering test pilot with the Aero Design & Engineering Co. Bert, who conducted the official flight tests of the Aero Design Commander for CAA, will now be on the other side of the fence. His first assignment will be to obtain CAA approval of an improved version of the Commander equipped with Lycoming geared 260-hp. engines. Aero Design's new mailing address is Box 118, Bethany, Okla. Ted Smith is president.

* * *

WORDS OF WISDOM—Sewell F. Griggers, captain of the Los Angeles Aero Detail and commander of the Sheriff's Aero Squadron, while discussing possible improvements in pilot training methods: "Include one hour of instrument flying in the student pilot curriculum in order to convince the prospective pilot of his inability to fly safely under instrument conditions."

(We have received a letter from a Canadian reader who asks what Von Flugen's M.B.S. degree signifies. We have forwarded the letter to the Doktor—R. H. W.)

WHAT'S NEW

New Books

Major objective of **Jet Aircraft Power Systems**, a new McGraw-Hill book edited by Jack V. Casamassa, is to provide an elementary manual to deal with the principles of operation and maintenance of these newest powerplants.

Casamassa is the director of the engine department at the Academy of Aeronautics, LaGuardia Field, N. Y. He has drawn on other published material and his own lecture notes in compiling the book.

The text contains much irrelevant material, such as some doubtful drawings of Russian fighter aircraft. It contains much reasoning from one specific property of one engine to a sweeping generalization applied to the entire field. It contains much obsolescent or obsolete material; the chapters on turboprops, for example, deal almost exclusively with General Electric's long-defunct TG-100 engine. And there are some errors, such as the statement that negative thrust for ground braking of aircraft can be obtained by moving the prop blades into starting pitch.

On the credit side, there is a smattering of knowledge presented which could be of value to the absolute beginner in this field.

Book is available from McGraw-Hill Book Co., N. Y., N. Y. for \$4.25.—

Italian Group to Make DH Venoms

De Havilland's Venom night-fighter is to be produced in Italy under license agreements made between the British firm and a group of Italian concerns.

The announcement of the agreement follows a second order by the Italian government for DH Vampires, an interim measure in the creation of an Italian force of home-built jet fighters.

First arrangements for the Italian manufacture of DH airframes and engines were announced a little over a year ago. Italian-made jigs and tools are ready for quantity production.

Coupled with this exceptionally fast tooling program were equally speedy preparations for the production of the Ghost, DH's 5000-lb.-static-thrust jet. This engine will be built by the Fiat and Alfa Romeo organizations.

Venom airframes will be built by Macchi, Ambrosini and Fiat and assembled at Fiat and Macchi plants. Coordination of the entire program is in the hands of the Sicmar company which was formed especially to acquire licenses and materials.

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EDITORIAL

WHAT KIND OF WAR WILL IT BE? Instead of drawing some conclusions on this question so the Air Force, Navy and Army can go ahead at top speed to prepare for it, the Administration still appears first to be trying to make up its collective mind as to whether there will be a war or not. Because the White House, the Defense Department and the State Department are still making less than all-out preparations for the worst. Defense Secretary Marshall several times has urged a "go slow" policy for the present, apparently to shield the country from economic maladjustment if war doesn't come.

The Administration says it wants to get the machinery ready but it doesn't want to press the button to start it. What is it waiting for? Apparently, war. If we do not take fullest advantage of the time we do have, we may not have as many buttons to push.

We think most citizens are ahead of their government in this tragic matter of deciding whether to prepare for war. How much longer can we dare to take the chance of being unprepared? What else does Russia respect but power and brute force? If the best chance of staving off war is to build up our own brute force, what are we waiting for, especially if extinction is a possible penalty of a war that we are not ready for. And this our own Administration has said, time after time.

Until the President, the Secretary of State, the Secretary of Defense, and a few others, decide that we are going all-out to improve our chances of survival, we shall continue to read reports like the one elsewhere in this issue by our legislative editor, Katherine Johnsen. She writes:

"The Joint Chiefs of Staff haven't arrived at a 'war emergency' program on which to base fund estimates. . . . The Defense Department doesn't expect to have a program in ready enough shape much before spring to request a third supplemental appropriation for the (current) 1951 fiscal year, and a 1952 fiscal year appropriation to implement it. Budget and Congressional clearance will take at least several weeks. Then a program can get underway—a program admittedly needed since last Nov. 24 when onslaughts of Russian-equipped Chinese Communists in Korea jolted the U.S. into facing up to the prospect of a major war."

Meanwhile, keep in mind as you wait and wait for news of all the aircraft orders, that the services are still on the more modest build-up program drawn before the Korean reverses. The second supplemental appropriation bill, approved last week, implements it.

So don't expect immediate orders and don't put all the blame on Air Force officials. Their own bosses haven't told them what kind of war they must prepare for. Until the USAF gets a green light on what our world strategy is to be it can hardly know how many of what types of planes must be built to carry out that strategy. Obviously, this responsibility for determining some kind of program for survival is squarely on the shoulders of the President.

SOME OF THE HOT REACTION in the aircraft industry to the manner in which the Air Force summarily told air people which of their planes would be built by Kaiser-Frazer and General Motors has cooled, fortunately. AVIATION WEEK's editorial on this page Dec. 25 on Kaiser-Frazer being given the Fairchild Packet to build brought some angry words from the direction of the Pentagon and Kaiser-Frazer. Fairchild was given no notice for discussing a matter of greatest importance to the company. Neither was Mundy Peale, president of Republic, whose F-84 will be built by General Motors. He told our military editor, "I wouldn't mind having some production taken out of my hands if my advice on how best to do it were asked. Instead, I am told how, when, and where it will be done."

However, the quick response of the aviation press did reveal to harassed Air Force people just how the matter was resented in parts of the industry, and Aircraft Industries Assn. President D. C. Ramsey met with Air Force officials. We are still informed, as originally, that the Kaiser-Frazer deal was initiated outside the Air Force, in Administration circles.

Two phone calls to the editor of AVIATION WEEK were made by Edgar Kaiser, president of Kaiser-Frazer, concerning the editorial. He was offered space in this magazine for a statement. The offer remains open, any time Mr. Kaiser would like to comment.

Mr. Kaiser indicated that Fairchild Engine & Airplane Corp. had "gotten to" AVIATION WEEK and said he had been told that an ex-employee of AVIATION WEEK—whom he named—now works for Fairchild, whereas the man in question doesn't, and as our readers well know, wouldn't be a factor in what we say editorially if he were. Mr. Kaiser said Gen. Wolfe personally made the first call to Fairchild. He said that the now defunct Brewster Aeronautical Corp. and Fleetwings, which Kaiser took over, had excellent war records under the Kaiser banner. We had said that K-F won top government approval for the Packet contract in "less than 10 days," but Mr. Kaiser tells us it was much longer than that, although it now develops that K-F's Phase Two plans were for another plane, the B-47, and not the Fairchild Packet. Mr. Kaiser said he knew of no K-F production figures that had even been discussed with the Air Force or Fairchild.

We cannot feel that the past K-F record in aviation is outstanding. The Kaiser-Hughes flying boat partnership, the Kaiser relationship with the Hiller helicopter, the Kaiser-Hammond safety plane which never got beyond the prototype stage, and the Brewster and Fleetwings operations under Kaiser all ceased to exist.

Mr. Kaiser did not appear to have read the last paragraph of the editorial in which we wished "the Fabulous Kaiser all of the best, for the sake of the country." That still stands, too.

—Robert H. Wood

AVIATION WEEK, January 8, 1951

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In meeting these many problems as they arise, Bendix Products has assembled the finest engineering talents and the most modern and comprehensive machinery in the industry—a fact reflected in the recognition of Bendix today as the nation's outstanding source for these vital flight components.

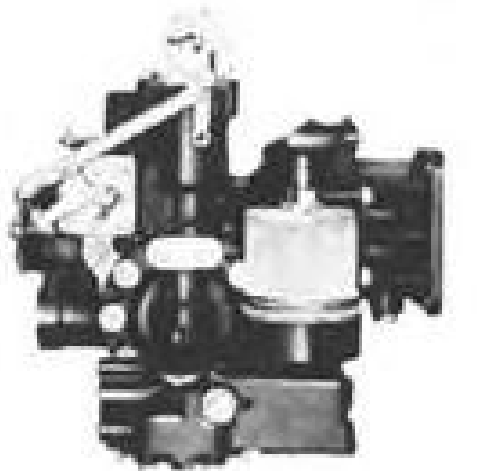
Engine builders and airframe manufacturers are urged to let this proven combination of skill and experience solve their fuel metering and landing gear problems.

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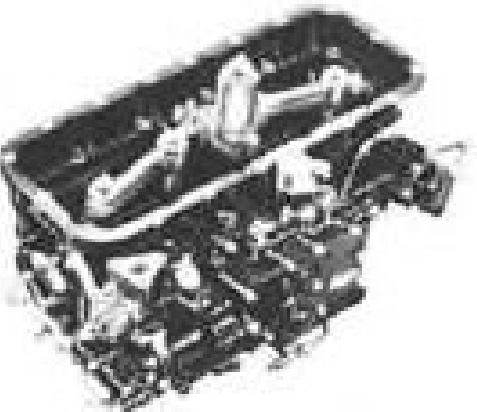


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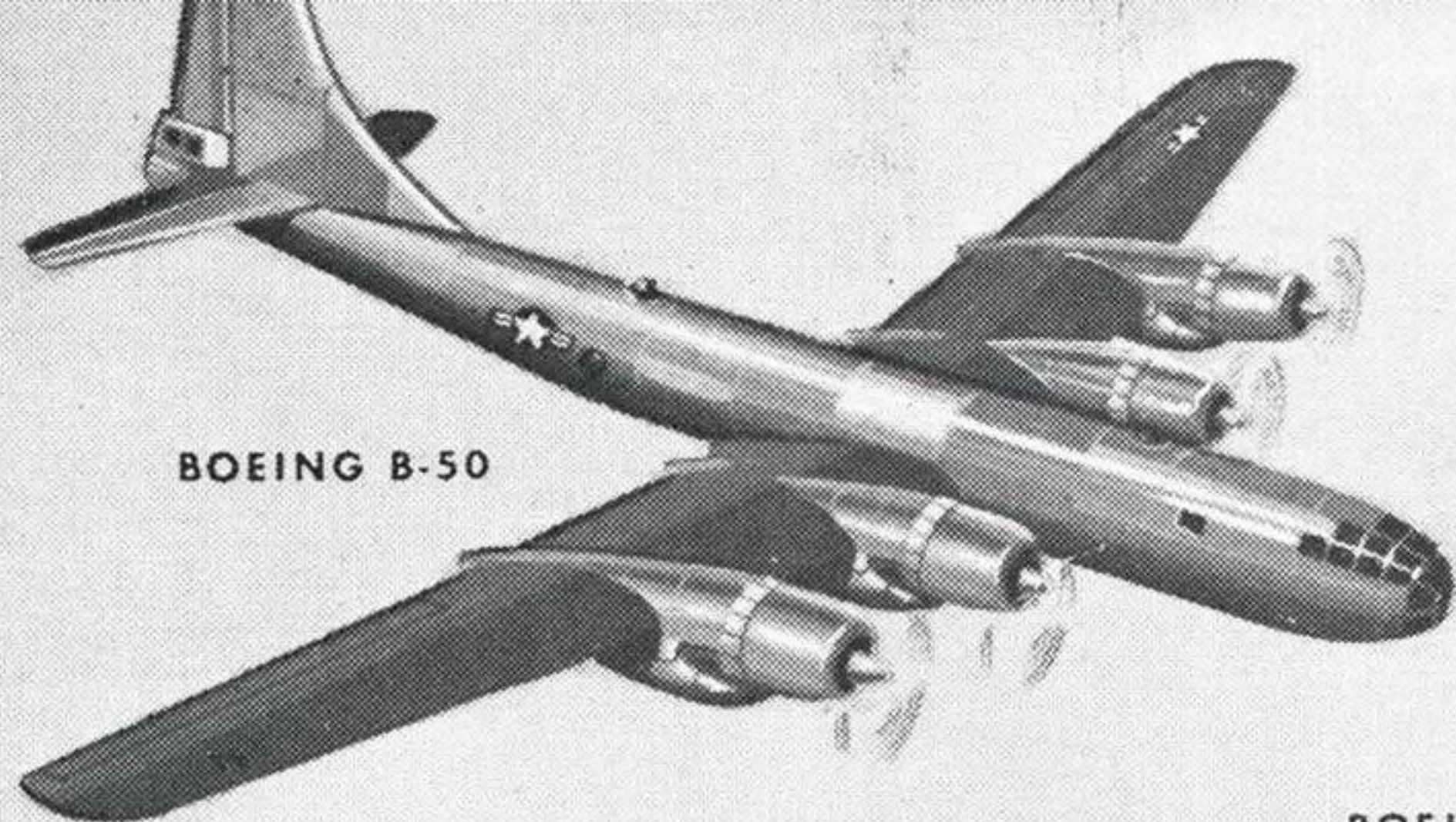


Pneumatic® Shock Absorbing Struts

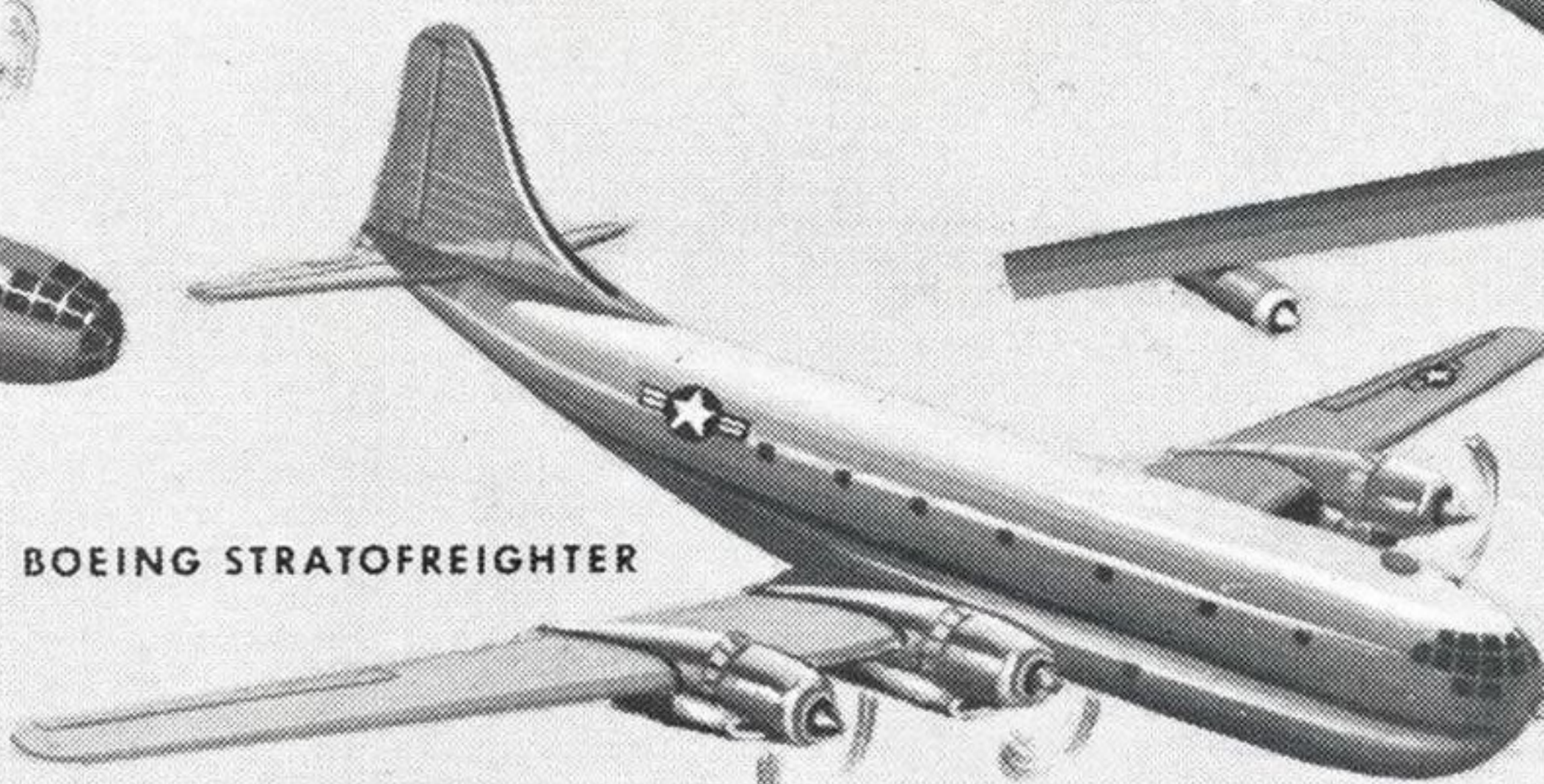


Segmented Rotor Brakes

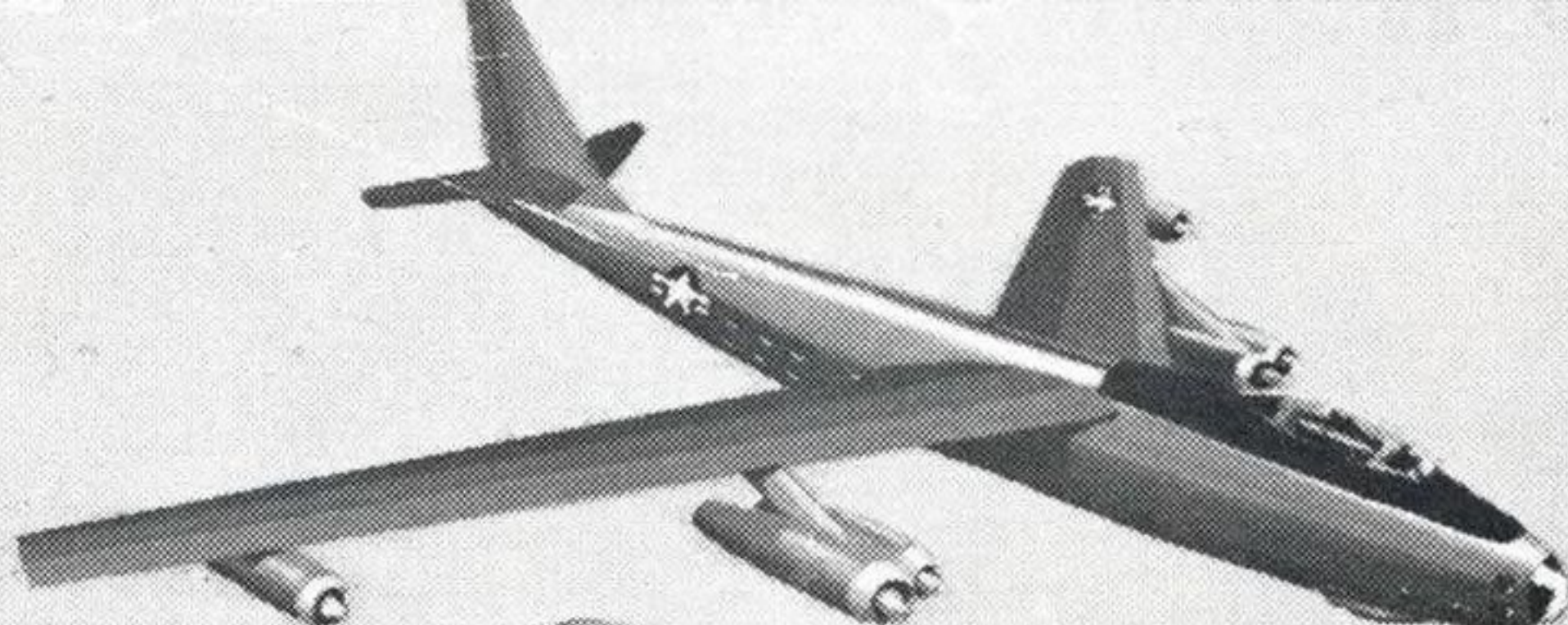
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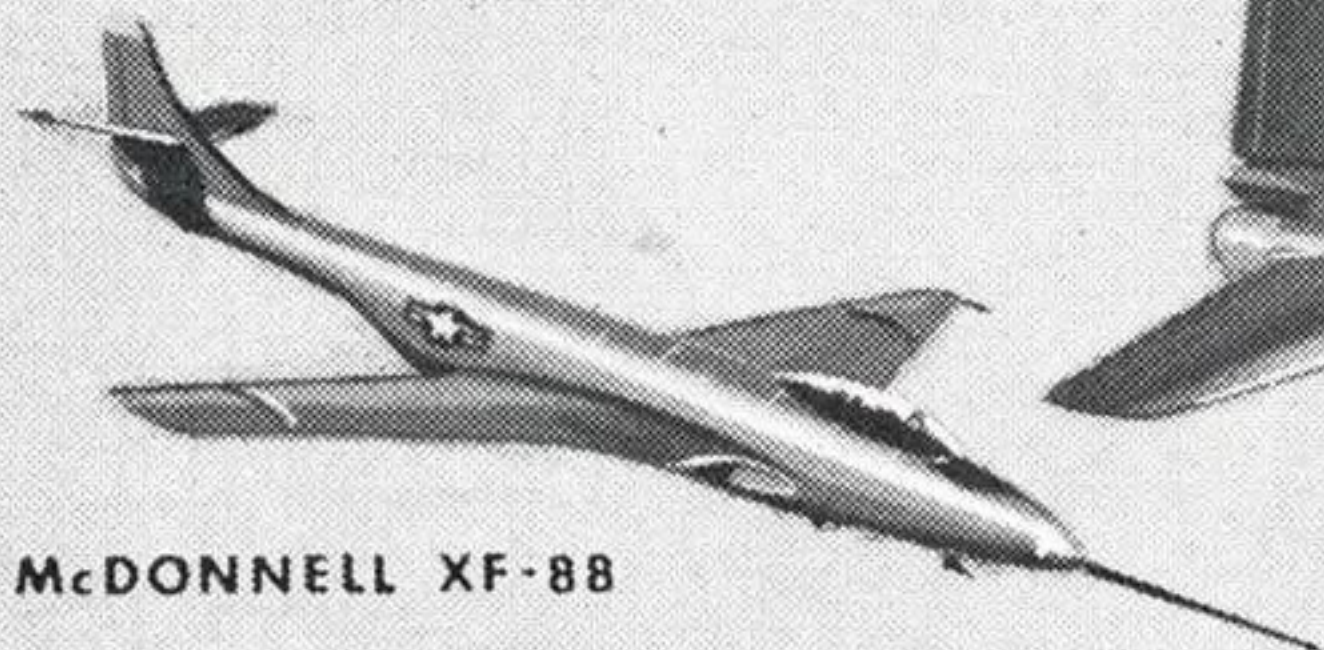
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When airplane design grew beyond the handcraft stage, when both speeds and loads went up—up—up, transmitting the vastly increased horsepower and controlling the complicated miracles of a modern air age posed serious problems for design engineers.

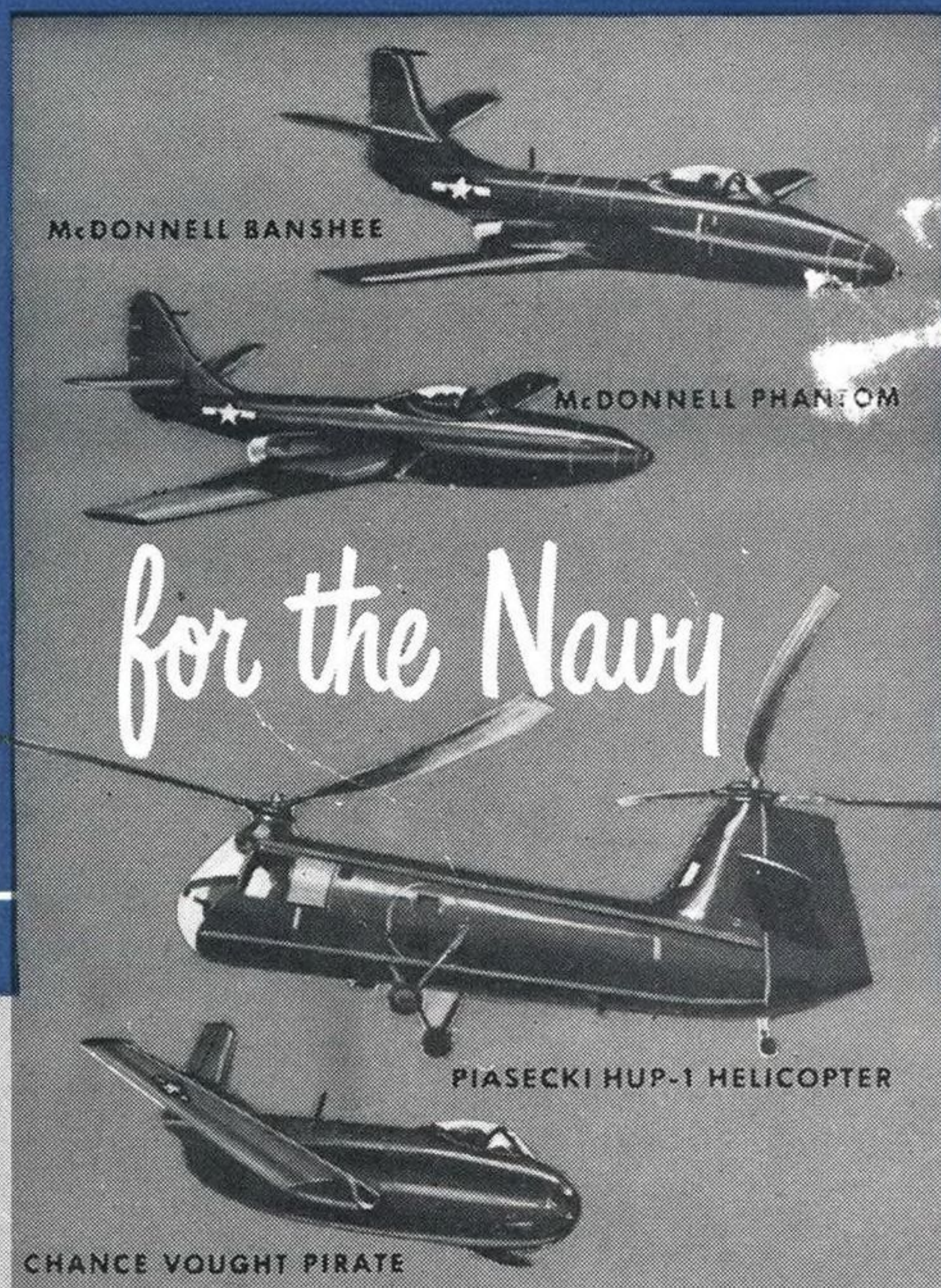
From the laboratories, from the machine shops, from the heat treating department of Foote Bros., came many of the answers that enabled aircraft engineers to meet these new exacting requirements.

Today on America's leading aircraft, pictured here, you will find gears, actuators and power units produced by Foote Bros. They meet the demands of extreme precision, light weight, compactness and above all, the ability to stand up under loads that in many cases, might seem excessive.

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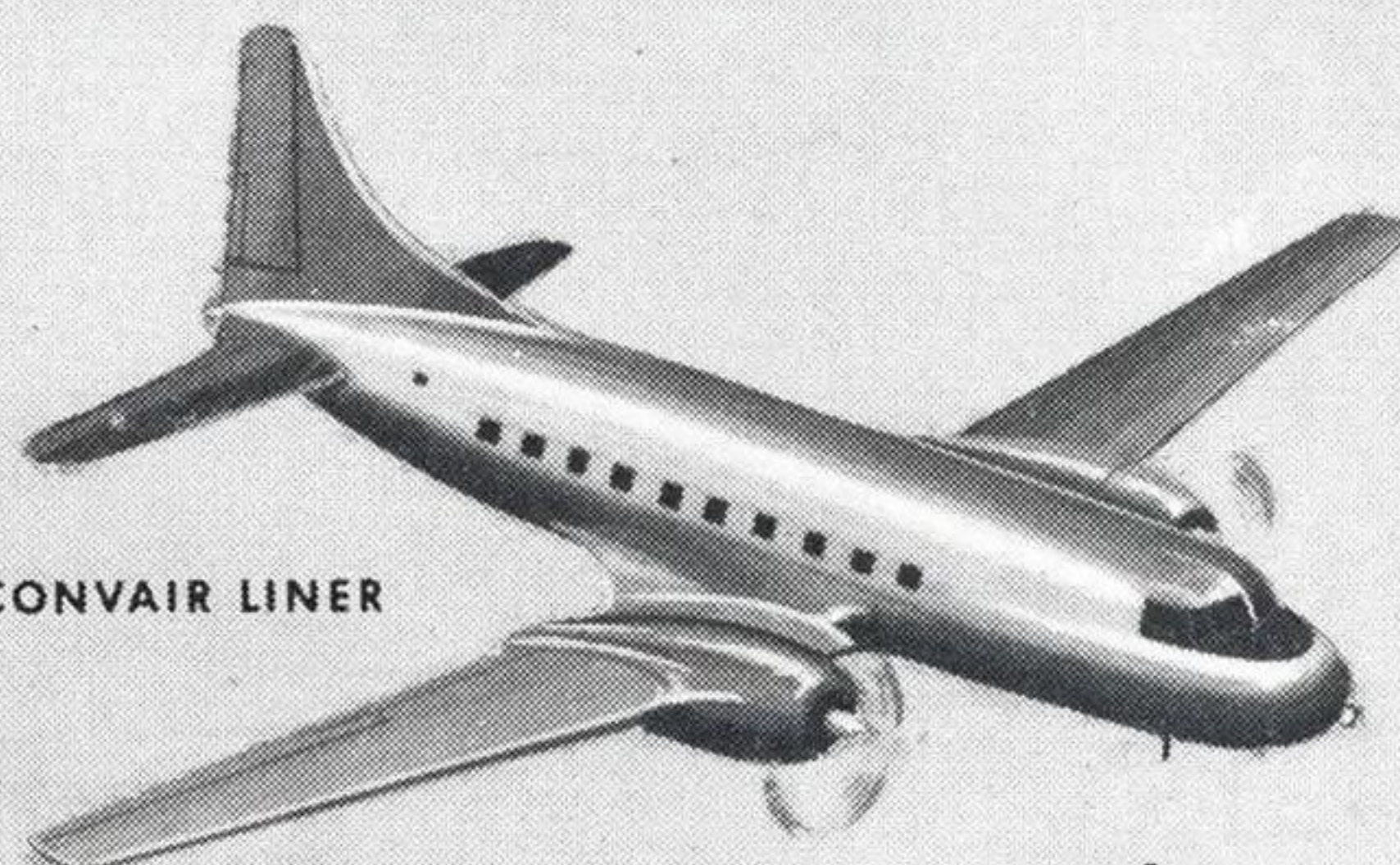
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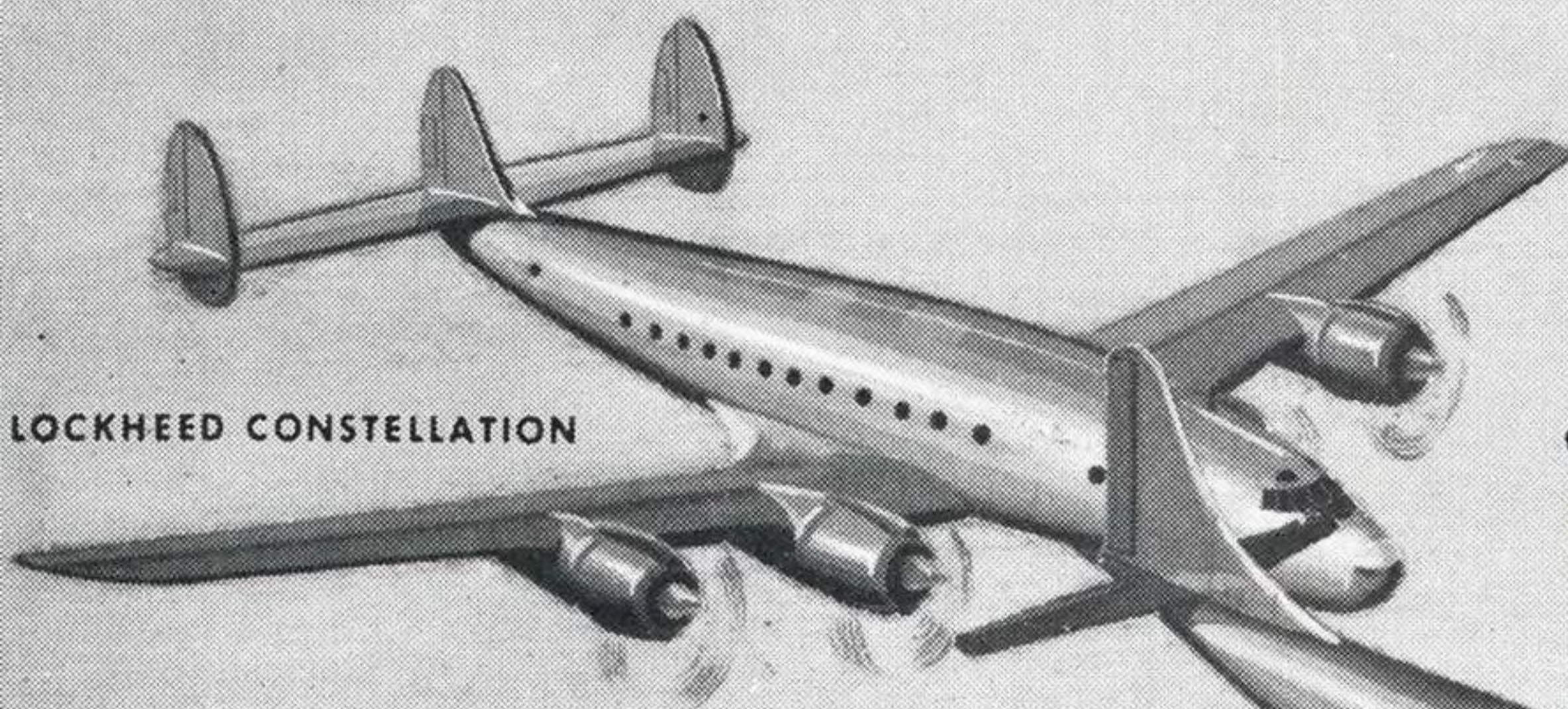
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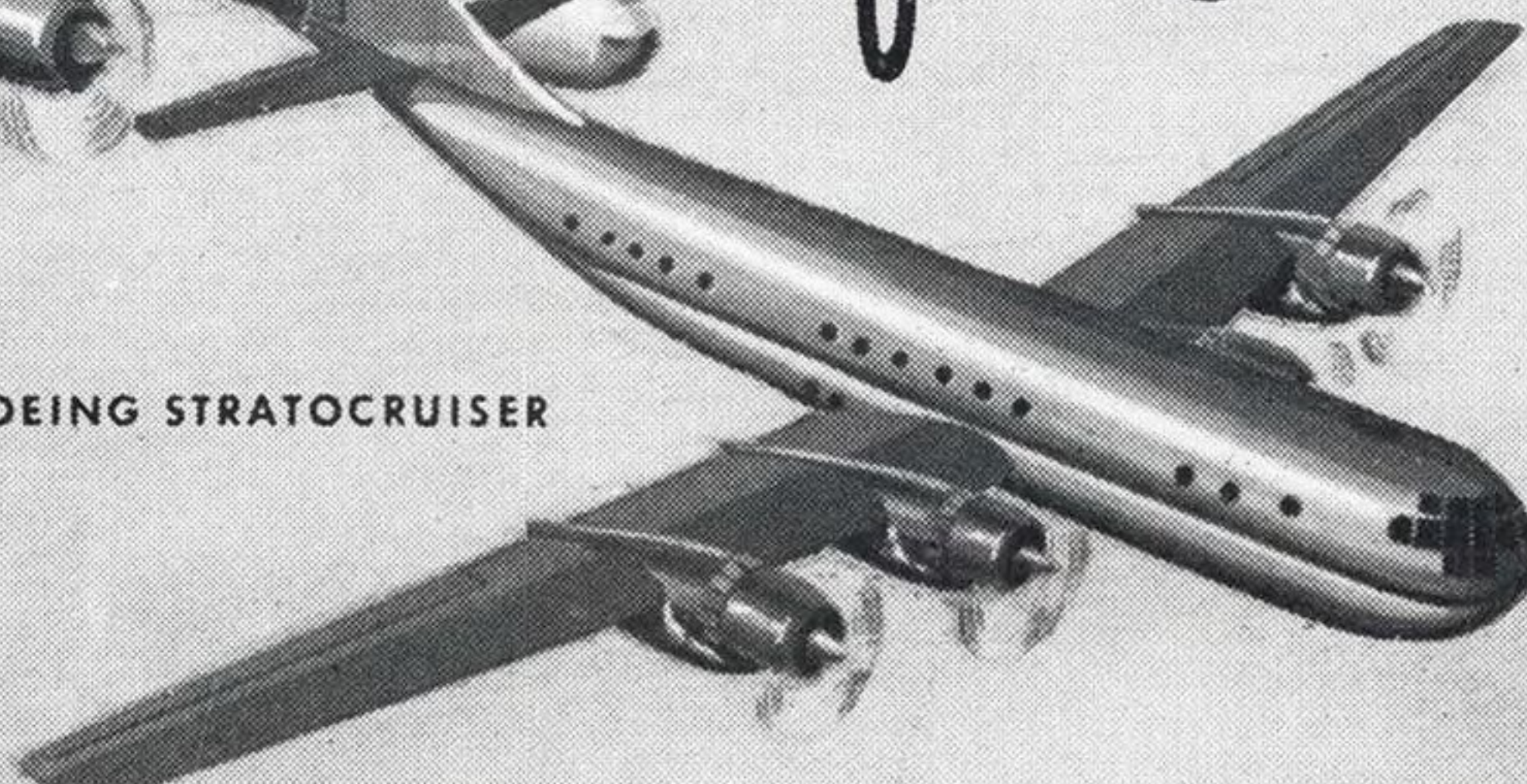
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