

# AVIATION WEEK

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OCT. 24, 1949

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One day they slipped away to a lonely stretch of beach at Kitty Hawk. Here, alone with their vision and the sky, they built a strange mechanical bird of hickory sticks and muslin.

*And they flew.* And they gave the sky to all of us that day.

Perhaps there is a reason why so many of the great dreams of mankind—the dream of wings, the dream of plenty, the dream of security—have come true here, under the American sky. Perhaps it is because all men rise higher where all are free to soar.

And maybe that is why nothing seemed impossible—or was—to the two nice young fellows from Dayton, Ohio, whose eyes were always leveled at the sky.

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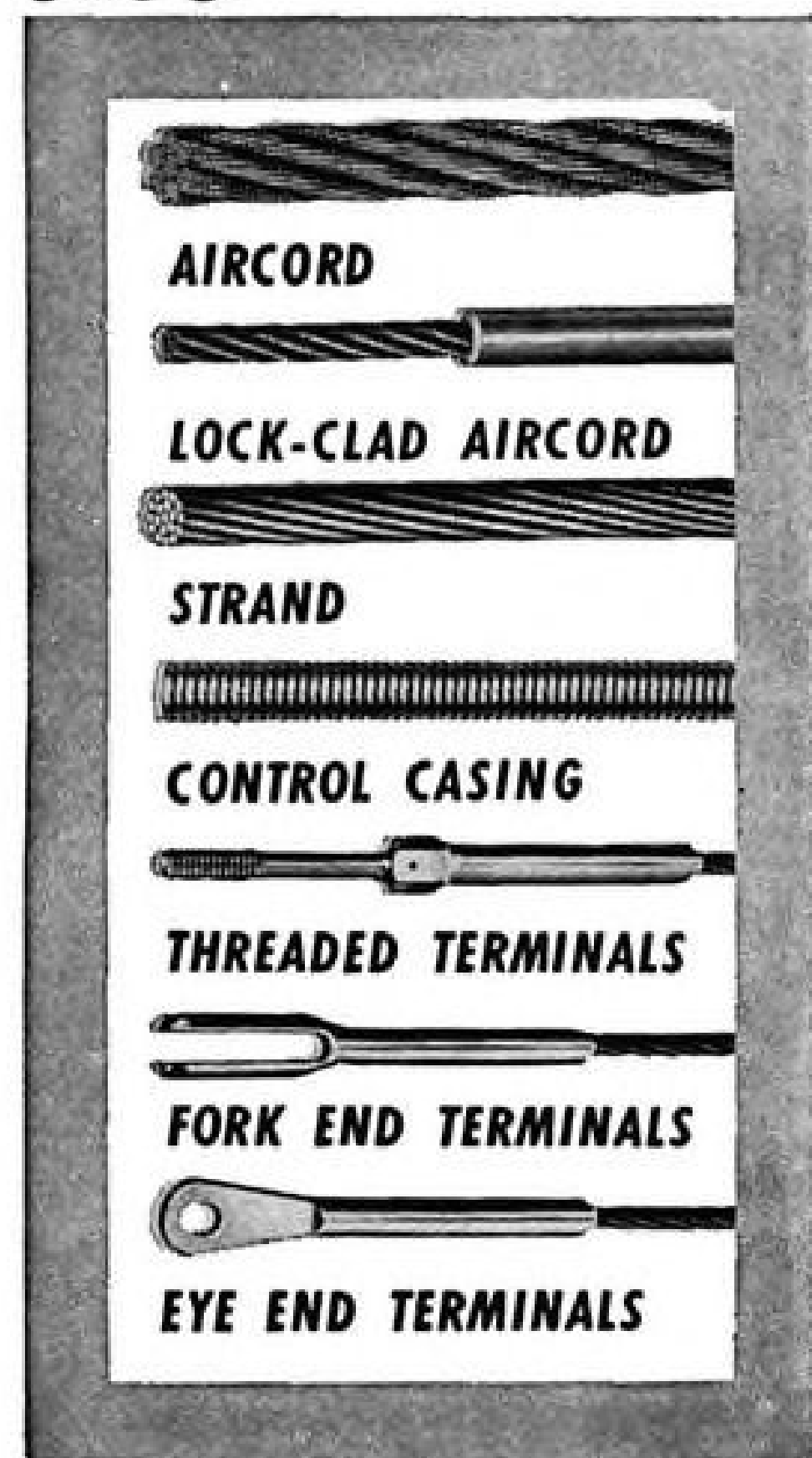
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# Aviation Week

Volume 51

October 24, 1949

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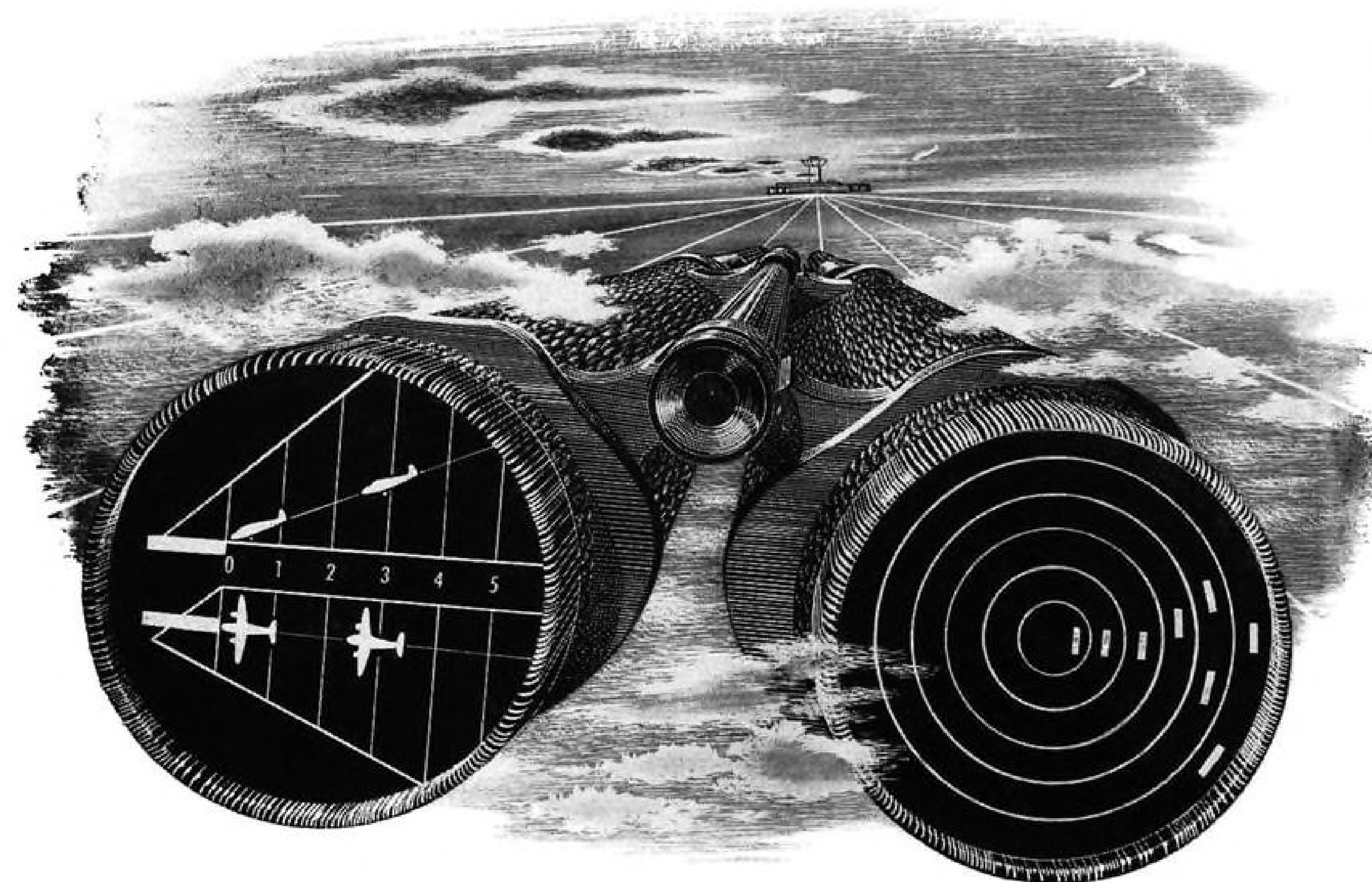
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## THE AVIATION WEEK

### The Budget Victory—A Staff Report

WASHINGTON—Air power won a major victory again on Capitol Hill last week with the Senate succumbing to relentless House pressure for funds to implement a 58-group Air Force.

Senate approval sent the record peacetime USAF \$6-billion appropriation to the White House where it faces its final and perhaps most formidable hurdle.

For the aircraft industry the new USAF budget means:

- **New contract authorization of \$1,992,755,000.** This is more than \$500 million above the original budget demanded by President Truman and once supported by the Senate.

- **Procurement of 2538 new aircraft.** This is 869 planes more than 1669 authorized in the President's budget. Additional planes will be 474 fighters; 164 transports, and 231 trainers.

The new USAF budget will boost total new contract authority for fiscal 1950 air power (USAF and Navy) to close to \$2.7 billion for 3381 new planes. However the air power budget again faces a rocky road in the executive branch of the government. Factors aligning for reduction in the congressional appropriation are:

- **President Truman's stubborn insistence** on the 48-group Air Force specified in his budget message of last January. Just last week the President told senators he was still standing firm for the 48-group program. Some senators supported the USAF increase only because they felt confident the President would refuse to allow the additional funds to be spent.

- **The economy program** under way in the Defense Department. Defense Secretary Johnson is now in the midst of cutting back fiscal 1950 military spending some \$800 million below the presidentially approved budget. This would mean lopping off about \$1,500,000,000 from the fiscal 1950 budget just approved by Congress. Air Force Secretary W. Stuart Symington revealed during hearings on Capitol Hill that Johnson's cuts were aimed mainly at reducing the armed forces during fiscal 1950 so they would be approaching the level of new reductions already being planned for the fiscal 1951 defense budget.

Clearly the Congress and the executive branch of the government do not see eye to eye on defense problems. For while the President and Johnson are hacking away at reduction, the Congress is voting substantial increases for the defense budget. Rep. Carl A. Vinson (D., Ga.), probably the most powerful legislator on the Hill when it comes to defense matters, has enlivened the hearings of the House Armed Services Committee during the past week with his rapidly rising ire at Johnson's \$800 million cut already ordered in fiscal 1950 spending. This cut will come largely at the expense of aircraft procurement for Navy and USAF.

Vinson is determined that Johnson be headed off from an "economy" program that makes reductions in the armed service strength rather than the promised savings through increased efficiency and elimination of wasteful overhead. The increased funds for the USAF approved by both House and Senate now give added significance to the impending clash between Vinson and Johnson when the latter appears before the House Armed Services Committee. For aside from the Navy-USAF feud and mudslinging over the B-36, the real issue at stake will be whether the Defense Department must spend money appropriated by Congress for the purposes for which it was appropriated.

Vinson did his best to encourage Symington into open defiance of the presidentially imposed 48-group USAF ceiling. Baiting Symington with a newspaper account that Sen. Elmer Thomas (D., Okla.) alleged that Symington had told him the USAF did not need the planes, Vinson asked Symington bluntly where he stood on the size of the USAF. Symington denied the quotation to Sen. Thomas.

"I have always believed that the security of the United States demands an Air Force of 70 groups," Symington told Vinson. "The President feels there is not sufficient money to get them at this time. However he shows that he believes we should have 70 groups when the money is available by approving the authorization legislation for the 70-group force. I support the President in that we do not have the money for 70 groups at this time but feel we should have them as soon as possible."

Symington said that because of the doubling in plane strength of B-36 bomber groups the USAF program now contemplated only 67 groups for minimum peacetime security.

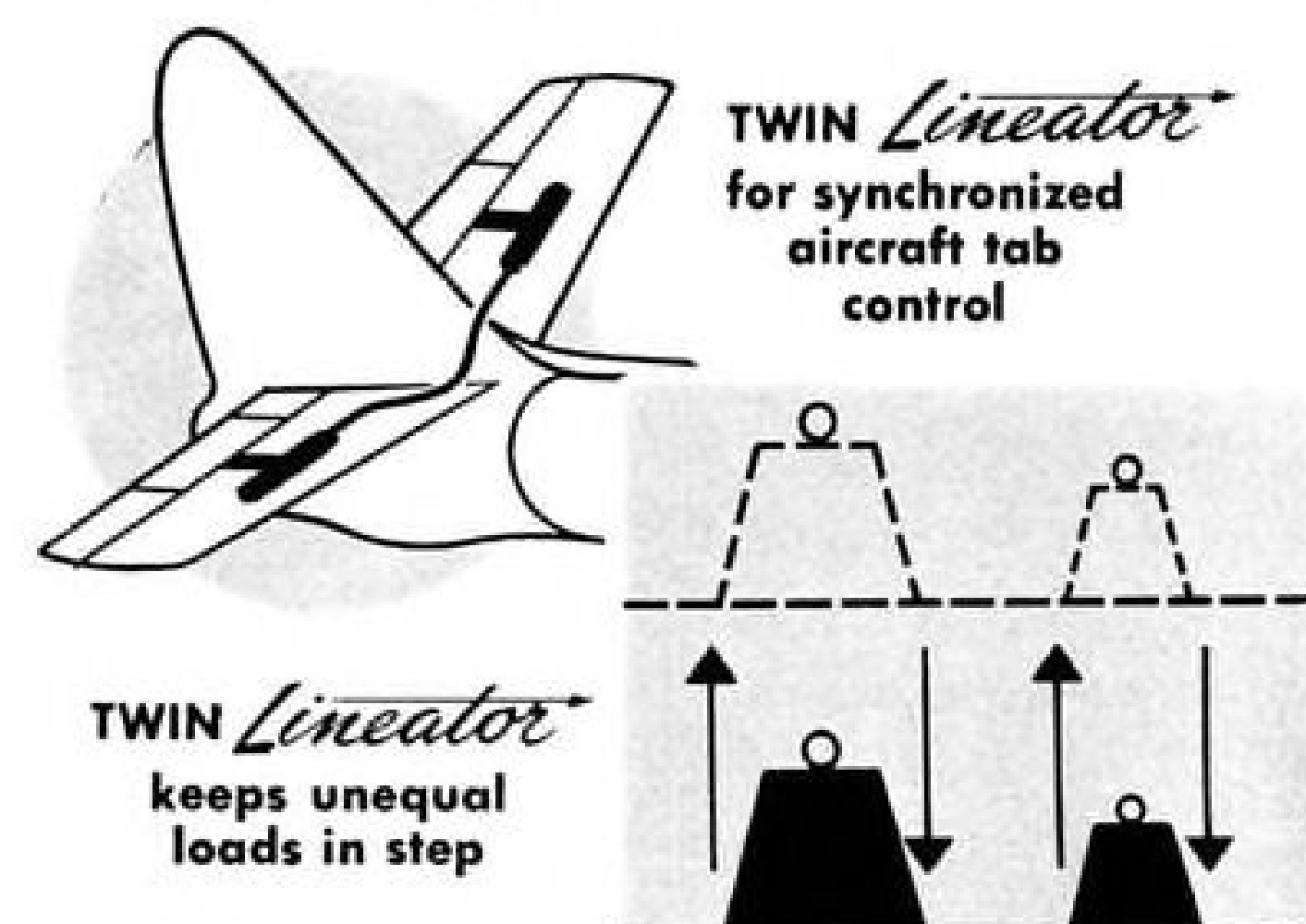
The Senate debate on the USAF appropriation indicated how little of the basic elements of aviation procurement are even now understood on Capitol Hill and the magnitude of the job of educating legislators on the facts of air power that still needs to be done. For example, Sen. Saltonstall (R., Mass.), a supporter of the 48-group program, noted that only half of the 474 additional fighters can be procured in fiscal 1951. He apparently still doesn't realize the three to five-year time lag from placing an aircraft order until deliveries to military squadrons. The facts of air power and its industrial problems must be hammered into the Hill ceaselessly if these incredible annual budget rows are to be avoided in the future and military air power is to finally get the funds it needs as the nation's first line of defense.

Symington opined that the Russians are three years ahead of their timetable on atomic bomb development. The figures show that we are already two years behind our timetable calling for the development of a 70-group Air Force by 1952.



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## AVIATION CALENDAR

- Oct. 26-27—CAA Non-scheduled Flying Advisory Committee meeting, Oklahoma City.
- Oct. 30—Third annual San Francisco Air Fair, sponsored by Junior Chamber of Commerce, San Francisco Airport.
- Oct. 30-Nov. 2—Annual convention, National Assn. of State Aviation Officials, New Orleans.
- Nov. 3-4—SAE national fuels and lubricants meeting, Chase Hotel, St. Louis, Mo.
- Nov. 9-10—Second annual aircraft sprayer and dusting short course, auditorium, Coffey Hall, University Farm, St. Paul, Minn.
- Nov. 9-11—Seventh annual meeting Aviation Distributors and Manufacturers Assn., French Lick Springs Hotel, French Lick, Ind.
- Nov. 30-Dec. 2—Annual meeting, Society for Experimental Stress Analysis, Hotel New Yorker, New York.
- Nov. 30-Dec. 2—Kansas Airport and Aerial Spray Conference, Manhattan, Kansas.
- Dec. 9-10—First Convertible Aircraft Congress, sponsored by Philadelphia chapter of IAS and American Helicopter Society, in Philadelphia.
- Dec. 15-17—National aviation meeting, sponsored by the National Aeronautic Assn., Washington, D. C.
- Dec. 17—Institute of the Aeronautical Sciences 13th annual Wright Brothers lecture, U. S. Chamber of Commerce Building, auditorium, Washington, D. C.
- Jan. 13-15, 1950—All-American Air Maneuvers, Miami.
- Jan. 16-19—Plant Maintenance Show, sponsored by American Society of Mechanical Engineers and the Society for the Advancement of Management, Cleveland Auditorium, Cleveland.
- Jan. 23—IAS annual Honors Night dinner, Hotel Astor, New York, N. Y.
- Jan. 23-26—IAS 18th annual meeting, technical sessions, Hotel Astor, New York, N. Y.
- Feb. 18-26—National Sportsmen's Show, Grand Central Palace, New York, N. Y.
- Mar. 6-9—47th annual meeting, American Road Builders' Assn., Netherlands Plaza Hotel, Cincinnati.
- Mar. 28-31—National Plastics Exposition, sponsored by Society of the Plastics Industry, Navy Pier, Chicago.
- April 16-20—Annual business meeting, American Assn. of Airport Executives, Neil House Hotel, Columbus, Ohio.

## PICTURE CREDITS

12—Wide World; 14—Republic Aviation Corp.; 15—INP; 17—Lockheed Aircraft Corp.; 46—Aeroplane; 47—(bottom right) Frederick R. Brewster, (others) de Havilland.

## NEWS DIGEST

### DOMESTIC

Navy has grounded its two Constitutions, spokesmen saying it costs three to four times as much to operate the Constitution as the 50-passenger DC-4. Constitution is capable of carrying 180 passengers.

Air Reserve Assn. rejected a proposal to merge with the Air Force Assn., at its annual meeting in Long Beach, Calif.

Military Air Transport Service has taken delivery of its first new Boeing C-97A Stratofreighter. Boeing also delivered to British Overseas Airways Corp. its first Stratocruiser. MATS has an order for 50 C-97As; BOAC had an order for ten Stratocruisers.

Boeing Airplane Co. laid off 1150 workers at its Seattle plant, reducing the work force to 22,000 persons. Meanwhile, date for an NLRB election to determine the bargaining agent for Boeing employes has been set for Nov. 1. Involved are the IAM's Aero Mechanics union and an affiliate of the Teamsters Union.

Curtiss-Wright Corp.'s airplane division, Columbus, will start production immediately on a new \$1.2 million USAF order for C-46 spare parts. Final deliveries will not be completed until March, 1951. Wright engine division shipped first three production models of Cyclone C-7 which has just passed military model tests—one for use in USAF's T-28, and two for Goodyear blimps being developed in Akron for Navy anti-submarine service.

James M. Shoemaker, 47, Chance Vought Aircraft's chief engineer since 1943, died in Dallas, Tex., after a long illness.

American Airlines has been authorized to use omni-range for scheduled operations between Walnut Ridge, Ark., and Tulsa, Okla., a route that currently has no traffic control facilities.

### INTERNATIONAL

Canadian Pacific Air Lines has installed cross-wind landing gear on a DC-3 for service from Montreal to Val d'Or and Rouyn-Noranda where one-strip landing fields are now being completed.

Peter Masefield, Great Britain's first civil air attache to the U. S. from June, 1945, to September, 1946, has been appointed chief executive of British European Airways Corp. After leaving Washington, Masefield served as director general of long-term planning and projects for the British Ministry of Civil Aviation. He then joined BEA as assistant to the chairman.

Two passenger dispatchers for Compania Mexicana de Aviacion—Pan American Airways affiliate—were arrested and held as an outgrowth of the recent crash of a CMA plane (AVIATION WEEK, Oct. 17). They were charged with criminal negligence in permitting the DC-3 to fly in allegedly well-indicated bad weather over a route that had no radio beam and used "ground contact" for navigation.

South African Airways has flown 473,380 passengers over 26,501,188 miles in 14 years without a single passenger fatality. This year, 128,033 passengers have already been carried 6,859,918 miles, a considerable increase over the 266,493 miles and 3074 passengers flown in 1935. SAA is adding Constellations to its fleet to fly on the Springbok service between the United Kingdom and South Africa.

British Ministry of Civil Aviation said aggregate operating deficit during fiscal year ended Mar. 31 for British Overseas Airways Corp., British European Airways Corp. and British South American Airways was reduced by 12.2 percent. Decreased loss was balanced by a 32 percent increase in capacity ton miles flown. Revenue ton miles were increased 20 percent.

Tasman Empire Airways Solent IV flying boat set an unofficial flying boat record for the England-New Zealand trip, completing the flight in 66 hr., 45 min.

### FINANCIAL

Beech Aircraft Co. board of directors has voted a quarterly dividend of 25 cents per share on its 599,865 issued and outstanding shares of common stock. Dividend is payable to stockholders of record at the close of business Oct. 26.

Northrop Aircraft, Inc. which suffered a net loss of \$3,834,434 for the fiscal year ended July 31, compared with a \$520,146 profit in the previous fiscal year, described the last 12-month period as one of the most difficult in its history. Northrop's annual report revealed the loss was incurred on its fixed-price contract for production of C-125 aircraft for USAF. January cancellations of Air Force contracts for 30 RB-49 Flying Wings and for 30 additional C-125s reduced company backlog by \$90 million in a single day.

American Airlines reports net profit after taxes of \$5,935,000 for nine months ending Sept. 30, compared with loss of \$3,416,000 for like period last year. Third-quarter profit alone was \$2,399,000.



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## WHO'S WHERE

### Changes

James A. Wooten, formerly president of Alaska Airlines, is now chairman of the board of Near East Air Transport, Inc. . . . Tom Y. Smith, former general manager of the Fleet Manufacturing Co., Ft. Erie, Ontario, airplane company, is now president of the new Fleet of America, Inc., Buffalo, N. Y. Firm is engaged in production of aluminum products. . . . Michael E. Cole, Southwest Airways general traffic manager, has resigned to become vice president of Bonanza Air Lines in Las Vegas, Nev.

### Appointments

Richard C. Coleman, for two years regional personnel manager for Eastern Air Lines in Atlanta, is now employment manager for EAL's entire system. . . . F. K. Purinton is director of publications and mail services for American Airlines, replacing H. M. Byrnes, resigned. . . . Ronald S. Gall is manager of public relations for Curtiss propeller division. . . . Michael J. Phillips is general manager of the newly-formed Industrial Division of Greer Hydraulics, Inc. . . . John N. Westfall is research analyst in charge of National Airlines' research and statistics department, succeeding W. B. Caldwell, Jr., now manager of schedules and tariffs.

Richard T. "Dick" McCauley is assistant in charge of government relations for Herman Nelson Corp.'s Portable Products Division. . . . Frederick A. Mattfield is factory manager of the Eclipse plant in Elmira, N. Y., replacing S. B. Kurzina, now with Curtiss-Wright Corp. in Wood-Ridge, N. J.

### Awards, Elections, Honors

George C. Van Nostrand has been elected vice president and general manager of American Airlines de Mexico, succeeding Jacques de Sibour, resigned. . . . S. M. Schusheim was reelected president of S. M. S. Instrument Sales & Service, Inc. . . . John W. Newey of the Newey-Ayers Organization has been elected a director of Helicopter Air Service, Inc. . . . E. S. Thompson, manager of sales for General Electric's Aircraft Gas Turbine division at Lynn, Mass., has been appointed to the Daniel Guggenheim Medal Board of Award.

Gordon R. McGregor, president of Trans-Canada Air Lines has been elected a member of the executive committee of the International Air Transport Assn. . . . John L. Collyer, president of B. F. Goodrich Co., has been elected a trustee of the Alfred P. Sloan Foundation.

### Leave and Retirement

Joseph T. Geuting, manager of Aircraft Industries Assn.'s Personal Aircraft Council, will be on leave from his Washington office for a month or more, after a physical checkup revealed his need for a complete rest. . . . George B. Post, vice president of the Edo Corp., has retired because of illness.

## INDUSTRY OBSERVER

► Watch for two and possibly three West Coast aircraft manufacturers to announce shortly they are moving their turbojet transport projects off the drawing board into their experimental shops. These manufacturers will go ahead with turbojet transport prototypes regardless of what happens to the prototype legislation now before Congress. At least two of the three firms are expected to take a strong stand against government financing of commercial transport prototypes, on the grounds that private financing of such projects poses less problem than trying to build planes according to the dictates of the type of aviation politician that might staff a government prototype development board.

► Major airlines are now in the midst of a trend toward aluminum propeller blades, with the result that Curtiss Propeller division and Hamilton Standard are reaching a new peak in production of this type blade. Trend is a result of recent airline difficulties with hollow steel blades, but CAA's technical staff expects a swing back to steel after exhaustive stress work is completed on hollow steel blades. Major asset of the hollow steel blade, according to CAA, is a weight-strength ratio that will count heavily in the long run.

► Initial steps are under way to bring aeronautical requirements on screw thread standardization in line with the broad international agreement recently reached between the U. S. and Great Britain. Generally, the aircraft industry feels the international agreement's provisions are too broad for precision aircraft work and wants a supplementary pact calling for closer tolerances for special types of threads used in aviation. A new standardization project to detail the needs of this supplementary agreement is expected to emerge from the joint military-civil aeronautical standards group.

► Piper Aircraft's new experimental twin-engine all-metal five-place executive transport is a modified version of the West Coast experimental Bauman Brigadier, which Piper has purchased. Piper version will use two 200-hp. engines installed in tractor position, instead of the two 125-hp. pusher engines used in the original plane. Main changes are in wing position and powerplant installations with few fuselage modifications. The Piper Brigadier, which is expected to be renamed, will probably fly in December.

► Boeing Aircraft Co. closed its Moses Lake AFB flight test operations in Washington with departure of the second XB-47 Stratojet bomber, fitted with GE J-47 engines, from the field. Approximately 40 Boeing employees stationed at Moses Lake were transferred to Wichita, while other experimental division employees were temporarily assigned at Wichita. The six-jet bomber flew from Moses Lake to Wichita nonstop in a routine flight of 2 hr., 39 min. for the 1300-mi. distance, or at the rate of approximately 600 mph. Pilots were John Fornasero and A. M. (Tex) Johnson.

► McDonnell Aircraft Corp. short afterburners have been fitted to the second XF-88 Voodoo jet fighter now at Muroc Air Force Base, Calif. As its name implies, this is a very short tailpipe extension incorporating fuel nozzles. Although its shortness limits its power increase over the twin Westinghouse J-34 turbojet engine installation, it provides about 40 percent increase in thrust for short periods.

► Lieut. Col. Marion E. Carl, former world speed record holder, dove a North American F-86A Sabre jet fighter to Mach number 1.05 recently over Wright-Patterson Air Force Base, Dayton, Ohio. Carl made the flight in the course of a routine visit to the Air Force installation. Supersonic speed mark was attained in a 35-degree dive from 47,000 ft. In a vertical dive, the F-86A is capable of Mach 1.275, or slightly less than 850 mph. at 40,000 ft. Air Force has not yet fully explored the tremendous speed possibilities of the Sabre due to structural dangers but the prototype XF-93 contains structural modifications aimed at permitting realization of full aerodynamic capabilities of the design.





DENFELD AND CATES—Power is combined strength of Navy, Marines and Air Force.



THACH—Carrier-based air power is answer.



BLANDY—Strategic bombing has its points.

## Symington Counter-Attacks the Admirals

Secretary tells House committee of new anonymous document criticizing USAF.

Control of the military services by civilians is now the fundamental principle at issue before the House Armed Services Committee investigation of national defense, Air Force Secretary W. Stuart Symington told the group last week. Symington opened a blistering USAF counter-attack on previous testimony by Navy admirals blasting the B-36, the Unification Act and strategic bombing.

The admirals had told the committee they were unhappy over handling of the Navy by Defense Secretary Louis Johnson; his management committee; the Joint Chiefs of Staff and the civilian secretaries of the Defense Department components. The admirals contended that people now making Defense Department decisions were not qualified to evaluate Naval problems. Symington

described himself to the committee as "just a civilian trying to run the Air Force."

► **New Anonymous Attack**—Symington also charged there was a "disturbing similarity" between the admirals' testimony and the contents of a new anonymous attack on USAF strategic bombing entitled "The Strategic Bombing Myth." (Symington read into the record a letter from Franklin D'Olier, head of the U. S. Strategic Bombing Survey to Louis Johnson branding the anonymous document as a deliberate falsification aimed at distorting the conclusions of the survey report.)

Symington said the anonymous document and the admirals' testimony stressed the same principal arguments, used identical quotations, and in some cases made the same mis-statements.

Symington also put into the record an Air Force investigation report showing that the anonymous document was sent to several hundred newspapermen by James C. Stahlman of the Nashville Banner. (Stahlman is a Naval Reserve captain.)

► **Used by Reservists**—The USAF report also shows "The Strategic Bombing Myth" was also used for indoctrination of a Naval Reserve group in New York. The House investigation was touched off by an anonymous letter charging corruption and political influence in B-36 procurement. The committee identified the author of the first anonymous document as Cedric Worth, a \$10,000 a year civilian assistant to Navy Undersecretary Dan Kimball. A Navy inquiry into whether Navy officers aided Worth in preparing and circulating the charges on Capitol Hill has temporarily suspended activities after implicating several Naval officers in Worth's activities.

Symington denied that he or any

regular Air Force officers favored abolition of Naval aviation.

► **Nimitz Speech**—"I believe some of our Air Force reserve officers have been advocating a single air force ever since so many Navy regulars have come out for Navy participation in strategic bombing," Symington told the committee. He credited a 1947 speech by Admiral Chester Nimitz advocating Navy participation in bombing the Russian heartland as serving notice of the Navy's intention to encroach on USAF strategic bombing functions.

Symington charged that since 1947 members of the Naval establishment have been conducting a carefully organized, able and unfortunate campaign against any airplane with long range. He said the Navy had traditionally opposed extension of the range of land-based aircraft and that the principal reason for its wrath against the B-36 was that the Convair bomber had intercontinental range.

► **Range Critics**—"To the best of our knowledge nobody has ever tried to limit or criticize the development of plane speed, altitude or weight carrying capacity," Symington asserted, "but everytime there is a major increase in range the storm breaks."

He charged that the "bitter and organized attack" on the B-36 or any other long-range airplane always reaches a crescendo when military appropriations are about to be determined.

► **Replies to Charges**—Symington answered the following specific charges made by the admirals:

• **The USAF is putting all its eggs into one basket.** Symington pointed out that the 70-group USAF program involved only four groups of B-36 bombers totaling 159 planes plus two reconnaissance groups of which there has been no criticism. The B-36 bomber groups would constitute only 8 percent of contemplated USAF strength.

• **Investment in B-36 procurement is starving other branches of the service for defense appropriations and forcing cutbacks.** Symington pointed out that when the B-36 program was completed its cost would be less than a billion dollars. Cost of the additional B-36 procurement to which Admirals Radford and Denfeld objected amounts to 14 percent of the National Military Establishment budget of fiscal 1949 through '51, Symington told the committee.

• **Testimony by Admiral Denfeld** that a high level joint USAF-Army and Navy committee appointed to study atomic bombing had concluded that atomic attacks would be ineffective. Symington quoted a letter from Maj. Gen. H. R. Harmon, head of the joint group which stated that the group's report was at variance with the impressions Denfeld sought to create. Har-

mon also denied a story by Hanson Baldwin in the N. Y. Times stating that pressure had allegedly been brought on Harmon to reverse his views against atomic bombing. Symington pointed out that Denfeld had refused to give the committee the conclusion of the Harmon Report on the grounds of secrecy.

• **Testimony by other admirals** that the USAF had purchased additional B-36s through precipitate action that sought to force the Joint Chiefs of Staff and Defense Secretary Forrestal into approval of the action. Symington pointed out that the Air Force had gone through all of the complicated approval and certification process for aircraft procurement required in the Defense Department and that it took from January to April to wind through this maze of red tape. He branded as false the implication that neither the Navy nor Forrestal knew the USAF wanted to buy more B-36 bombers.

► **Simplify Procurement**—Symington recommended that the present procurement procedures for aircraft in the Defense Department should be simplified and reduced to the same simple buying process required for ships and tanks and other munitions.

"Simplification would help the Air Force and the aircraft industry," Symington said.

Marine Corps Commandant Gen. C. C. Cates told the committee that the Army was trying to strip the Marine Corps of its combat functions and turn it into a police force.

► **Major Surprise**—Major surprise of the Navy's case was the testimony of Admiral Louis Denfeld, chief of naval operations and Navy representative on the Joint Chiefs of Staff. Denfeld swung into line behind the phalanx of admirals led by Admiral Arthur W. Radford in assailing the functioning of the present Joint Chiefs of Staff and the Secretary of Defense.

Denfeld, who was recently appointed to a second two-year term as chief of naval operations by President Truman, faced a difficult choice in supporting either the Navy dissidents or the civilians to whom he owed his appointment. His opening statement to the committee made his choice clear.

► **Supports Radford**—"As the senior Naval spokesman for the Navy," Denfeld said, "I want to state forthwith that I fully support the conclusions presented to this committee by the Naval and Marine officers who have preceded me."

Denfeld, a submarine expert, proclaimed that he is an advocate of air power and believes air power is now the dominant force in the U.S. military structure. Apparently taking issue with the earlier condemnation of strategic bombing by Radford and Rear

Admiral Ralph Oftsie, Denfeld said:

"I am also a proponent of strategic air warfare. It is my deep conviction that the portion of the early air offensive undertaken by the Strategic Air Command in the next war, if one should come, must be directed with far greater precision and selectivity than the bombing effort in the last war. Target systems and individual targets must be carefully selected, identified and hit with accuracy if this air offensive is to justify the expenditures of resources involved."

► **Navy's Share**—"Furthermore I maintain that the initial air offensive is not solely a function of the U.S. Air Force. This country's total military power is the combined strength of the Air Force, the Navy and the Marine Corps."

Denfeld said that procurement of additional Convair B-36 bombers should be postponed until the report on it by the Weapons Systems Evaluation Board was completed.

"It is illogical, damaging and dangerous to proceed directly to mass procurement without evaluation to the extent that the Army and Navy may be starved for funds and our strategic concept of war frozen about an uncertain weapon."

► **Approved B-36 Purchase**—USAF officials testified previously that the Air Force planned to buy 170 B-36 bombers at a total cost, including prototype development, of about \$1 billion. Denfeld said no service should be allowed to proceed with weapons procurement without JCS approval and admitted he had approved additional USAF B-36 purchases when they were submitted to JCS last April.

Denfeld also charged that there is a steady campaign within the councils of the Defense Department to relegate the Navy to a convoy and anti-submarine service on the grounds that "any probable enemy possesses only negligible fleet strength." Denfeld said the Navy needed aircraft primarily to attack submarines. Fast carrier task forces are necessary to attack submarine bases, shipyards and training areas; aerial minelayers must be available to blockade submarines; air hunter-killer groups must find and destroy submarines at sea; while patrol planes, helicopters and blimps are necessary for the arduous task of locating schnorkel submarines.

► **Wants Full Partnership**—Denfeld charged the Navy was not being admitted to "full partnership" in the unified Defense Department and ascribed cancellation of the 65,000-ton super-carrier to a reverse in the vote of Army Chief of Staff Gen. Omar Bradley. Denfeld said he received a mimeographed press release announcing the super-carrier cancellation by Defense Secretary Louis Johnson only



40 minutes after he signed the report of the JCS enclosing the members' opinions on the carrier project.

Denfeld asserted that the "tentative" cut of \$350 million below the Navy's minimum fiscal 1950 budget ordered by the Management Committee headed by Gen. Joseph McNarney was "firm" as of Sept. 8. Denfeld said that Navy had no choice but to make Naval aviation absorb two-thirds of the cut since shipbuilding had already been cut 60 percent and electronics procurement reduced 40 percent. He did not mention that 500 anti-submarine warfare planes had previously been slashed from Naval aviation's budget by the Navy and the Budget Bureau.

► **Case for Carrier**—The case for the super-carrier was argued by a galaxy of prominent Naval war veterans including:

• **Admiral William H. P. (Spike) Blandy**, commander of the Atlantic Fleet. Blandy disagreed with both Radford and Oftsie on their belittling of the effects of strategic bombing in World War II. Blandy said the U. S. strategic bombing survey report "shows clearly that this form of attack had a very great effect on Germany's oil and steel industries, and her transportation plus a marked effect on her general national economy and the morale of her people."

Blandy said however that British "area bombing" by night was "quite ineffective" and that no strategic bombing was effective until long-range escort fighters and very large numbers of bombers were available.

► **Navy Atom Bombers**—Reminding the committee that the Navy has a secondary mission involving strategic air war, Blandy said that land targets assigned to Naval aviation may justify use

of the atomic bomb. The aircraft intended for operation off the super-carrier USS United States could have conducted strategic bombing if required, Blandy asserted.

The carrier task force is now the spearhead of Naval power, Blandy told the committee, and it is needed to control the sea against any opposition including land-based airpower and submarines. He said there is nothing on the horizon to replace it and until the best Naval minds agree that a substitute has arrived it "should not be emasculated nor its development curtailed."

• **Admiral Richard L. Connolly**, commander of the Eastern Atlantic and Mediterranean Task Force. Connolly said that initial requirements of our European allies in event of war could only be supplied by aircraft carriers and naval forces. Early fighting in Europe would require many times the carriers and escort forces provided in the present Navy, he asserted.

Connolly told the committee that U. S. Naval requirements in the Eastern Atlantic and Mediterranean are mounting due to the waning of overall British naval strength and that unless strong U. S. forces were available for immediate deployment there, our military operations and those of our allies "would be hamstrung."

• **Rear Admiral Luis De Florez**, reservist specialist in synthetic training devices and research problems. De Florez maintained that development of the super-carrier is necessary to be hedged technically against the character of future warfare. He said the vulnerability of the carrier has been greatly exaggerated and is not borne out by its Pacific war record.

"The carrier has not become obso-

lete like the battleship whose guns have been dwarfed by the striking power of naval aviation," De Florez asserted "nor will the carrier become obsolete until planes it carries on its back have become obsolete themselves."

► **Urges Tests**—De Florez urged a test and evaluation of the B-36 in terms of its probable opposition by means of a joint operation between Strategic Air Command and Naval aviation for aerial war games over sufficient time and with sufficient preparation to develop technical data which will form a factual basis for guidance in planning a weapons development program.

"If such a program seems extravagant," De Florez told the committee, "let us remember that we found it necessary to explode atomic bombs in peace time to gain factual knowledge. No one has begrudged the tremendous cost of that experiment knowing it was necessary for our security."

• **Capt. John S. Thach** of the Naval Air Training Command. Thach told the committee that carrier-based air power can destroy enemy atomic bombers over the ocean before they reach the United States. Outlining the future role of carrier warfare, he pointed out that the threat of surprise carrier attacks would force a potential enemy to spread his defense thinly around his perimeter and prevent concentration against any principal directions of attack.

Thach maintained that only high performance fighters can assure command of the air and that carrier-based airpower is the only method by which high performance fighters can be projected over many areas of the world. Because carrier-based planes cover four-fifths of an intercontinental mission by ship and only one-fifth by air,

they can deliver 25 times the weight of bombs on a target possible through use of land-based intercontinental bombers in any given length of time, according to Thach. He asserted a fast carrier task force was not a profitable target for atomic air attack.

## Alcoa Strike Effect On Aircraft Slight

Strike of CIO workers against Aluminum Company of America has cut off 50 percent of Alcoa's production and 25 percent of the nation's total output. But the situation is not critical for the aircraft industry and will not be for some time.

Alcoa has a sizeable stock of aluminum sheet used in aircraft and large quantities of ingots. In general, aircraft manufacturers also have substantial inventories of sheet.

► **No Immediate Pinch**—The plane builders are well-stocked on standard items. Prospects are that there won't be any pinch for several weeks—and even then only on a few items.

Alcoa's Lafayette, Ind., plant, an important producer of airframe extrusions, has not been struck. This plant has more capacity than it has been utilizing.

► **New Plant Ready**—Also not struck are the Cleveland, Garwood, N. J., and Vernon, Calif., plants where aircraft forgings and castings are made. Two major Alcoa sheet-producing mills at New Kensington, Pa., and Alcoa, Tenn., have been shut down by the strike. But the company has a brand new sheet plant at Davenport, Ia., which has never been run at full capacity because of insufficient orders.

If Alcoa can't satisfy its current demands through its unstruck plants, aircraft customers may turn to its competitors—Kaiser and Reynolds.

► **Strike Issues**—Issues in the Alcoa strike are these:

The company has a pension plan and health insurance in which employees do not contribute. Pensions cost the firm 5 cents an hour and insurance 2 cents an hour. Alcoa has offered to increase these figures to 6 cents and 4 cents, respectively, and to pay the entire cost of pensions and insurance as recommended by the President's Steel Board.

However, the company asked that pensions and insurance be subject to adjustment later on the basis of any changes in the social security laws affecting these benefits which the employees receive from the government.

The union has refused to tie strings to the agreement. Alcoa contends the union's position deviates from the stand it took before the Steel Board. CIO President Philip Murray claims Alcoa's proposal would result in a reduction of the company's pension payments.

## Bell Strike Ends

The 19-week old Bell Aircraft strike came to an abrupt end last week through the conciliation efforts of N. Y. State Board of Inquiry. Dr. Edmund Ezra Day, board chairman, announced that the company and union had "mutually agreed upon terms for resumption of work at the plant."

The agreement, which had been signed by both sides, was ratified later by the striking Local 501, United Auto Workers. It provides that the men return to work while all matters in dispute be submitted to the board of inquiry for arbitration, the board's decision on all matters to be final.

## CAA to Centralize Prop, Engine Staff

Move to re-centralize the Civil Aeronautics Administration engine and propeller technical staff in Washington, where all certifications of aircraft engines and propellers will be handled hereafter, is being started by CAA.

Administrator Del Rentzel has already advised the Aircraft Industries Assn. that the centralization of certification procedures will be put into effect shortly, thereby acceding to repeated industry requests for the move.

For the last four years certification procedures have been handled in the New York and Chicago regional offices.

► **Two Plans**—Two alternate proposals are being considered. One calls for moving the two regional technical engine and propeller staffs into Washington. The other would leave part of the staffs in the regions, but place them under direct control of the Washington tech-

nical staff, instead of under the regional administrators as has been the case. It is believed that the more complete centralization will be chosen in order to eliminate the time lag which would continue between regional and Washington offices if the half-way measure were effected.

Move will not entail a large shift numerically in CAA personnel. Recent resignations from the regional technical staffs have cut the number to be moved to a total of five persons from both regions.

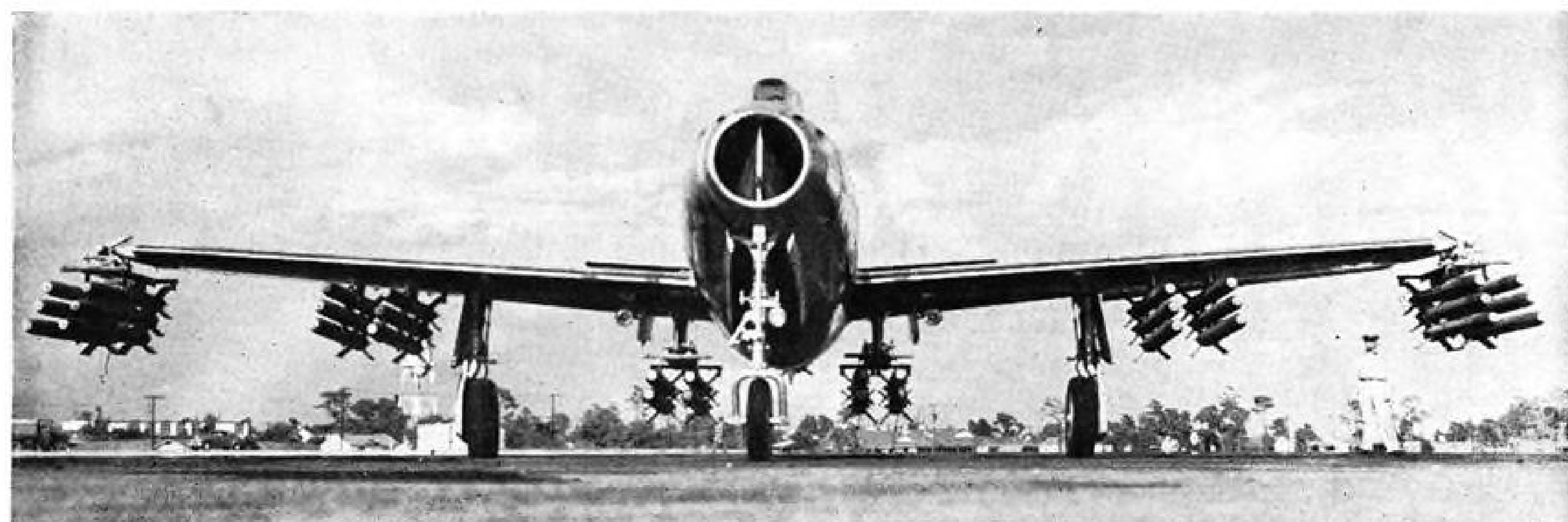
► **Single Standard**—Importance of the shift to the aircraft industry however is far out of proportion to the size of the personnel move. It will insure for the first time in four years a uniform procedure and single standard for all new engines and new propellers and a single centralized recordation of certifications.

Representatives from the Washington office can be sent out overnight to any engine or propeller plant in the country, and will have final authority to make quick decisions, which previously have been deferred until the regional offices could get Washington authorization. Result will be in many cases a savings of several days' time.

► **Policy Differences**—Still more important however will be the elimination of differences in policy between regions and the Washington office. These have been headaches to manufacturers and users of aviation equipment alike.

Typical of such difficulties was a recent case involving the overhaul time required for a certain propeller. Region where it was certificated set one overhaul time interval, while other regions in which it was used and the Washington office made another conflicting overhaul time ruling.

► **Opinion Divided**—While there has



### THUNDERJET GARLANDED WITH ROCKETS

The air indoctrination course at Eglin Field, Fla., recently ushered in a heavily-armed version of the Republic F-84E, performing as a fighter-bomber. In addition to its normal armament of six M-3 .50-cal. guns,

the plane carried 32 HVAR rockets, each weighing 140 lb. Alternate versions can carry 16 HVAR and two "Tiny Tim" rockets (on pylons under the center section), or 12 HVAR, two Tiny Tims and two

230-gal. wingtip fuel tanks. JATO-equipped F-84s have been taking off at Eglin at 24,000 lb. gross weight. F-84E power is supplied by an Allison J-35-17 jet engine rated at about 5000 lb. thrust.



### BEFORE FIRST FLIGHT

Chase Aircraft Co.'s XC-123 is shown as it prepared to take to the air for its first flight. The troop and cargo carrier is powered by two Pratt & Whitney R-2800 engines. It is estimated to have a top speed

of over 250 mph. and a cruising speed of 200 mph. Chase estimates the XC-123 can carry a useful load much greater than its empty weight of 25,000 lb. Service ceiling is calculated at 23,000 ft., range 550 mi.



been some industry agitation for a similar centralization of aircraft certification procedures in Washington from the regional offices, opinion is more divided in reference to this matter. Another CAA study is expected to be made on this matter.

It is understood that West Coast aircraft plants generally are not dissatisfied with the existing regional office certification procedure, and might prefer it to a centralization in Washington. Several personal aircraft manufacturers however have expressed a desire for centralization of aircraft certification.



DAMON in Ambassador's copilot's seat.

## Buying British?

TWA president sees little U. S. market for England's new planes.

The impressive array of new British transports at the recent Farnborough show continues to get rave notices from U. S. airline officials, but second-day comments on possible British sales to U. S. carriers are tempered.

TWA president Ralph Damon, returning from Europe last week, told a New York news conference that he had seen four of Britain's prize stable of transports—the de Havilland Comet, the Bristol Brabazon, the Airspeed Ambassador and the Vickers Viscount—and had flown in the last two. He found them "very impressive."

But, like Eastern Airlines' Capt. Eddie Rickenbacker (page 51), he does not think they will be sold in this country despite the price advantage stemming from devaluation, because:

• **Lack of availability.** British European Airways, which has ordered both the Ambassador and the Viscount, is being quoted a delivery date of 1951 for the

Ambassador, and 1952 for the Viscount. • **Maintenance problems.** British measurement units are different and stocking spares would be a terrific headache. There is also the matter of different tolerances for materials and different standards.

• **High fuel consumption of jets.** Damon says he has never been able to get jet fuel consumption figures that show any promise of economy. He missed seeing the Comet in flight because it was grounded while de Havilland was checking fuel flow meters in the hope of finding why fuel consumption has seemed so high.

• **No marked superiority** over U. S. transport types. Damon told AVIATION WEEK that he was so impressed by the British planes he saw because they were the first British planes he recalls being designed for real, economical airline operations.

► **Foreign Markets**—Nor does the TWA boss see where British planes such as the Ambassador will be markedly competitive with U. S. aircraft in the export market. The Ambassador, for instance, is normally a 40-passenger, four-engine high-wing pressurized monoplane. With that capacity, and the shortage of dollars abroad, it might be expected to cut into the Convair-Liner's foreign market.

Damon doesn't think it will, mainly for this reason: It is too big, and foreign traffic too small. BEA, for instance, plans to put about 52 seats in its Ambassadors. Inference from Damon's remarks is that traffic potential on European routes won't be enough to fill that many seats.

► **Holy Year Lift**—Damon spent 21 days in European and Near East countries. He found economic conditions substantially improving everywhere except possibly in Greece. The come-back augurs well for TWA's 1950 "Holy Year" plans for boosting traffic across the Atlantic to Rome. The Italian government has launched a housing program that will make about 60,000 beds available for pilgrims, and has promised to keep living costs and other prices down. In addition, devaluation has made living and traveling in Europe cheaper for American tourists.

TWA is expanding both its frequencies and its fleet to harvest the Holy Year traffic. There will be four trips a week to Rome. The 20 new Constellations bought for delivery next year will add 1000 seats, making it possible for TWA to carry 50,000 passengers to Europe next year.

► **Standard Capacity**—In addition TWA is launching a six-month program to increase and standardize the seating capacity of its present 35-plane Constellation fleet.

Twenty-three Model 049 Constellations now used on domestic transconti-

ental schedules will have their passenger capacity increased from 51 to 57. Twelve model 749 Constellations on international service will be redesigned to carry 49 instead of 40 passengers.

The 20 new Connies will carry 49 passengers. When the 12 Connies currently on international service are transferred to domestic schedules late in 1950 their interiors will be redesigned again to hold 57 passengers.

► **Modification**—Additional seats will be possible by relocating coat racks and installing more compact washrooms. Three windows will be inserted in the cabins to provide visibility from the added seats.

Work will be done at TWA's maintenance and overhaul base at Kansas City.

## Flight Safety Group Makes Four Awards

Four awards for outstanding contributions to the field of flying safety were presented in New York last week by the Flight Safety Foundation to Hugh De Haven, research associate at Cornell University; Dr. Leonard Greene, president of Safe Flight Instrument Corp.; United Air Lines, and American Airlines.

The awards, to be sponsored each year by AVIATION WEEK, were made in each case in recognition of an outstanding service which had clearly demonstrated its value in achieving safer utilization of aircraft.

Achievements were:

• **Hugh De Haven**, member of the Cornell University Committee for Air Safety Research, for his studies of aircraft design principles which will reduce the rate of fatalities in accidents.

• **Dr. Leonard Greene**, president of Safe Flight Instrument Co., for development of a successful stall warning indicator now "widely recognized and adopted by the aviation industry to reduce the accident potential of the unpremeditated stall."

• **United Air Lines**, for the preparation, production in cooperation with the U. S. Coast Guard, and "utilization in crew training of sound motion pictures having to do with safety in over-water flying."

• **American Airlines**, for preparation, production and utilization in crew training of the sound film "This Way Out," a motion picture which shows the most efficient procedures to be taken by crew members to assure passenger safety in the event of an emergency occurring in flight.

Selection of recipients was made by the Flight Safety Foundation, in consultation with the National Safety Council, the Aircraft Owners and Pilots Assn., and the director of the Institute of the Aeronautical Sciences.

## Air Races May Stay in Cleveland

National Air Races are expected to be held in Cleveland in 1950 again if the air race management can satisfy surrounding communities and CAA of the safety of the races planned.

Contest committee of NAA meets in Washington Oct. 28 to consider recommendations of a technical sub-committee on revision of 1949 air race rules, and another sub-committee on the Goodyear races.

CAA Administrator Del Rentzel has assigned his assistant, Howard Rough, to sit on the technical committee on revisions, but pointed out that this did not necessarily mean CAA would accept the committee's recommendations.

"We would like to see the National Aeronautic Assn. and the National Air Races work it out themselves and have encouraged them to take the initiative," Rentzel said. "However we are not interested in going along with a renewal of pylon racing in 1950 unless it can be put in a location where it is not hazardous to residential areas."

The revisions sub-committee, headed by Roger W. Kahn, chairman of the NAA contest committee, will present specific recommendations developed from general instructions given at an earlier Washington meeting. At the earlier meeting were representatives of CAA, racing pilots, air race management and the NAA contest board. Their instructions called for:

## Air Power Budget Facts

Here is how the fiscal 1950 air power budget, described on page 7, stands as approved by Congress:

	New Contract Authority (billions)	New Planes	Airframe Weight (million lbs.)	Total New Obligation* (billions)
USAF .....	\$1.992	2538	32	\$6.0
Navy .....	.687	843	9	4.6
	<b>\$2.679</b>	<b>3381</b>	<b>41</b>	<b>\$10.6</b>

\* Including procurement funds and other major items of the new USAF budget, including: \$1,100,000,000 cash for liquidation of previous contract authority; \$230,000 for research and development; \$50,000,000 for radar warning network; \$1,143,858,000 for maintenance and operations; \$1,201,000,000 for military personnel; \$58,687,000 for administrative salaries and expenses; \$77,630,000 for USAF reserve; and \$114,690,000 for Air National Guard.

• **Raising altitude** at which races are flown.

• **Relocation of closed course** to more sparsely settled locality.

• **Additional safety equipment** to be worn by pilots.

• **Extension of present medical pilot requirements.**

It is understood that wearing of anti-G suits may be made compulsory for the high speed races.

► **Goodyear Revisions**—Revision of the 1950 Goodyear midget race requirements has been recommended and is expected to be adopted.

One revision requires that all planes entered must have 100 percent dynamically balanced ailerons. (This will cause modification of the two Wittman Spe-

cials which took first and third place in the 1949 race but which did not have the balanced ailerons. The 1949 rules said ailerons should be balanced, but did not make it mandatory.)

Fuel requirement revision would restrict fuel to commercially available types of gasoline including triptane, thereby eliminating an alcohol fuel system developed by Tony LeVier for his Cosmic Wind racer but which he withdrew from the 1949 race after protests of other pilots.

Protests by other pilots against the Wittman planes were withdrawn just before the races. It was pointed out that Wittman had not learned of the "should have" provisions until his arrival at Cleveland.



### LOCKHEED'S AIR DESTROYER

First flight view of the Lockheed XF-90, experimental supersonic penetration fighter, now undergoing flight testing at Muroc AFB with Lockheed test pilot Tony LeVier at

the controls. Unusually large (220-gal.) wing-tip tanks are shown which help to give the Lockheed fighter its unusually long range for a jet plane. Powered by two West-

inghouse J-34 turbojets, and Solar afterburners, the XF-90 has now made more than 25 successful flights and has exceeded Mach 1 (AVIATION WEEK, Oct. 10).



## FINANCIAL

### McDonnell Profits Over War Peak

Company net earnings for fiscal 1949 are reported as \$1,731,832. Backlog is over \$84 million.

McDonnell Aircraft Corp.'s report for the fiscal year ending June 30 revealed that the company has achieved the unique distinction of being the only aircraft builder to have surpassed wartime sales and net earnings in the postwar period.

This record, accomplished without benefit of commercial orders, is another reflection of the ability to return satisfactory profits on military bookings.

For the fiscal year ended June 30, 1949, McDonnell Aircraft showed net sales of \$32,659,384. Adding work-in-process to the volume of completed production would have augmented billings to \$35,674,131. During the war period, the company's peak production was for the fiscal 1944 year when total sales aggregated \$21,704,225. For 1945, sales remained virtually unchanged at \$20.7 million but dropped sharply to about \$6.6 million for 1946 as postwar readjustments were being effected. A steady improvement set in during 1947 with total sales reaching about \$11.2 million. Sales were almost doubled for 1948 with billings of \$20.7 million.

► **Earned \$1,731,832**—For the most recent fiscal year, McDonnell showed net earnings, after all charges and taxes, of \$1,731,832, equivalent to \$7.47 per common share on its present capitalization. Best earnings performance during the war years was for the twelve months ended June 30, 1945, when net profits of \$187,407 were recorded. This was followed by a net loss of \$226,177 for 1946. Subsequent operations assumed an accelerated profitable rate when net earnings of \$540,870 for 1947 more than tripled to \$1,675,327 in the following year.

► **Exclusively Military Business**—McDonnell Aircraft was incorporated in July, 1939 with two employees and no orders. After accumulating \$139,496 in cash capital and assembling 15 engineering employees, the company received its first order in June, 1940. The Army Air Forces awarded it \$3000 for a pursuit airplane design submitted in competition. The company has never deviated from confining its activities to military prime and subcontracts.

During its first ten years McDonnell has produced more than \$135 million

of work, all for the U. S. Government.

► **Earnings Plowed Back**—The company's capital structure development is significant in that earnings have consistently been re-employed in the enterprise. On June 30, 1940, the total capitalization consisted of 36,368 shares of common stock and 2216 1/2 shares of preferred stock. The entire net worth was valued at \$222,390.

Ten years later, the enterprise had a net worth of more than \$5.2 million. The most recent capital structure consisted of 227,424 shares of common stock, par value \$1 per share, and 5254 shares of convertible preferred stock with a par value of \$100 per share.

A statistical analysis reveals that more than \$4 million of the company's net worth was contributed by past earnings. In other words, during the past decade while additional shares were sold to provide needed working capital, such augmented financing is estimated to have aggregated less than \$1 million.

Nevertheless, the investment in this enterprise during its formative years represented a substantial risk with little assurance that profitable results would ensue. This was venture capital in its most traditional role. In this instance, the original sponsors of the enterprise have had their faith and judgment vindicated and have gained accordingly.

► **Share Conversion**—McDonnell's present capitalization may submit to some dilution in the immediate future. The 5254 shares of preferred stock are convertible into common at the rate of 10 shares of common for each share of preferred. While the preferred currently pays a noncumulative 6 percent dividend in contrast to no disbursements on the common, the conversion process has been underway since 1944. At the outset, there were 10,000 shares of preferred stock outstanding, before conversions into common were made. Should the common be placed upon a dividend paying basis and should such payments exceed 60 cents per share, from an income standpoint it would become immediately advantageous for the preferred shareholders to convert into the common. It is more probable, however, that the management may choose to force conversion by calling the preferred at the stipulated price of

\$105 per share. With the common currently selling around \$20 per share, it is obvious that the preferred stockholders would elect to convert their holdings into common and receive the equivalent value of about \$200 rather than the stated call price of \$105 for each share of preferred held.

Even further dilution of the common stock would occur upon the exercise of purchase warrants at \$10 per share on 79,973 shares of common. The bulk of these warrants are held by J. S. McDonnell, founder and president.

In the event of complete conversion of the preferred and the exercise of all outstanding warrants, the present outstanding common shares would be increased more than 50 percent to bring the total common shares to 359,937.

It is obvious that in this dilution process, the book value of \$20.70 per common share as of June 30, 1949, would be materially reduced.

The company's financial position reflects the consistent improvement in sales and earnings. As of June 30, 1949, net working capital was in excess of \$4.3 million, representing a far cry from only \$29,418 existing in the same category as of June 30, 1941.

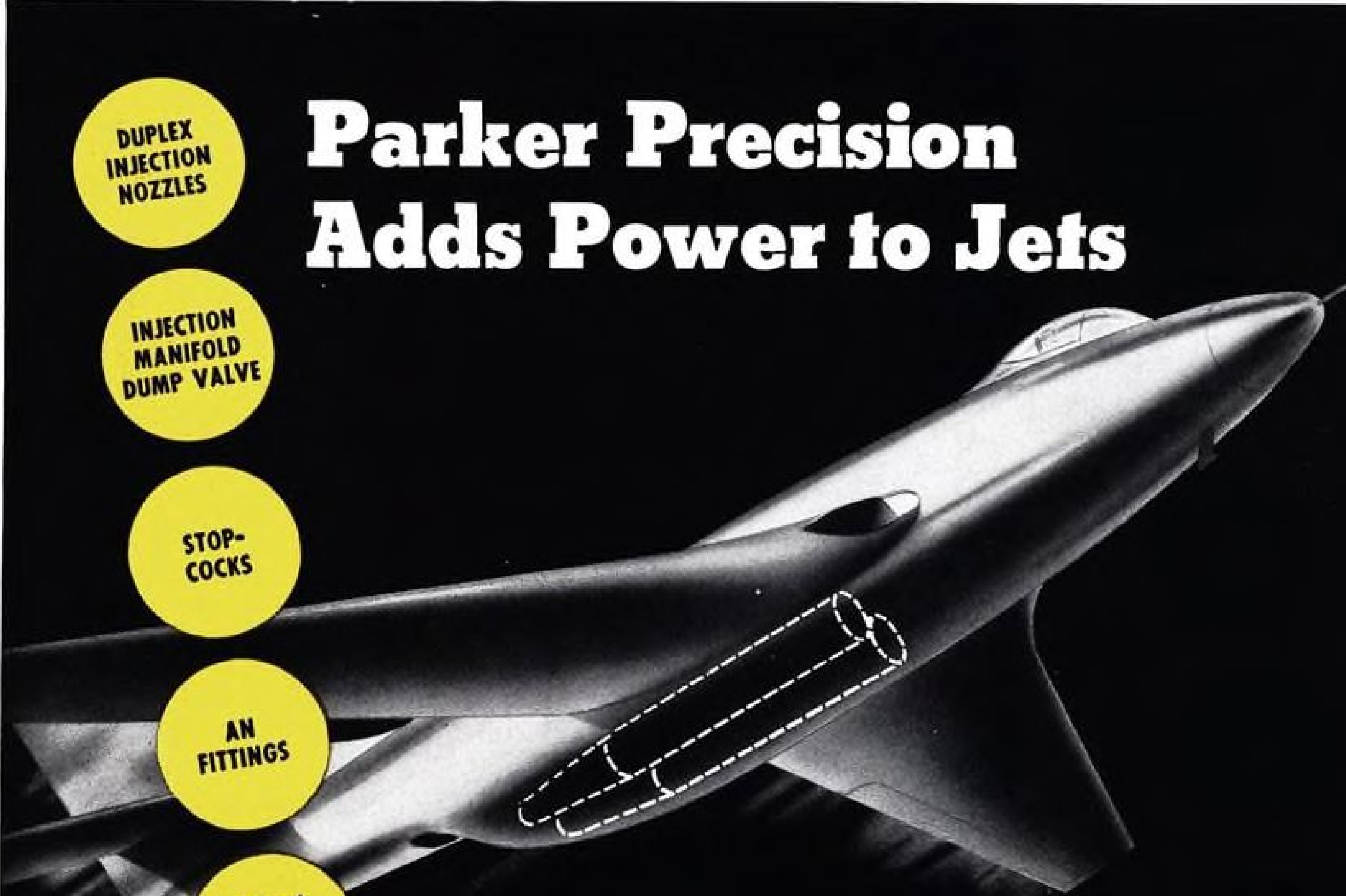
► **Property Costs**—Leasing its main plant facility at Lambert-St. Louis Municipal Airport, McDonnell has been able to avoid extensive property commitments.

Current indications point to a relatively high continuing rate of production for the fiscal year to end June 30, 1950 and perhaps for the immediate period beyond. As of June 30, 1949, the company's backlog was reported at \$61,896,041. The annual report noted that as of September 27, 1949 the backlog was over \$84 million.

► **Navy Orders**—Main production for McDonnell in recent periods has centered around the Banshee deliveries to the Navy. This procurement is divided between two contracts, one for 56 F2H-1s for which deliveries were started in August, 1948 and completed about mid 1949; and the second for 179 F2H-2s. The first of this later series was flown in August, 1949 with delivery completion scheduled by January, 1951. In September, 1949, the company received a contract for additional F2H-2 Banshees, of which some are night fighters and other photo-reconnaissance planes.

The McDonnell management takes a fairly optimistic view of the future with the assertion that its present backlog will not be completed until December, 1951. Further, it expects a normal follow-up business on existing production contracts, plus a normal amount of production work from present experimental contracts to result in a satisfactory continuation of business.

—Selig Altshul



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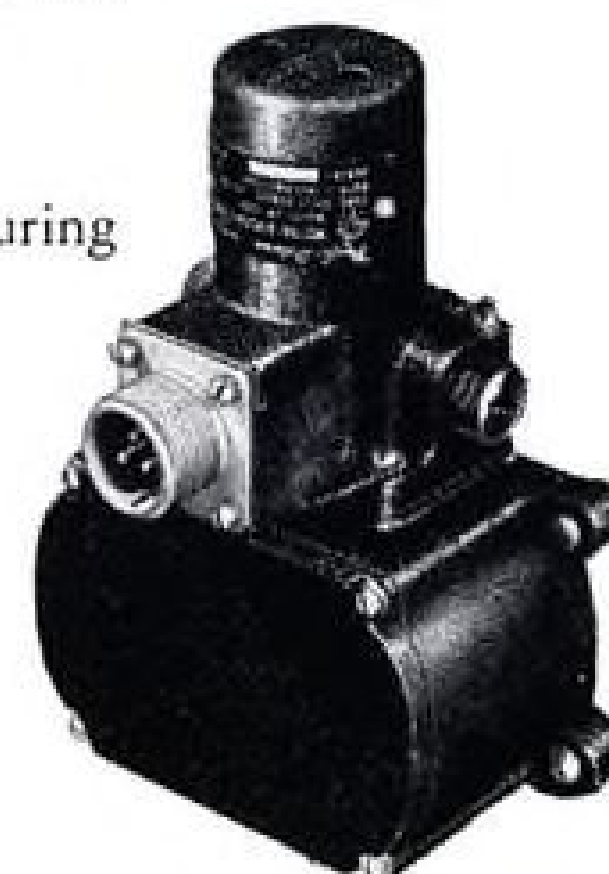
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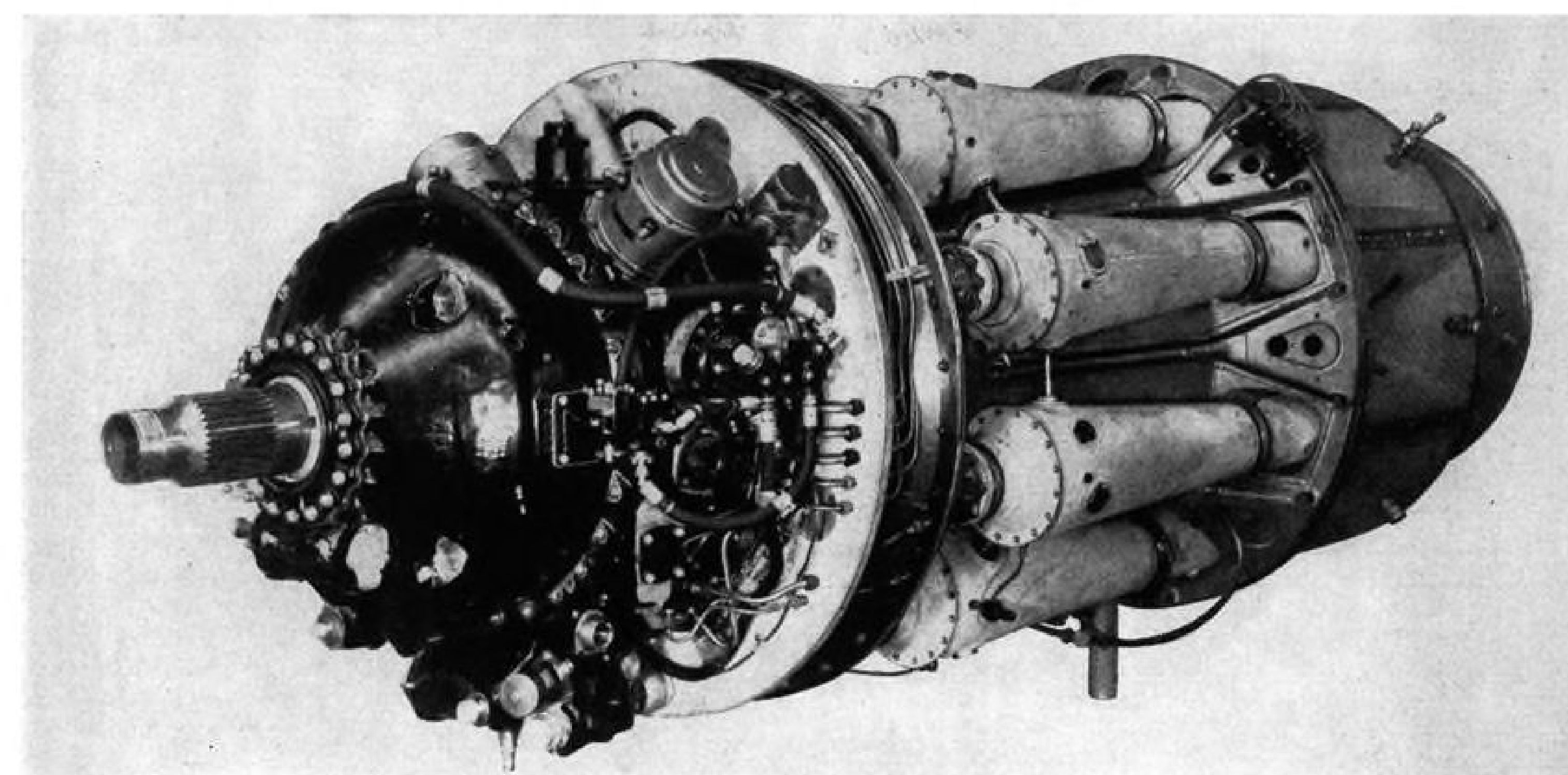
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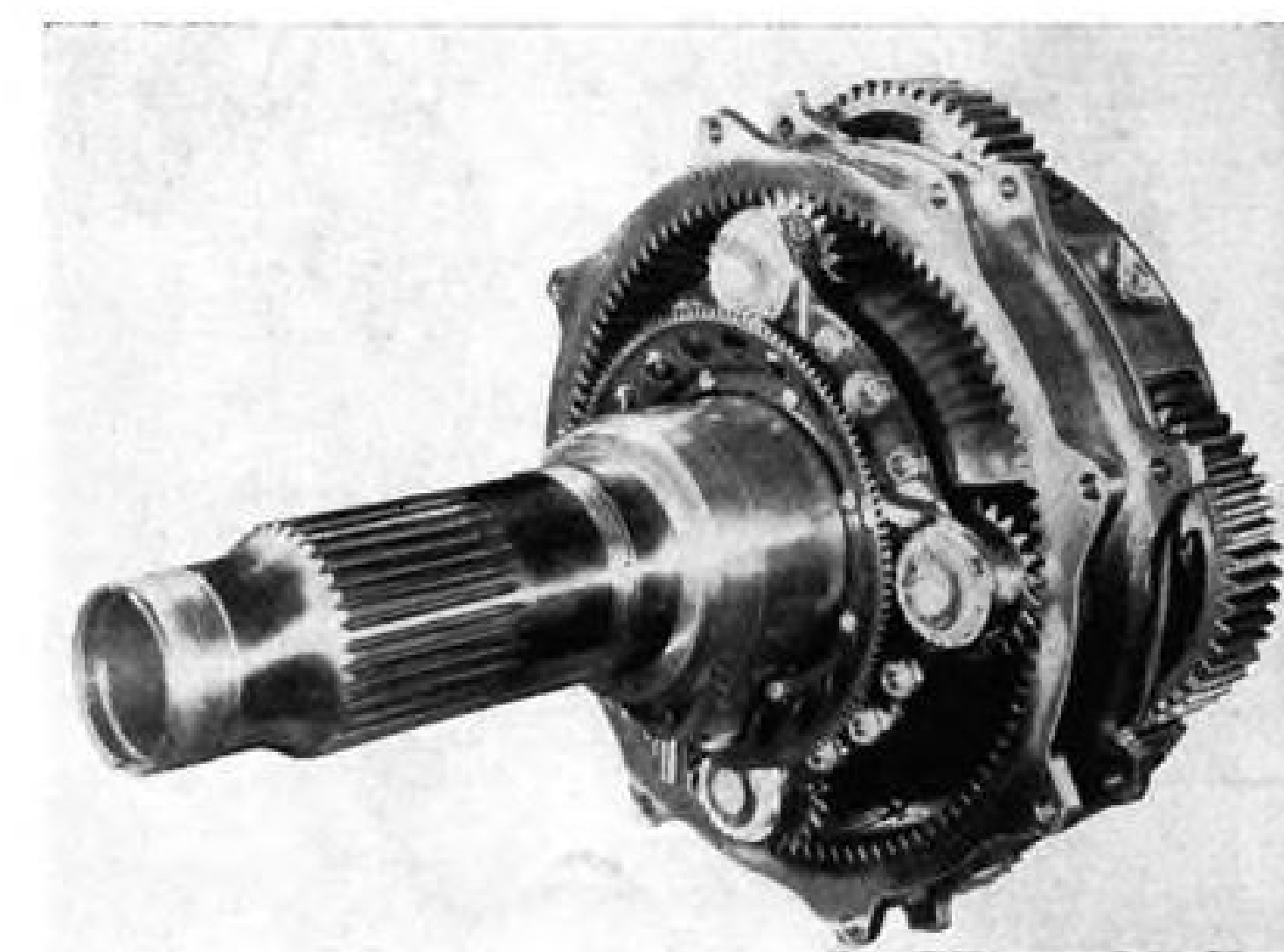
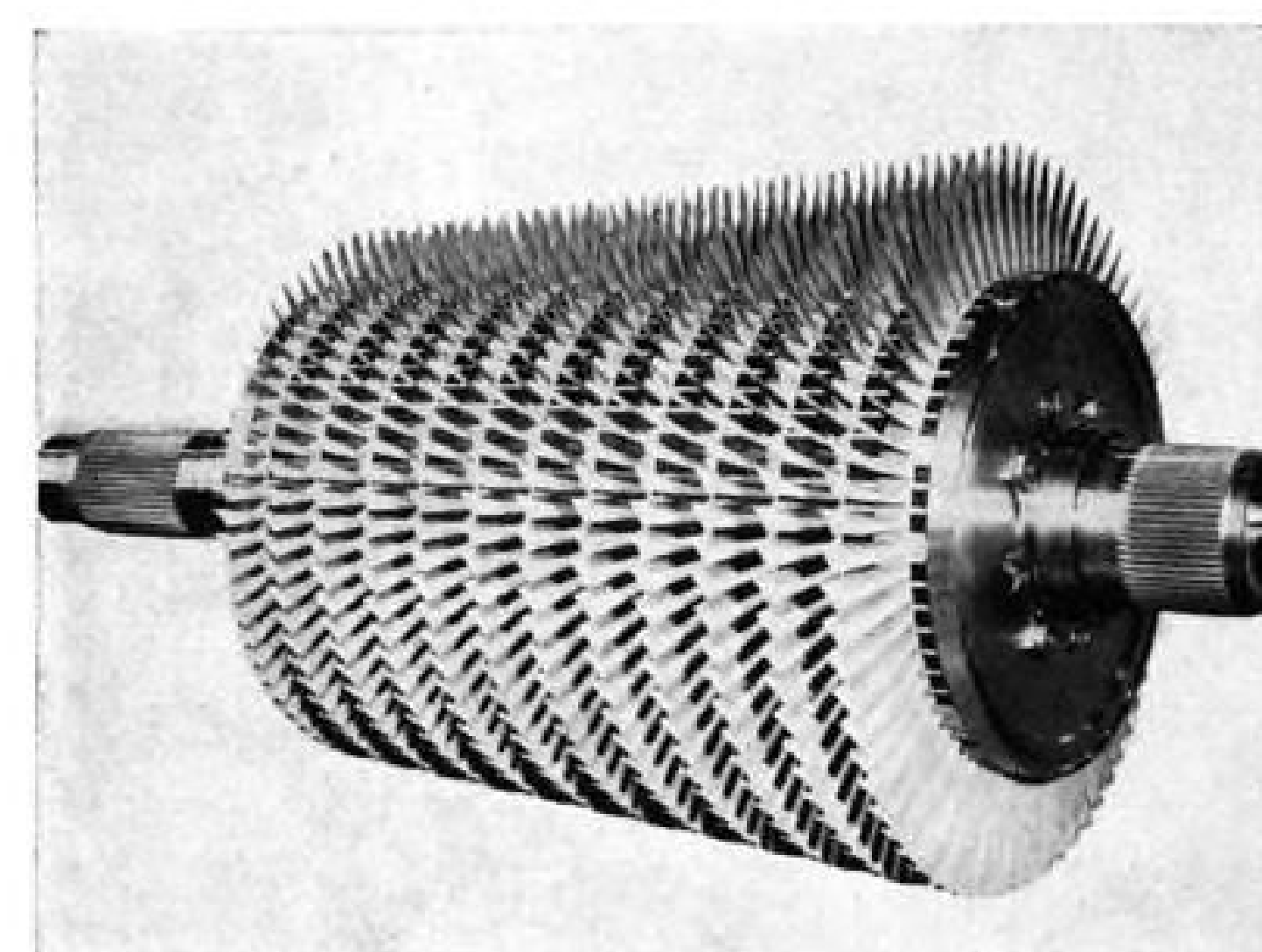
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## AERONAUTICAL ENGINEERING



Proteus' intake is at rear. Flow reversal from forward through compressor to rear through combustion chambers reduces engine length.



Compressor rotor (left) has disk makeup, each disk supporting single rotor stage. Reduction gear (right) is compound epicyclic train.

## Analyzing the Bristol Proteus Turboprop

**Engine uses "free turbine" arrangement. Will power Brabazon 2, Type 175 liner, Princess flying boat.**

Details of the Bristol Proteus turboprop—Britain's second largest—have been released by the Air Ministry. Only British turboprop with more power is Armstrong Siddeley's Python (developing over 4000 hp.).

Advanced as specially suitable for buried installations, the Proteus is designed for economy within the 300-400-mph. range, at 30,000 to 40,000 ft. It is a good example of British progress

with this type of engine, which they undoubtedly think will have wide application in the transport field.

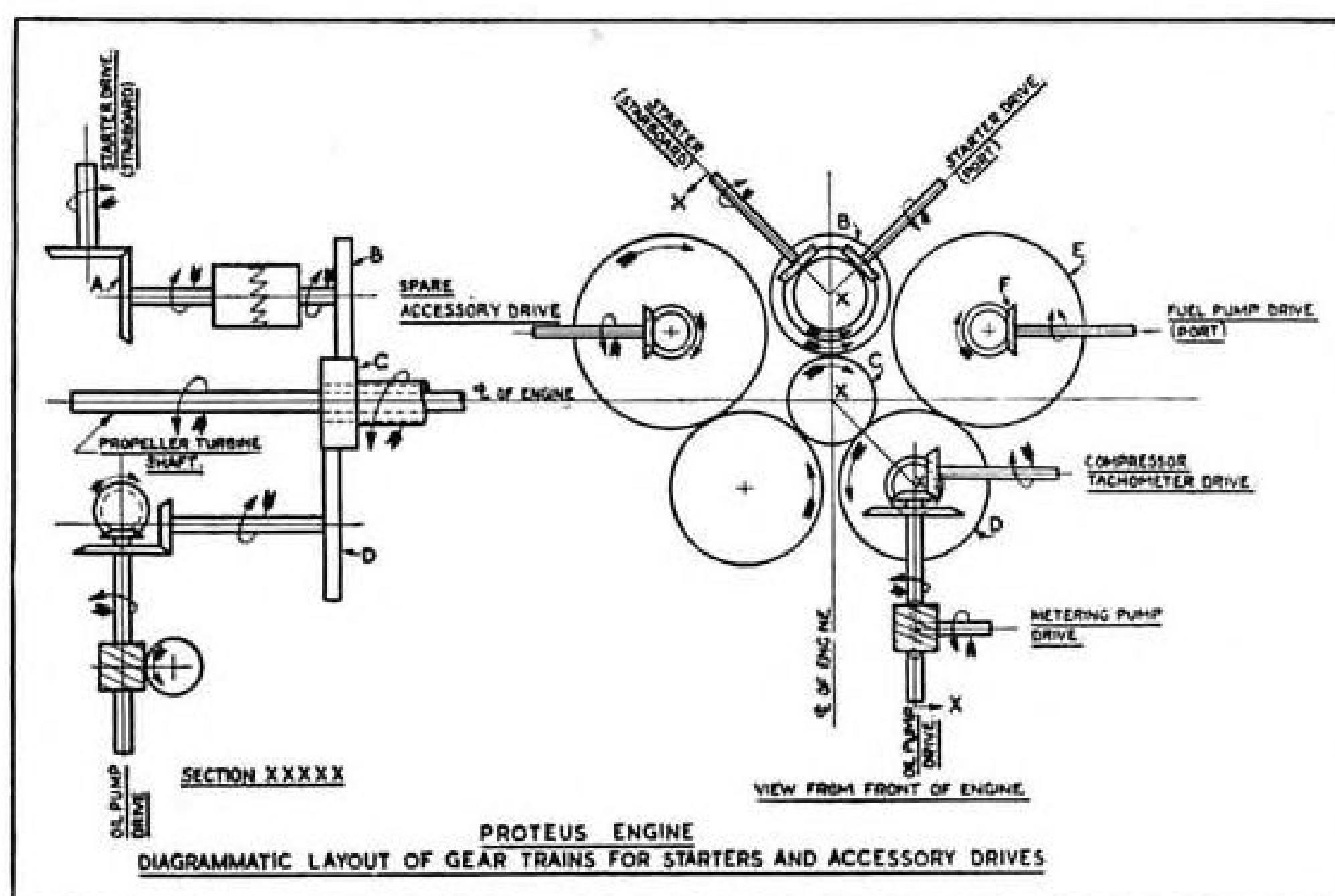
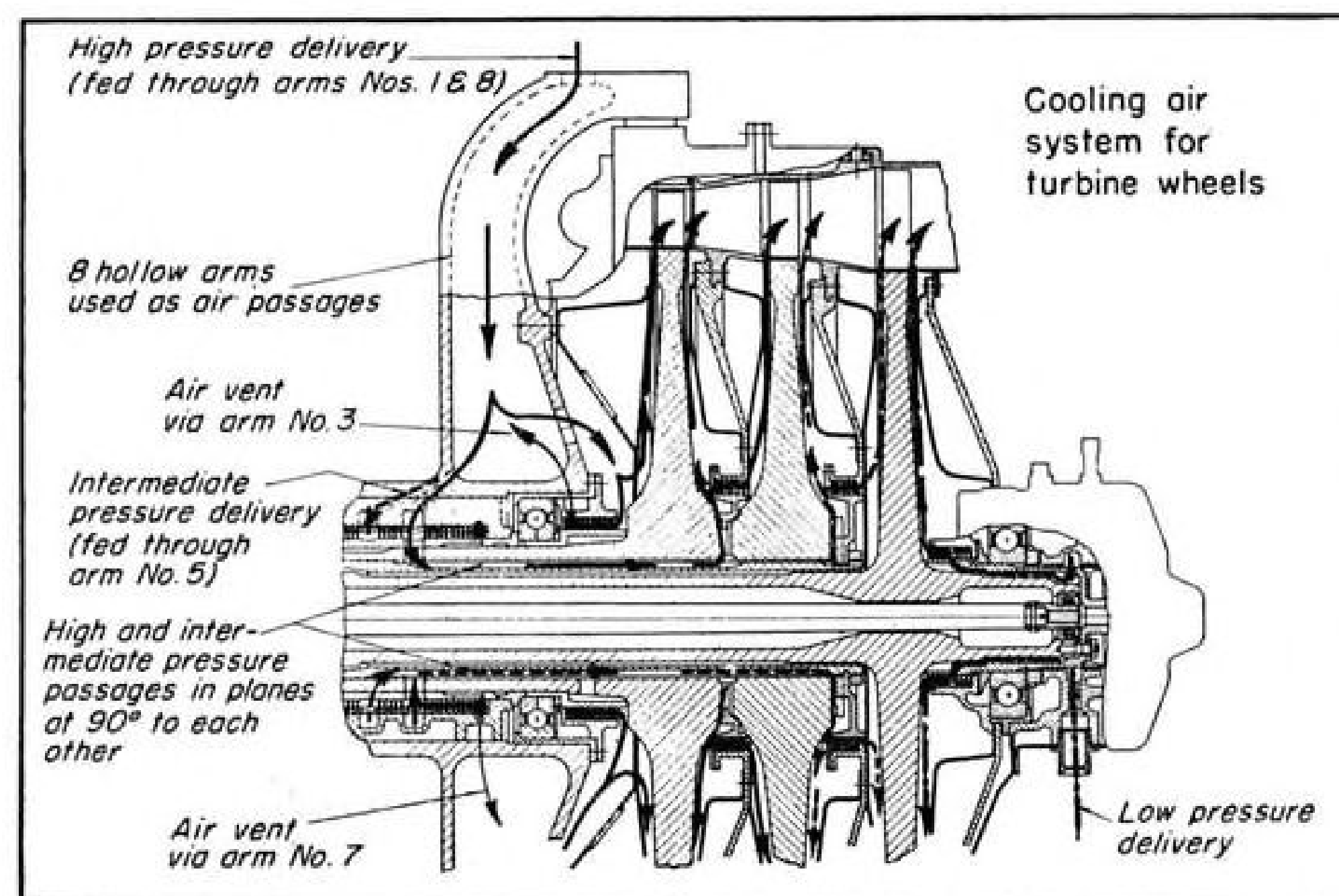
At sea level static conditions, maximum power developed is 3200 propeller shp. plus 800 lb. jet thrust. At 35,000 ft. and 350 mph., the engine develops 1260 shp. plus 560 lb. jet thrust.

Specific fuel consumption at sea level is .688 lb./shp./hr. At 35,000 ft. (350 mph.) it is .510 lb./equiv.hp./hr.

►Use—The Proteus is slated for use in the 130-ton Brabazon Mk. 2, 140-ton Saunders Roe Princess flying boat, and later models of the Bristol Type 175 four-engine, medium-range airliners. For the 175, company estimates indicate that the Proteus will give the craft a cruising speed of at least 75 mph. above that of the Constellation.

In both the Brabazon 2 and the Saunders Roe Princess, eight of the engines will be used in two coupled pairs in each wing to drive contrarotating props. In addition, the Princess will carry a single unit on each wing.





## Bristol Proteus

Overall Length (exhaust cone, jet pipe removed)	115.35 in.
Overall diameter	38.5 in.
Bare weight	2900 lb.
Propeller rotation	1.11 tractor
Propeller shaft size	S.B.A.C. Standard No. 6
Output, sea level static	3200 shp. + 800 lb. thrust
at 35,000 ft., 350 mph.	1260 shp. + 560 lb. thrust
Specific fuel consumption	
sea level static	0.688 lb./shp./hr.
at 35,000 ft., 350 mph.	0.510 lb./shp./hr.
Compressor rpm	10,000
Propeller turbine rpm	10,700

► **General Operation**—Air enters the unit at the rear of the compressor, led in by ducts to a plenum chamber. It passes through the axial compressor before entering a single centrifugal stage. From the centrifugal compressor the air flows into combustion chambers fit-

ted closely around the compressor casing to give the unit compactness (38½-in. dia.). Reversal of direction of airflow from forward through the compressor to rearward through the combustion chambers reduces engine length. The hot gases then pass through ducts to the

first row of turbine nozzles.

A feature of the Proteus is the mechanical separation of the compressor and propeller turbines—a "free turbine" arrangement. This is intended to simplify the propeller system and permits use of a much smaller starter motor.

Three turbine stages are used to absorb energy from the gases. First two rotors are coupled and provide the power required to drive the compressor. The third stage turbine is coupled to a shaft passing through the compressor to drive the propeller via an epicyclic reduction gear.

After leaving the turbine, the gases pass to a controllable orifice nozzle where remaining energy provides jet thrust to augment propeller thrust.

► **Compressor**—A high compression ratio is achieved via of a 12-stage axial compressor, followed by a single centrifugal stage, and rotating at a maximum design speed of 10,000 rpm.

Because of the high rotational speed, compressor rotor is of disk construction. Each of the 12 disks supports a single rotor stage. At either end they are bolted to hollow steel shafts, the entire assembly being held together by 8 long, high-tensile bolts passing through the 12 stages.

These bolts are not subjected to shear stress since the torque is transmitted from one disk to the next via dowels in the face of each.

Compressor blades are low camber, high speed sections. Disks and blades are light alloy and the latter are anodized. Rotor blades have "fir tree" roots, fit into axial grooves in the rotor, and are kept at correct spacing by distance pieces. Stator blades fit into circumferential grooves of dovetail section in the compressor casing and are held in position by bolted metal strips.

Holes between the roots of the stator blades permit air bleeding, at certain stages, for cooling purposes. Compressor casing is cast in halves, bolted together.

On leaving the axial compressor, air passes through an annular duct in the intermediate casing before it enters the centrifugal stage. Eight guide vanes in this duct hold the center section housing two ball bearings which support the front end of the compressor shaft.

Because of the temperature rise in the axial compressor under maximum rpm. conditions, and the high rotational speed, the double-shrouded centrifugal impeller is of steel. It is bolted to a short shaft running in a roller bearing, and is fitted on either side by labyrinth seals to prevent air passing to the intermediate casing or the gear casing.

► **Combustion Chambers**—These are somewhat longer than in previous designs to insure that the hot gases are thoroughly mixed and at an even tem-

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perature before entering the turbine.

From the diffuser casing, compressed air flows to the eight combustion chambers fitted round the compressor casing. These are of conventional design, with centrally placed burner at the upstream end of the chamber.

Air is led in through a small swirl casing, followed by the primary and secondary air holes in the liner walls. Swirl is imparted to the fuel prior to atomization and to the incoming air, to ensure good mixing and a centrally burning flame. Two ignitor plugs are used and combustion chambers are interconnected for flame propagation.

Plugs in the outer casing hold the liners in position, while the liner down-

stream end has a spacer ring free to slide in the outer casing.

The liner is made from Nimonic 75, outer casing from mild steel sheet sprayed with aluminum.

► **Turbine**—Turbine wheels are heat-resistant stainless steel carrying Nimonic-80 blades. Turbine nozzles are also of this material and are cast in segments containing three to seven blades, varying with the stage. Segments are bolted to diaphragms between the turbine wheels.

Because of the high pressure drop through the turbine, the annular area between the entrance and exit of the second and third stage nozzles increases considerably. This calls for fairly long

sections for the stator blades so that expansion is not too rapid.

First turbine wheel has an integral short shaft carrying a toothed coupling. This rotor and the second stage rotor have radial serrations on adjoining faces, and are clamped together by a sleeve passing through their bores. The short extension shaft runs in two bearings located by the turbine mounting spider. Rear one is a ball bearing taking the thrust from the turbine.

The drive shaft couples on to the compressor shaft via engaging gear teeth, so that the compressor and turbine sections can be assembled separately and coupled later. This allows the two components to expand axially, independently of each other.

As the exhaust gases become cooler through the stages, greater stresses can be withstood in the turbine components, and advantage is taken of this in the third stage to run the propeller turbine wheel at slightly higher rpm.—10,700 at maximum speed compared with 10,000 rpm. of the compressor. Thrust from this disk is taken up on a ball bearing in the rear casing, while forward end of the shaft couples to the propeller shaft in a manner similar to that for the compressor assembly.

► **Reduction Gear**—A high ratio reduction gear brings the propeller turbine speed to a suitable value for efficient propeller operation. Gear ratio is 11.1:1 or 11.9:1, and is accomplished by a compound epicyclic train.

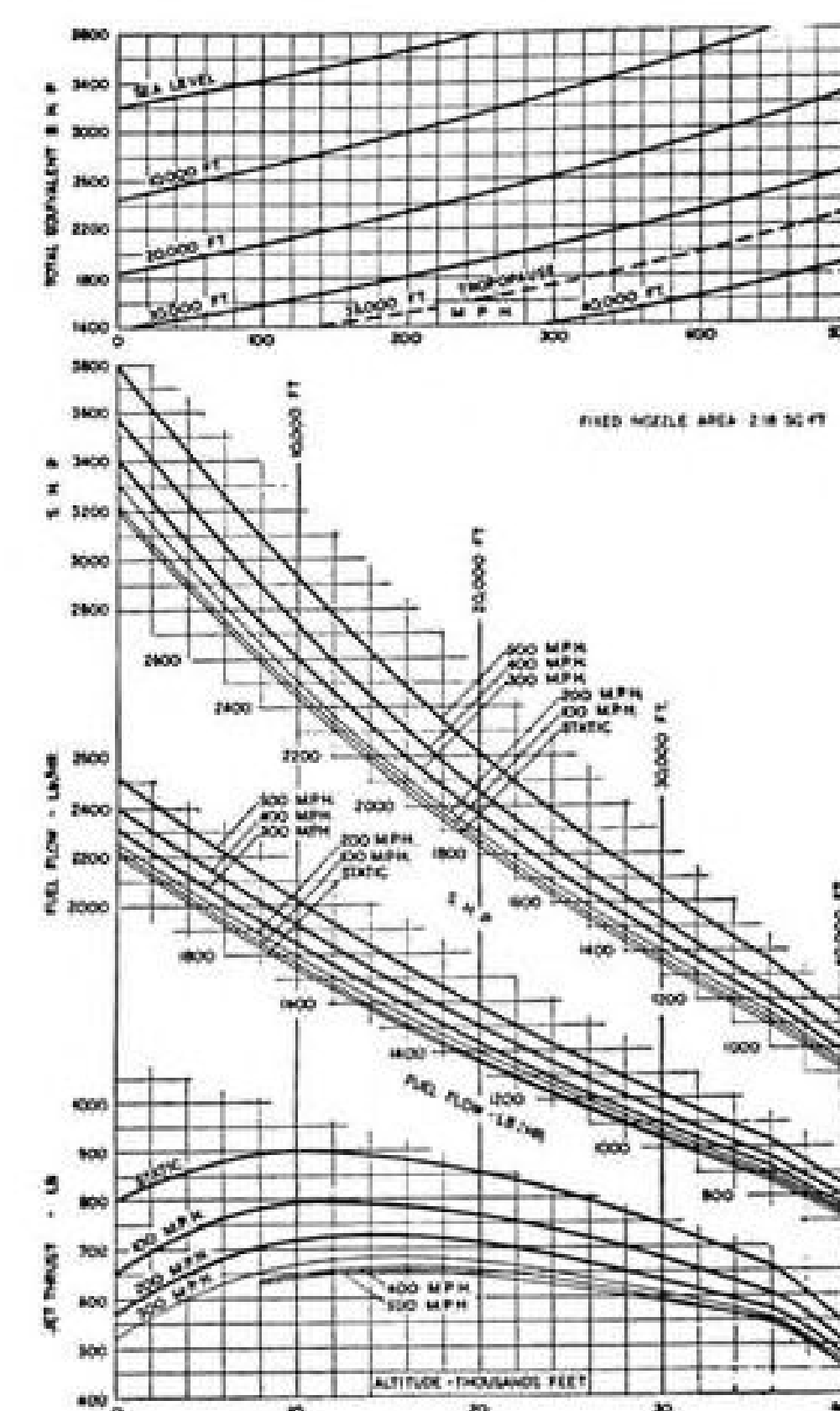
Power is supplied to a sun wheel, which drives four planet wheels. Smaller planet gears on the four planetary axes rotate against a fixed gear. These planet gears are enclosed in a casing which rotates with them. The casing bolts to the propeller shaft.

Load on the fixed gear is balanced by a torque meter consisting of eight pistons in cylinders containing oil under pressure. From this pressure, power applied to the prop can be measured, providing a reliable indication of turbine performance.

The gearing is supported at its front end by a ball bearing on the propeller shaft, and at the rear by a roller bearing.

► **Starter and Accessory Drives**—Two starter motors are located at the top of the gear casing, inclined 100 deg. to each other (see accompanying sketch). These drive a bevel gear A connected to spur gear B through a dog clutch. Gear B engages with C splined to compressor rotor shaft.

Gear C also forms the connecting link between the compressor shaft and the drive to the fuel and oil pumps. Spur gear D meshing with C drives the oil pumps through a set of bevel gears below the prop shaft. Oil pump and sump are in the bottom of the gear casing.



Performance curves, ICAN conditions. Compressor rpm. 10,000 (5 min. limit).

Fuel pump, just above the centerline on the casing side, is also driven from gear D through gear E and bevel gears F. Provision is also made for another fuel pump or other accessory drive on the opposite side of the casing.

► **Fuel and Oil Systems**—Main oil pump, below the forward gear casing, delivers oil at 650 psi. to the prop pitch control mechanism and to a reducing valve. The pitch control is operated by a floating piston whose position is controlled by oil from a differential pump, with a manual override for feathering or braking.

The reducing valve delivers oil at 80 psi. to three outlets. One supplies oil to the differential pump and to the reduction gear, where it simply acts as a lubricant. Second outlet feeds the dynamometer pump, while the third outlet delivers oil to a second valve where pressure is reduced to 30 psi., then feeding to a metering pump.

The metering pump delivers a predetermined flow directly to six sets of bearings and indirectly to two bearings. Oil is drained from these bearings and bottom of the reduction gear casing to the sump, then returned to the tank via filter, scavenge pump and oil cooler.

Fuel pump is a variable displacement type, and supplies at a pressure of 750 psi.

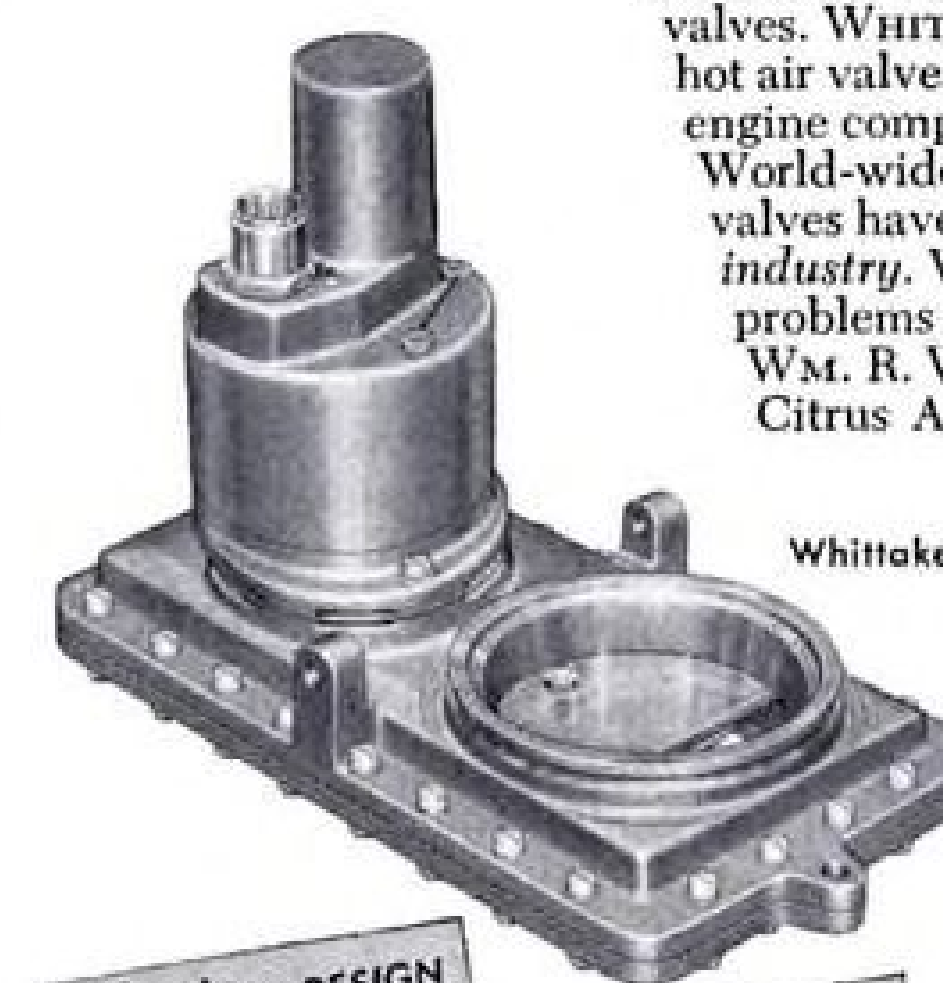
Pilot's control consists of a cock in the high pressure supply line to the engine.

► **Differential Pump**—This is used to maintain a constant ratio between rpm. of compressor and propeller turbine.



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Both the pump casing and the driving wheel of the gearing rotate. Speed of rotation of the pump casing is governed by a drive from the compressor, while the gear wheel is driven from the propeller turbine shaft. If the compressor and turbine are running at correct ratio, there will be no relative movement between the pump and the driving gear.

However, if the ratio deviates from the correct value, the driving gear will rotate relative to the casing and, in turn, cause an idling gear to rotate. If the turbine speed is too high, oil is directed from the differential pump to one side of the control valve, increasing the propeller pitch and so restoring the turbine speed. If the turbine speed is too low, the differential pump works in the reverse direction and the propeller pitch becomes finer.

► **Cooling System**—Turbine wheels are cooled by a flow of air obtained from the tapping off the compressor at various stages. For the first stage turbine, where the exhaust gases are at high pressure, air is taken off from the volute casing after having passed through the axial compressor. It is led through a pipe to two of the spider arms of the supporting casing. Passing down the hollow arm it separates into either diaphragm annulus supporting the first stage rotors or through a passage into an air ring between two labyrinth seals surrounding the turbine shaft.

The first section flows through holes in the diaphragm and up the front face of the turbine wheel into the stream of hot gases. Second section passes along grooves through the root of the turbine wheel and out between the first and second wheels. It can then either flow behind the first stage turbine to cool its rear face, or through a specially designed labyrinth seal to cool the forward face of the second wheel. Hence, this source of supply cools three of the six turbine faces.

Another air supply is tapped off between the roots of the seventh stage stators and is piped to another spider arm. It passes through drilled holes to a second air ring in the labyrinth seal, situated forward of the high pressure air ring.

From here another set of grooves allows the air to pass through the roots of the first and second wheels so that it reaches the space between the second and third turbine wheels. Part of the air now flows up and cools the rear face of the second wheel while the remainder filters through the labyrinth seal and cools the forward face of the propeller turbine wheel.

Rear face of the propeller turbine wheel is cooled by a further supply of air tapped from the fifth stage of the compressor. This is led to a pipe at the rear of the turbine bearing and flows up the rear face.

In addition to cooling the turbine wheels, the air acts as a seal between the blade roots and the nozzles, to prevent escape of the hot gases. Passages and tappings from the compressor are so arranged that air reaches the blade roots at a pressure slightly higher than the hot gases at that particular stage.

► **Turbine Mounting, Suspension**—Turbine is mounted from a ring near the rear of the compressor casing. This arrangement has been designed to suit either a monocoque or conventional supporting structure.

A sheet-metal cylindrical sheath bolts firmly to this ring, encloses the compressor casing and supports forward end of compressor and the gear casing. Rear end of the compressor is suspended from the main support by eight hinges and trunnions, allowing for both radial and axial expansion.

Turbine section is mounted from a faired structure bolted to the compressor casing. This supports the turbine casing by pins passing through the arms of the spider casing carrying the compressor-turbine bearings.

## Commonwealth CA-22 Designed in Australia

The Royal Australian Air Force has awarded a contract to build two prototypes of an Australian-designed basic trainer, the CA-22, to the Commonwealth Aircraft Corp., Melbourne.

The new trainer, a low-wing, single-engine craft of all-metal construction, reportedly is designed with an eye on reducing maintenance problems and costs to a minimum. While it is to be primarily an Australian product, it will be powered by an American-made Pratt & Whitney Wasp Jr. radial engine which develops 445 hp. at takeoff.

► **Three-Seater**—Built to afford maximum crash protection to occupants, the CA-22 will have a rugged, tubular-truss fuselage constructed to minimize impact forces around the cockpit. Instructor and student will sit side-by-side in the front seats. Rear seat is to accommodate a third person and the baggage compartment aft of this is said to be roomy enough for a fourth passenger.

The cockpit will have a jettisonable canopy equipped with retractable amber screens for synthetic night or instrument flying instruction. Students, wearing blue goggles, will have restricted vision to simulate night flying conditions, while the instructor will be able to see clearly. A VHF radio set is to be located behind the rear seat to provide air-to-ground, aircraft-to-aircraft and crew intercommunications.

Some construction details on the new plane:

• Wing will be in three units with

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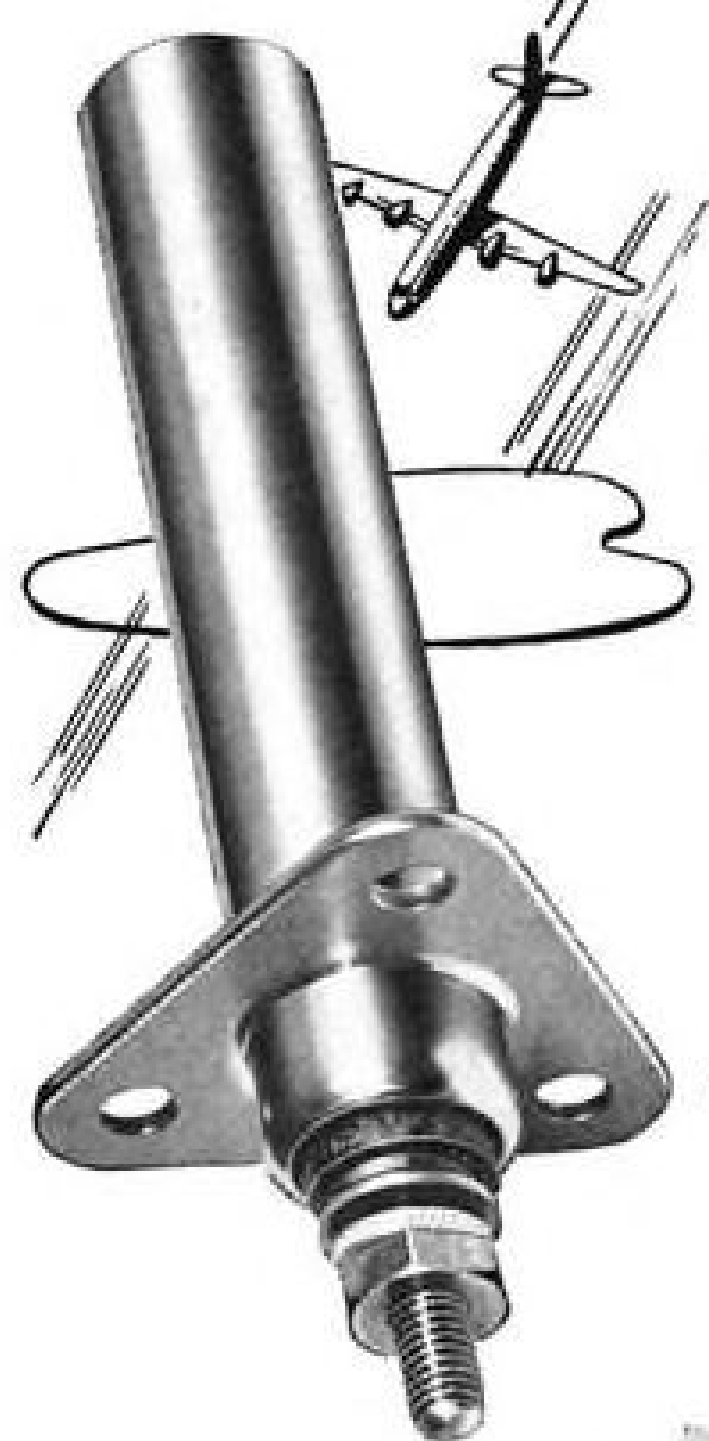


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center section carrying split flaps. Outer wings are to be angle-bolted to the center section and have full, trailing-edge flaps and fabric-covered ailerons.

- Conventional tail assembly will have fabric-covered control surfaces with cockpit trim for rudder, elevator.

- Bag-type, 78-gal. fuel tank with submerged booster pump will be housed in the center section. A fixed belly tank which feeds directly into main tank can be attached to underside of center section.

- Nine-cylinder, Wasp Jr. engine will be quickly removable with 10-gal oil tank, flexibly mounted oil cooler and other accessories as complete power egg. Access to the engine will be gained through cowl which is conveniently hinged at the firewall.

- Fixed landing gear is to have long stroke, oleo pneumatic struts and hydraulic, single disc brakes. Provisions have been made in the center section for installation of retractable gear if required. Tail wheel is to be coupled to rudder controls but may be disconnected to freely castor by moving control stick forward.

Available specifications on the new trainer are: Span, 38 ft. 9 in.; length, 28 ft. 10½ in.; height, 8 ft. 3 in.; gross wing area, 250 sq. ft.; wheel track, 10 ft.; maximum gross weight, 3660 lb.; wing loading, 14.7 lb./sq. ft.; power loading at takeoff, 8.2 lb./hp.; takeoff power at sea level, 445 hp. @ 2300 rpm.; maximum cruising power at 5000 ft., 283 hp. @ 2000 rpm.

## Firestone Produces Rubber for Arctic

Development of a synthetic rubber polymer that will bounce instead of shatter at -75 F. has been announced by the Firestone Tire and Rubber Co., Akron, Ohio.

The ability of the new rubber to remain resilient at low temperatures may help solve many problems connected with operation of machinery, motor vehicles and aircraft in Arctic regions, according to the company. It points out that rubber tires, hose, gaskets and belting previously have frozen hard as rock at -60 F.

Tires made with the new polymer rubber, however, do not stiffen or develop permanent flat spots when parked, and treads don't harden and chip out, even at -75 F.

Firestone's research staff has been conducting resiliency, elasticity, flex fatigue and mileage tests on various types of Arctic rubbers under contract with the U. S. Army's Ordnance Department. Additional research and test programs are being made in collaboration with the Office of Rubber Reserve.

## Evaluation of New Stiffener Form

Curved web Y-section configuration evolved as high efficiency panel member in series of NACA tests.

By Robert McLarren

It has long been held that there are two infallible clues to an airplane's genealogy: shape of its vertical tail surface and the stiffener form used in its structure.

These two design habits have characterized most of the airplanes produced by companies, design groups or even individual designers the world over and suggest that they are selected by individual preference, even though weighty technical reports can be produced to justify these forms.

Question of whether these forms had a substantial effect on the performance of the airplane on which they appeared is a point that may be long debated, but the fact is becoming increasingly clear that artistry and opinion have lost their grip on the Preliminary Design Group in favor of mathematically-derived curves and shapes.

This change marks the passing of the old-time "designer" of vaunted individual reputation and in his stead there are now batteries of specialists, calculating machines nearby, that perform the startling complex and manifold functions involved in the design of a modern airplane.

And their common watchword is "most efficient this-or-that" for it is the degree to which they approach this goal that determines the success or failure of the design.

► **Efficiency Considerations**—"Most efficient structure" has been a design goal since the advent of stressed-skin construction but it has always suffered from a wide variety of definitions that cost it its apparent value as an index.

Comparisons of two different aircraft structures on the basis of "percent structural weight" (of gross) is unrealistic unless account is taken of variations in design load factors, allowable stresses used and a variety of such factors as maintenance, production costs, etc.

Although the familiar strength/weight ratio is not a wholly satisfactory criterion for comparison of various structural elements, it has gained wide usage because of its simplicity.

One of the basic problems in aircraft structure is the design of wing compression panels of minimum weight. Obviously, the higher the working stresses, the lighter the weight of the structure. Working stresses are determined by the distribution of material between skin and stiffeners, and

the ideal panel is obtained when instability of the skin occurs simultaneously with primary and secondary instability of the stringers.

► **Equations**—This relationship is defined in Reference 1 in terms of panel geometry by three equations—

The first:  $\sigma_a = P/t_e$  (in which  $P$  is actual design load;  $t_e$ , area of the panel per inch of panel) gives the actual average stress,  $\sigma_a$ .

The second:  $\sigma_e = \pi^2 E \eta / (L/\rho)^2$  (in which  $E$  is modulus of elasticity;  $\eta$ , coefficient of effective modulus of elasticity;  $L$ , length of the panel; and  $\rho$ , radius of gyration) is a form of Euler's equations giving the stability of the panel as a whole.

The third:  $\sigma_c = KE \eta (t/b)^2$  (in which  $K$  is crippling constant;  $t$ , thickness; and  $b$ , unsupported width) provides a plate allowable stress for the crippling stress producing large deformations that destroy the form of the cross section and result in destruction of the panel. The ideal panel is obtained when  $\sigma_a = \sigma_e = \sigma_c$ .

Ref. 2 combines these equations and introduces the concept of "panel efficiency" in the following equation:  $\sigma = c(ENx/L')^{\frac{1}{3}}$  (in which  $\sigma$  is average stress;  $Nx$ , loading per chordwise inch;  $L'$ , effective rib spacing including end fixity coefficient; and  $c$ , a measure

of stringer panel efficiency.

By comparing values of this coefficient for various stringer shapes, the most efficient panel design can be readily determined.

It follows from the preceding equations that the coefficient  $c$  has its highest value when the crippling stress and the radius of gyration of the stringer are highest and when the stringer spacing is close.

The stringer must have both high column strength and high local buckling strength and these requirements immediately suggest a stiffener in the shape of a "Y" or "Z" as shown in Fig. 1.

► **Stiffeners Compared**—To determine the relative efficiencies of the two forms, the National Advisory Committee for Aeronautics has conducted a series of tests in panels made up of six stiffeners and five bays erected flat-ended in a hydraulic testing machine.

Results of these studies in both 24S-T and 75S-T showed a general advantage in efficiency for the Y-stiffened panels. However, a more effective method of comparison of the two stiffener forms is the design of two panels to meet the same conditions, thus permitting consideration of such factors as number of rivet lines, space required for the stiffeners and the distance from the mold line to the axis of the center-of-gravity of the panel.

A series of tests was carried out in this manner and indicated that the Y-stiffened panel produced higher average stresses at failure than did the Z-stiffened panel, indicating that less weight would be required for the former panel, as shown in Fig. 2. However, the latter requires more space inside the wing and closer rivet spacing.

During the course of the tests, several general trends were indicated by the designs. For given values of load per inch of panel width and the parameter  $L/\sqrt{c}$  (in which  $L$  is length of panel; and  $c$ , coefficient of end fixity as used in Euler column formula):

- Weight of the panel generally increases with an increase in sheet thickness, but the lightest panel is often obtained not at the thinnest sheet gage at which a design can be achieved but with the sheet one or two gages thicker than the minimum.

- Stress for local buckling of the sheet generally decreases with an increase in sheet thickness, but the maximum value of the stress for local buckling of the sheet is often obtained not at the thinnest sheet gage at which a design can be achieved but with the sheet one or two gages thicker than the minimum.

- Average spacing of rivet lines increases (fewer rivets required) with an

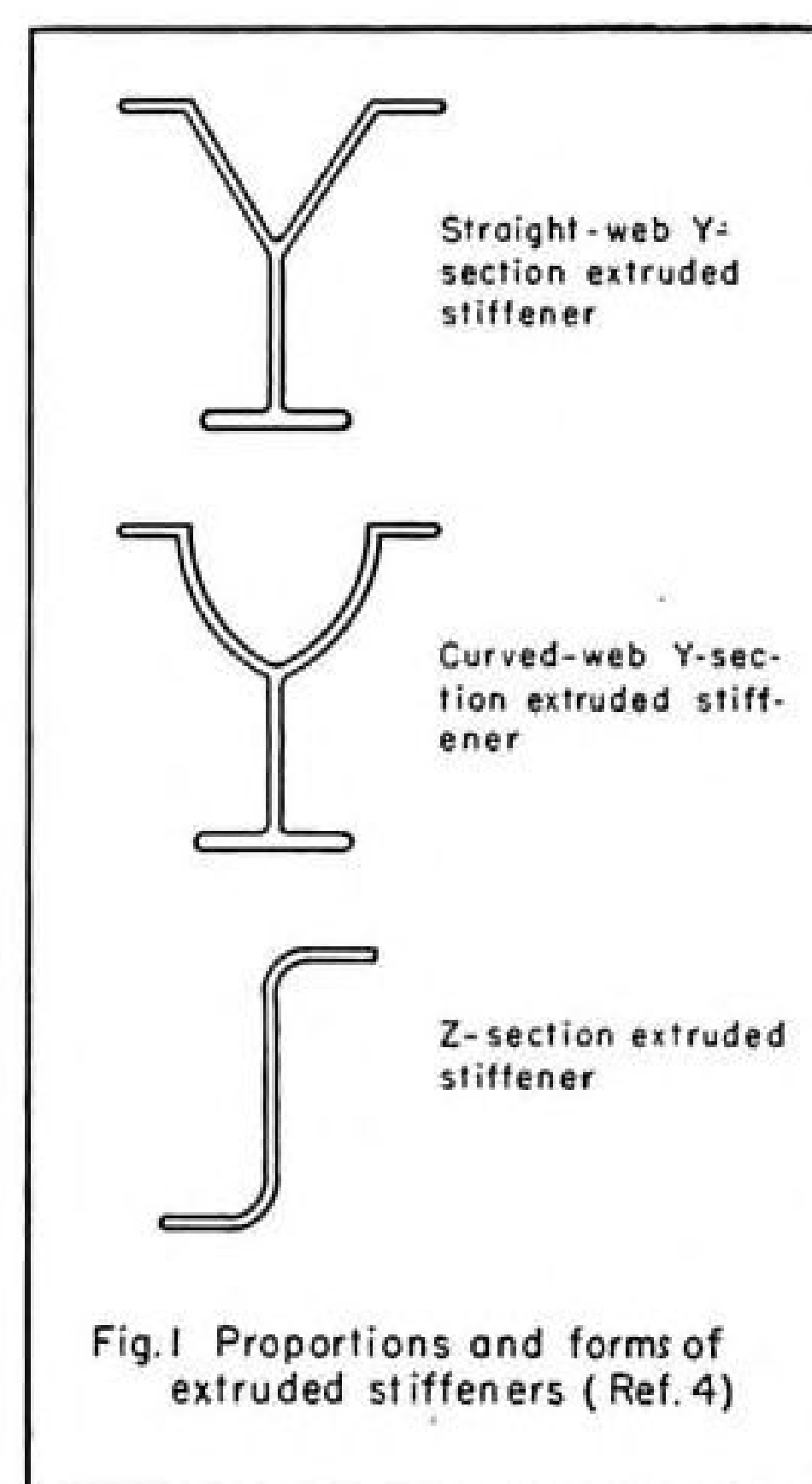


Fig. 1 Proportions and forms of extruded stiffeners (Ref. 4)



increase in sheet thickness.

- Distance from the mold line to the axis of the panel's C. G., decrease in which tends to decrease the effectiveness of the panel to resist bending of the wing, generally decreases with an increase in sheet thickness.

For given values of load per inch of panel width and sheet thickness:

- Weight of panel increases with an increase in the value of  $L/\sqrt{c}$ .
- Stress for local buckling of the sheet generally decreases with an increase in the value of  $L/\sqrt{c}$ , except at the heavy sheet thicknesses.

- Height of the stiffeners increase with an increase in the value of  $L/\sqrt{c}$ .

- Average spacing of rivet lines generally increases with an increase in the value of  $L/\sqrt{c}$ , except at the heavy sheet thicknesses.

- Distance from the mold line to the axis of the panel's C. G., generally increases with an increase in the value of  $L/\sqrt{c}$ .

- Radius of gyration increases with an increase in the value of  $L/\sqrt{c}$ , but this does not necessarily increase the effectiveness of the panel to resist local air loads.

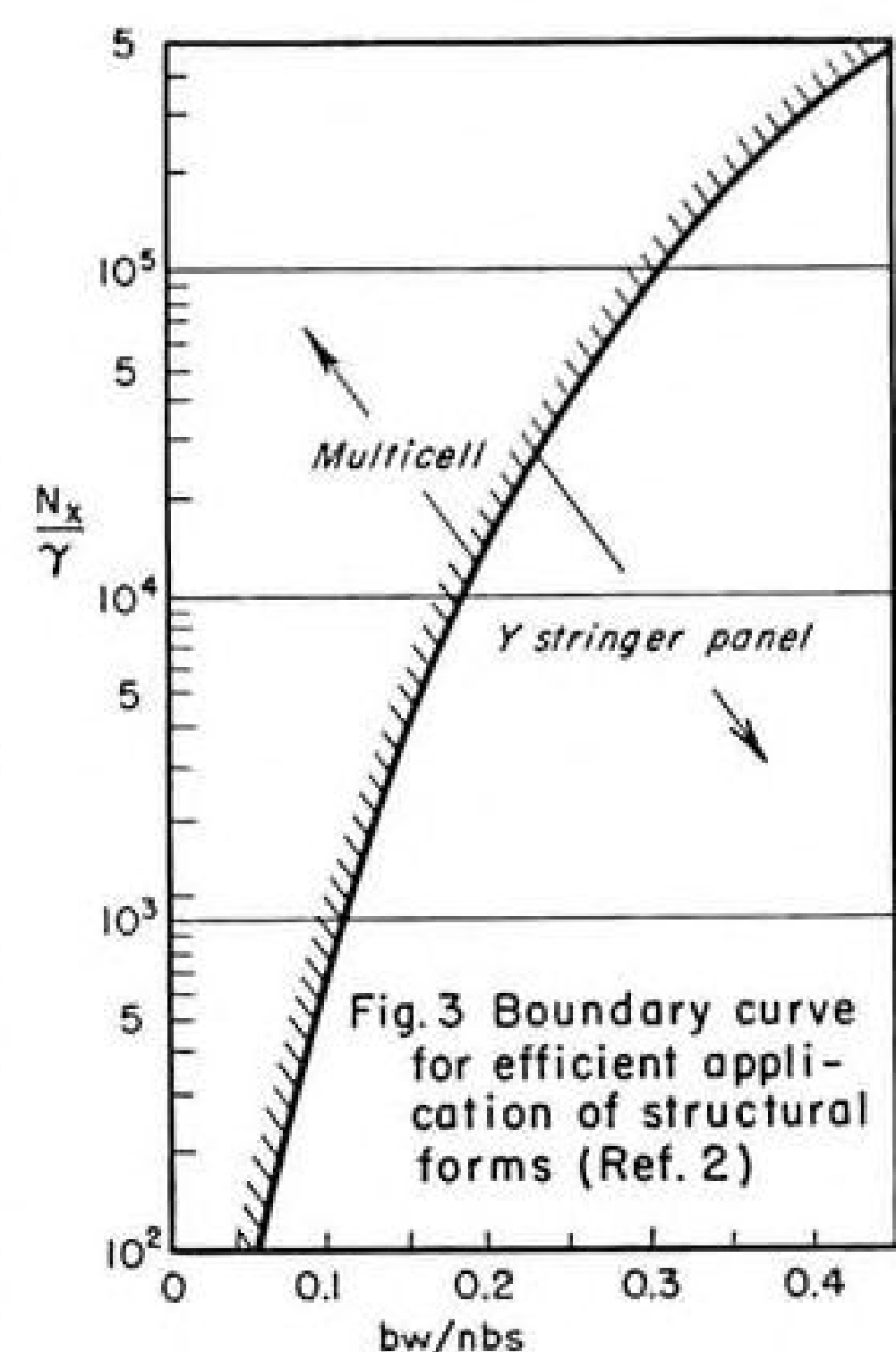
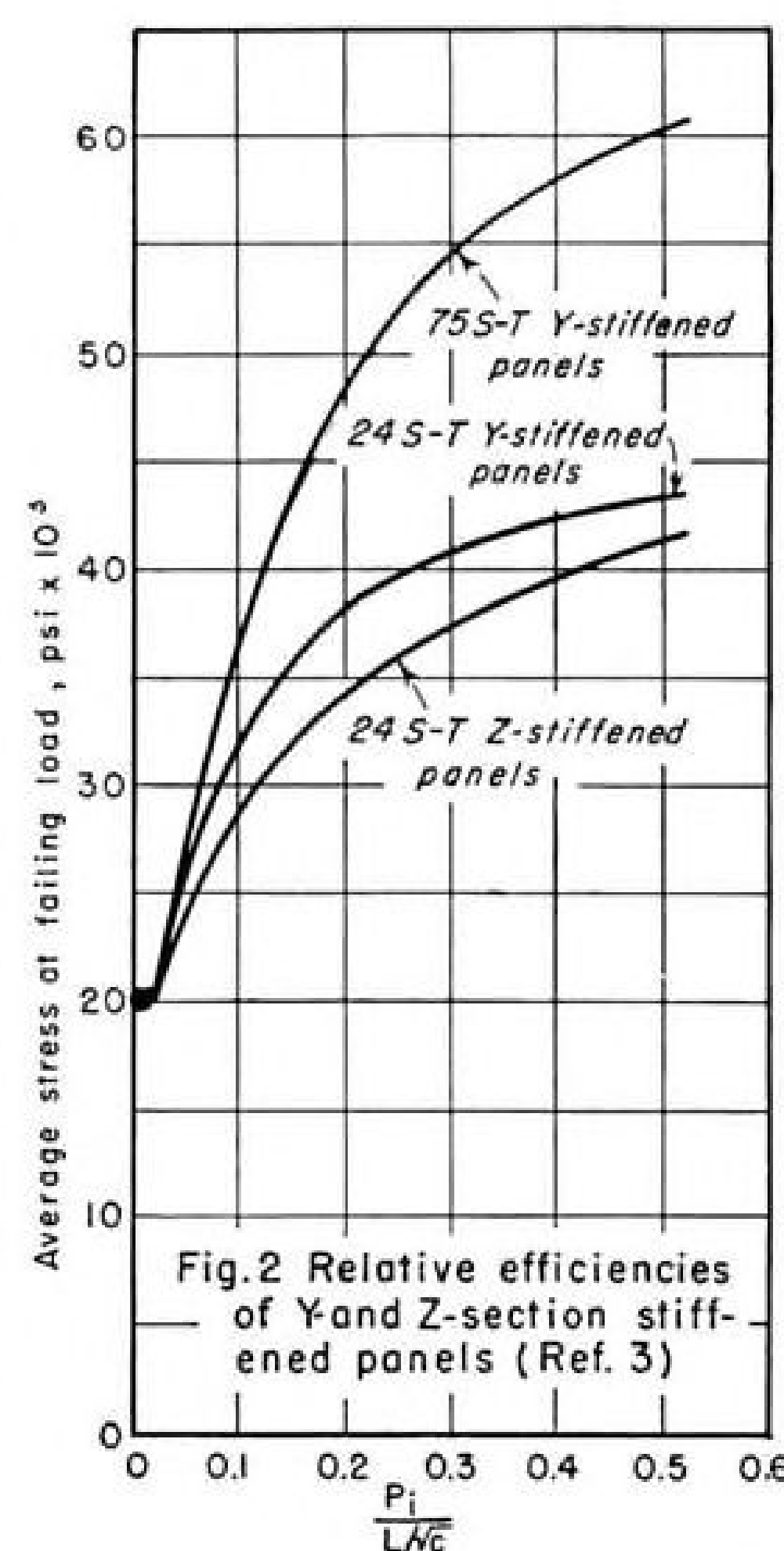
► **Curvature Effect**—One of the ways in which the local buckling strength of the Y-section form might be improved even further is by use of curvature in the webs of the section. To investigate this possibility, the NACA tested 48 panels having curved-web Y-section stiffeners.<sup>4</sup> The panels and method of tests were identical to those used in Ref. 3.

These tests showed the curved-web sections had a higher average stress at failure than did the corresponding straight-web Y-section panels.

Because there are two structural efficiency requirements for panel stiffeners, namely, high column strength and high local buckling strength, the tests were divided further into two sets of panels, one set of such length that failure is primarily by column bending, and a second set of shorter length such that failure would be, at least in part, associated with local buckling.

Curving of the webs of the Y-form of stiffener adds material near the axis of the C. G., thereby decreasing the efficiency of the panel as a column but, at the same time, increasing its efficiency from the standpoint of local buckling. Hence, it was recognized that web curvature can be expected to have either an adverse or beneficial effect upon the structural efficiency depending upon the length of the panel in which the stiffener is used.

Results of the tests confirmed these conclusions and showed that in the high-stress region in which failure is at least in part associated with local



buckling, panels having curved-web Y-section stiffeners have higher structural efficiencies than panels having straight-web Y-stiffeners.

These higher structural efficiencies were evidenced by higher average stresses at failure, smaller stiffener heights, or wider average spacing of rivet lines, in various combinations, depending on the design requirements.

► **Application Range**—Having deter-

mined the most efficient compression panel stringer design, it is of interest to consider the possible future range of application of stringer-stiffened panels.

The combination of increasing loadings and decreasing wing thicknesses, apparent from high-speed aircraft design trends, points towards ultimate elimination of stringers in favor of solid webs. The question now of concern to structures engineers is the exact combination of these factors at which this transition should occur, while maintaining minimum weight design.

A study of this problem<sup>2</sup> develops the following equation:  $N_x/\gamma = \bar{c}^2 \bar{\phi}^2 E$  (in which  $\gamma$  and  $\bar{\phi}$  are complex expressions undefined here other than to note that both are functions of the geometry of the structure)

A plot of this expression for various values of wing thickness/structural chord length is shown in Fig. 3 and establishes at least a tentative parameter for the determination of the boundaries of the problem.

It will be noted that since both  $\bar{c}$  and  $\bar{\phi}$  are terms of the sixth order, slight changes in either will profoundly affect the location of the boundary curve. The stringer panel efficiency term,  $\bar{c}$ , varies directly with variations in optimum panel dimensions, so that it is apparent that any deviation from the ideal combination of stiffener spacing, rivet pitch, sheet gage, etc., would shift the boundary curve considerably.

Similarly, the  $\bar{\phi}$  term is a function of the number of webs and structural chord thickness ratio, variations in which would produce substantial variations in the position of the boundary curve.

However, Fig. 3 indicates clearly that the stringer panel form is the most efficient up to very high loadings or very low wing thicknesses and that a wide range of application of the curved-web Y-section stiffener form exists.

But it should be emphasized that the foregoing has been concerned primarily with minimum weight design and that many structural designs may be determined on the basis of a variety of other primary considerations with minimum weight only of secondary importance.

Manufacturing considerations may require increases in rivet pitch and/or stringer spacing, a decrease in the number of webs used, etc.

Aerodynamic considerations may dictate an extremely thin wing, and aeroelastic considerations may demand greater torsional stiffness than is naturally present in the structure.

Such designs will require modifica-

tion of these data presented here, but their availability will permit the designer to "lean towards" the minimum weight relationships resulting in a more efficient structure than would otherwise be obtained.

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## Material Developed For Jet, Rocket Use

A metallic compound for jet and rocket engines, reportedly capable of withstanding temperatures up to 3000 F. has been developed by American Metals Corp., Yankers, N. Y., for the Navy.

Having survived higher temperature blasts than any other substance in recent tests by the Navy, the new compound may prove to be one answer to the stubborn problem of finding materials strong enough to stand up to the intense heat generated by turbine and rocket powerplants.

The compound contains zirconium and boron, and the Navy is planning further extensive test for it. If it proves capable of withstanding high operating temperatures while simultaneously handling stresses of 50,000-75,000 psi., considerable design data showing the benefits to be derived through use of higher compression ratios and combustion heat release can be practically applied.

## "Noiseless" Room

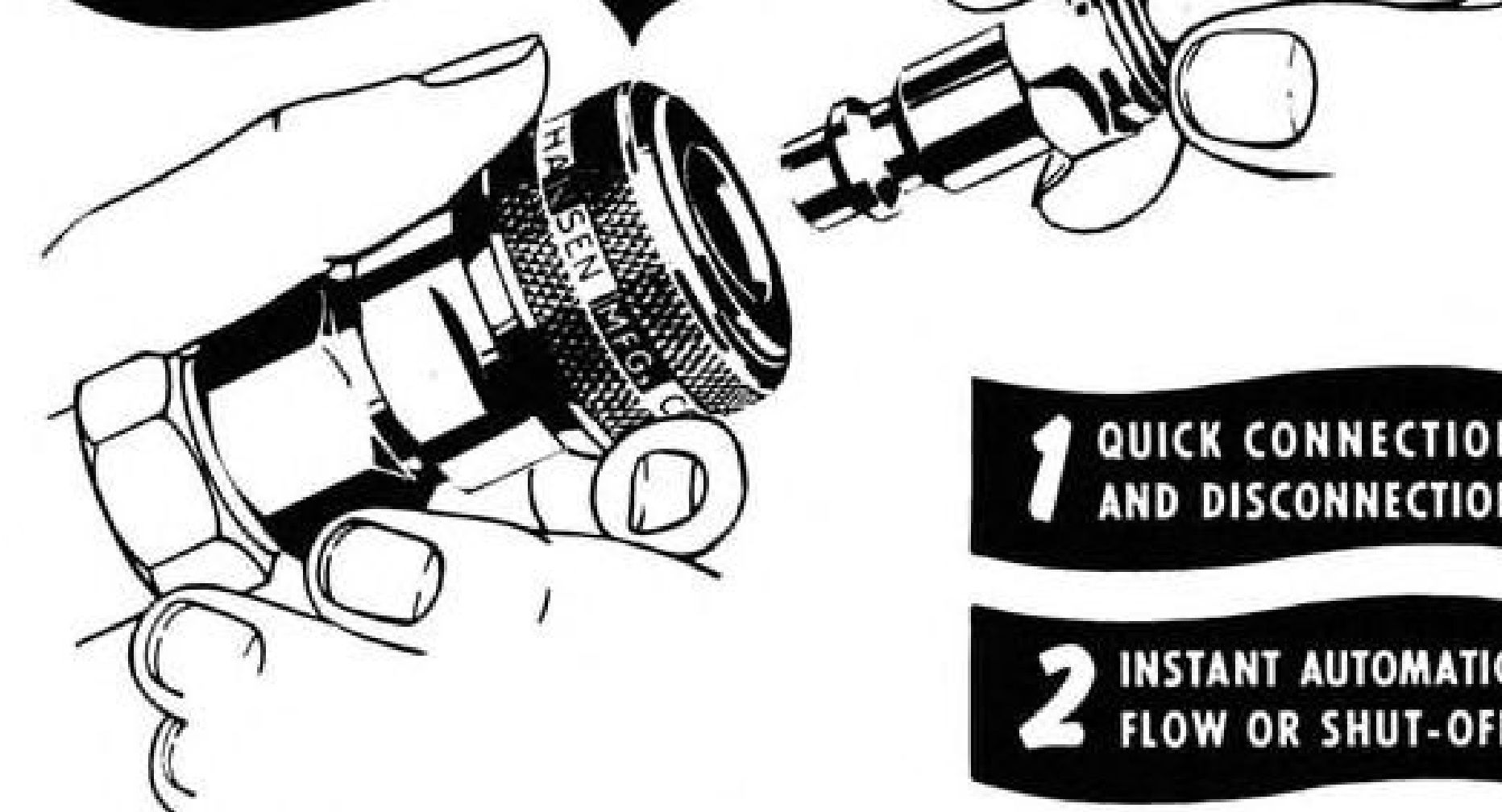
An anechoic (no echo) chamber that produces "absolute" stillness has been developed by engineers of the Army Signal Corp. The new chamber will make it possible to determine the operational accuracy of microphones, headsets and other equipment.

"Soundproofed" rooms previously used, have proved unreliable because variations, such as the reflection of a sound from a wall, have introduced false readings on indicators.

With the anechoic room, noises can be measured carefully, enabling engineers to devise means of effectively reducing sound values.

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## MUDDLING in High Places

It is time for men in Washington and London to stop toying with the problem of international trade. We of the democratic West are at a turning point in our economic affairs. A false step by either the United States or Britain could lead quickly to disintegration of trading between the people of the world as we have known it for the past hundred years. Recent meetings of diplomats in London and Washington have not lifted us out of this danger.

By two simple tests you and I can measure the sincerity of the men in Washington and in London who are trying to solve what they call "the dollar crisis."

**One test applies to the British: Is Britain making an honest effort to re-establish itself as a real competitor in world markets?**

**The other test applies to us in the United States: Are we willing to see Britain re-emerge as a strong competitor in world markets—even in our own home market—and to help her do so?**

**Today, even though both countries have faced the devaluation test, the answer to these questions probably is no.**

I

The situation we face is, in fact, unprecedented. In every important industrial country of the non-Communist world, except Germany and Japan, production is above prewar volume, thanks largely to the Marshall Plan. Yet trade between nations is shackled as it has never been since the 18th century. And the shackles grow day by day. What is worse, two distinct trading areas—the dollar area and the

sterling area—have grown up in the non-Communist world, and the gulf between them grows wider.

What kind of leadership have the United States and Britain had in the face of this crisis? President Truman late in August wisely checked the trans-Atlantic bickering over the dollar crisis. *But Mr. Truman showed no awareness of the basic question that the American people must soon decide: Is the United States able and willing to generate trade between nations, as Britain did in the 19th century?*

What have British leaders offered us? Foreign Secretary Bevin and Chancellor Cripps called their September visit to Washington "one of the most important missions in history." *But they did not tell the British people, and perhaps do not admit themselves, that their Labor government must change its internal and external policies if Britain is ever to earn its living in a competitive world.*

Admittedly, the problem Britain has faced since 1945 is a colossal one. But, in the face of its grave difficulties, what has Britain done? The working day was shortened. Welfare economics have run riot. High taxes have sapped incentives. Labor and capital have clung to their prewar psychology of cartels and featherbedding. Government controls and government trading have hamstrung private initiative. Nationalization schemes have injected politics into the struggle for industrial recovery.

Thus the policies of the Labor government have made Britain's adjustment to its new position in the world immensely more difficult. But Americans who attribute the danger of an international breakdown to British socialism greatly oversimplify the problem. Virtually every country in the world, socialist or not, faces the same dollar crisis that Britain faces.

*continued on next page*



We Americans must recognize that our economic strength unbalances world trade as does Britain's weakness. World War II increased America's superior power to produce goods. It also made the United States more self-sufficient. Thus, while the world demand for American goods has risen, our demand for foreign goods, except for basic raw materials, has not increased. Today we sell more to every major area of the world than we buy from it — and yet we wonder why there is a dollar crisis.

**It is time for us to recognize that there are two fundamentally conflicting pressures at work in the United States. One is our desire for a big surplus of exports over imports. The other is our desire for a system of free-wheeling trade around the world. We can not have both unless we as taxpayers wish to subsidize our exports. Which do we want?**

Curtis E. Calder, chairman of the International Relations Committee of the National Association of Manufacturers, says, "The battle of the foreign trade gap is essentially that of reconciling our urge to export our surpluses with a reluctance to accept imports in payment for them . . . The dilemma is an uncomfortable one to face."

## II

**Here, then, are the basic questions that confront men in Washington and London. Does Britain really want expanding world trade or a high-cost welfare state? Does the United States really want expanding world trade or a huge surplus of exports? So far politicians in Washington and especially in London have ducked these issues because they are political dynamite.**

If the people of Britain decide they want to regain their position as a competitive trader in expanding world markets, here are specific objectives that men in London should set for themselves:

**1. Lower government costs.** The British Treasury has asked for cuts of 5% in 1950. But a cut nearer 15% will be necessary, even if that means fewer government subsidies and health services. Enterprise will never revive nor costs come down while taxes take 40% of the British national income, including roughly 60% of business profits.

**2. Fewer government controls.** Only by removing controls and allocations (except on a few necessities) can Britain begin to return to prices fixed by competition rather than by government fiat.

**3. Stronger anti-monopoly legislation for both business and labor.** Britain needs a concerted drive

against all forms of restrictive, high-cost practices. This drive should put teeth in the anti-monopoly act and supplement it with legislation to end restrictions imposed by trade unions.

**4. Less restrictive trading practices.** Britain should retreat gradually from its international barter between governments if competition is ever to have free play in international trade.

Meanwhile, if we of the United States sincerely want multilateral world trade, men in Washington must face up to four problems and hammer out workable solutions:

**1. Use of the International Monetary Fund to back a devalued pound.** In time the Fund, in which we have the controlling voice, might be used to promote convertibility of pounds into dollars.

**2. Help for Britain in meeting war-created external debts.** This might mean support for London in getting a reduction of the war debts Britain owes India, Pakistan and Egypt, for example. To achieve such a debt reduction for Britain we might have to underwrite a part of a Southeast Asia recovery program.

**3. Encouragement of American investments abroad.** Such investments should be directed primarily into enterprises which will earn dollars, such as the development of new sources of raw materials, or which will raise productivity abroad.

**4. Our own tariff barriers.** Our attitude toward this critical issue will be the acid test of how deeply we believe in the merits of free world competition.

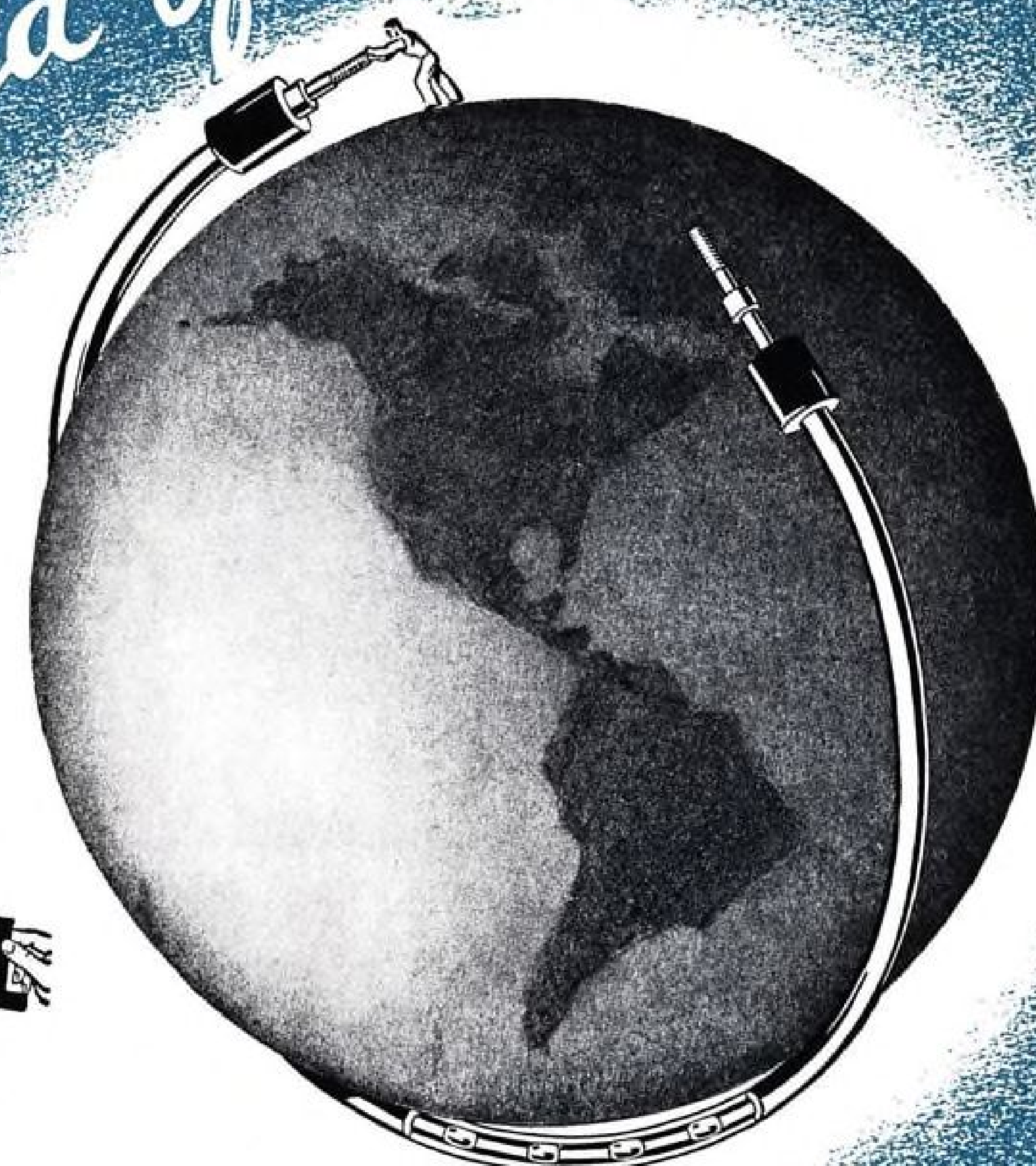
**If we really want free, competitive trading between the people of the world, these issues must be met and resolved by leaders on both sides of the Atlantic. If we do not want to face these issues, then let us resign ourselves to a world walled off into three trading areas: the Communist bloc, the sterling area, and the dollar area. So far, Washington and London have muddled along, except in facing the devaluation problem. Clarity and courage are still needed.**

*James H. McGraw, Jr.*

President, McGraw-Hill Publishing Company, Inc.

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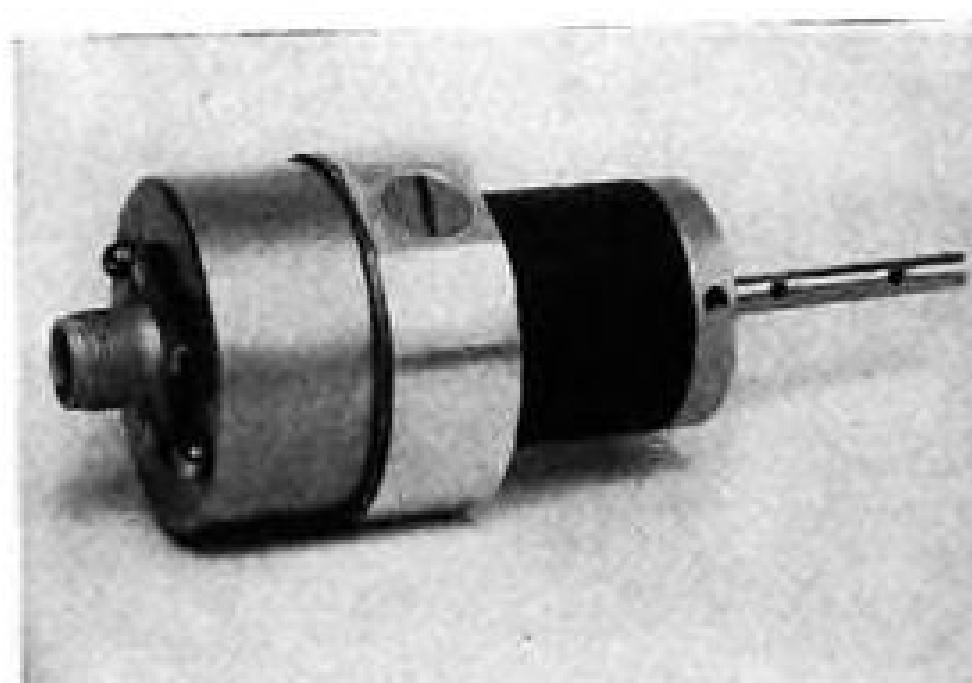
Small, Model 49A, metal cutting band saw, offered by Wells Mfg. Corp., 160 Service Rd., Three Rivers, Mich., is specially designed for use in small shops and for general plant work.

With  $\frac{1}{2} \times .025 \times 60$ -in. blade driven by  $\frac{1}{2}$ -hp. ball bearing motor, machine is capable of cutting  $3\frac{1}{2}$ -in. diameter round pieces and  $3\frac{1}{2} \times 6\frac{1}{2}$ -in. rectangular shapes. V-belt drive provides selective speeds of 54, 100 and 190 fpm. Saw also is equipped with quick action vise and adjustable blade guides. Disk-type idler and drive wheels run on grease-sealed ball bearings; frame and bed are welded steel and mounted on tubular steel legs. Weighing only 118 lb., saw has  $6\frac{1}{2} \times 24$  in. bed area and height to top of bed of 24 in. Floor space covered is  $16\frac{1}{2} \times 38$  in.

### Aircraft Pulley

No-Glo aircraft pulley, offered by the Formica Co., Cincinnati, Ohio, reportedly helps reduce possibility of spreading fires after crashes, because it is totally free of after-glow instant flame is removed.

In company tests, old and new type pulleys were subjected to blow torch until both ignited. After flame was removed, combustion in new unit ceased immediately, while old pulley still was glowing brightly too minutes later.



### Versatile Motor

Originally developed for aircraft actuator use, d.c. motor, made by Bendix Aviation Corp., Red Bank, N. J., can be furnished in wide variety of speed, torque and hp. ratings.

Motor is designed in accordance with specification ANM-40 and is available for operation on voltages from 12-64 d.c. Normally provided with AN connector, it is represented to be completely shielded to eliminate radiated R. F. noise and is equipped with integral filter to suppress conducted noise. Unit is guaranteed to be noise-free from .15-156 ma., through ambient temperature range of -55 to 71 C.

### Strong, Light Hose

Braided rayon, reinforced hose, stated to combine high strength and greater flexibility with light weight, is offered by U. S. Rubber Co., Rockefeller Center, New York 20, N. Y., for handling kerosene, fuel oil, aromatic fuels and other petroleum distillates.

To be marketed as Peerless Fuel Oil Distillate Hose, product has buna N tube and incorporates two stranded, annealed copper wires for dissipation of static. Hose cover is Neoprene to withstand cold temperatures, scuffing and abrasion. Sizes available are 1,  $1\frac{1}{4}$  and  $1\frac{1}{2}$  in.



### Small Blow-Torch

Super Jet blow-torch uses dry fuel in tablet form rather than alcohol or gasoline. Offered by Birk Mfg. Co., Niantic, Conn., lightweight unit is represented to produce temperatures well over 2000 F. and applicable for soldering, annealing or hardening small parts wherever clean, hot flame is needed. Tablets burn about 10 min. They are said to present no hazard in storing.

### Stronger Magnets

Development of two high-strength magnet materials, Alnico 5DG and Alnico 7, by General Electric Co., Pittsfield, Mass., makes possible use of smaller magnets in place of larger units now used in motors, instruments, magnetic separators and other industrial products. Alnico 5DG is said to have highest external and residual induction of any permanent magnet material.

Alnico 7 was developed specifically for applications where high demagnetization forces are present, as in motors, generators and variable air gap devices. Material is stated to have higher coercive force than any other Alnico.

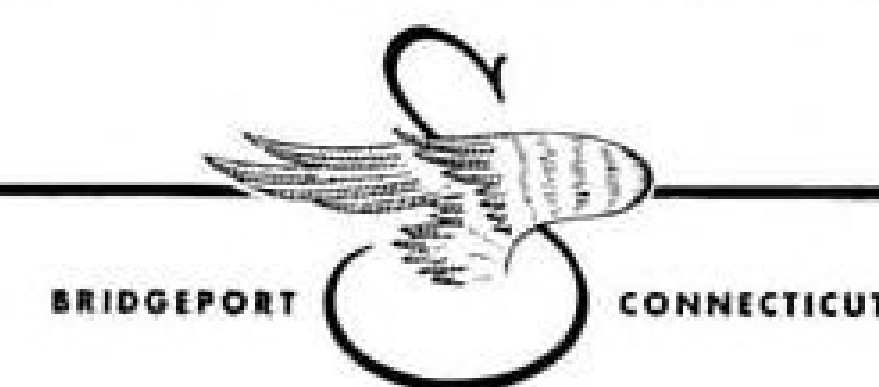


### BRITISH FIRE TRUCK

Picture shows aircraft fire-fighting tender developed by Pyrene Co., Ltd., Brentford, Middlesex, England, described on Page 31 of Aviation Week Oct. 3. Illustration erroneously used with the story was that of an American truck built by Cardox Corp., 307 N. Michigan Ave., Chicago 1, Ill., described in this section Feb. 21.



SIKORSKY AIRCRAFT  
ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION



Ten years ago last month Igor Sikorsky flew for only a few seconds at an altitude of less than six inches. Yet he made aviation history. This was the initial flight of America's first successful helicopter, the VS-300. It is the beginning of a story of leadership.

Less than 2 years later, the VS-300 became the world's endurance record holder and first to execute amphibious operations. The Army Air Force was interested. To meet its specifications, the research and development staff pioneered an improved type, the XR-4. It was the first successful military helicopter and became the first to go into quantity production.

Only Sikorsky helicopters went to war. A total of 400 R-4s, R-5s and R-6s were built up to V-J Day. Many of these served in various theaters of operation with the U. S. Army Air Force, Navy and Coast Guard as well as the British Royal Navy and Air Force. During this period a Sikorsky helicopter was the first to land and take off from shipboard. And people across the country began to read about hazardous rescues made possible by this versatile aircraft.

Since the war, Sikorskys have continued to make exciting history - first to carry the mail, first to explore the uses for helicopters in agriculture and industry, first and only helicopter to hold all 7 major international records.

Today Sikorskys bear the insignia of every branch of the Armed Services, and are being used for an ever increasing list of assignments heretofore considered impossible or impractical with any other type of vehicle.

This is still only the beginning. The pioneering goes on and on.

SIKORSKY AIRCRAFT



# here it is • THE NEW ADEL 3000 PSI NON-INTERFLOW 4-WAY SELECTOR VALVE\*

*The first* ★ **EXTREMELY LOW HANDLE LOAD**  
**3000 PSI** ★ **NEGLIGIBLE PRESSURE DROP**  
*Non-Interflow* ★ **EXCELLENT LEAKAGE CHARACTERISTICS**  
*Selector Valve* ★ **MORE THAN MEETS PROPOSED AN REQUIREMENTS**  
★ **MINIMUM WEARING PARTS**

#20907

1/4" AND 3/8" 4-WAY SELECTOR VALVES



**TOTAL PRESSURE DROP:**  
15 psi at 2 gpm flow,  
37 psi at 3 1/2 gpm flow  
**HANDLE LOAD:**  
17 inch-lbs. at 1500 psi,  
20 inch-lbs. at 3000 psi  
1 Drop-per-min. internal  
leakage max. at 3000 psi

#20908

1/2" 4-WAY SELECTOR VALVE



**TOTAL PRESSURE DROP:**  
45 psi at 6 gpm  
**HANDLE LOAD:**  
22 inch-lbs. at 1500 psi,  
30 inch-lbs. at 3000 psi  
1 Drop-per-min. internal  
leakage max. at 3000 psi

#20909

3/4" 4-WAY SELECTOR VALVE



**TOTAL PRESSURE DROP:**  
60 psi at 16 gpm  
**HANDLE LOAD:**  
30 inch-lbs. at 1500 psi,  
40 inch-lbs. at 3000 psi  
1 Drop-per-min. internal  
leakage max. at 3000 psi

Here's Adel's new line of lightweight 3000 psi, non-interflow 4-Way Disc Type Selector Valves with extremely low handle torque, negligible pressure drop and excellent leakage characteristics. More than meeting the latest proposed AN Specification requirements, they represent the most advanced engineering design for 3000 psi manually-operated Selector Valves. Non-interflow design completely eliminates all undesirable interflow when changing shaft positions. No moving packings under system pressure. Hydraulic sealing is accomplished by hardened surfaces that are optically flat within one eleven-millionth of an inch. Available with or without detents in 1/4", 3/8", 1/2" and 3/4" line sizes with a wide variety of flow patterns. ADEL PRECISION PRODUCTS CORP., 10777 Van Owen Street, Burbank, California.

\*Patent Pending

**TYPICAL  
FLOW  
PATTERNS**



1. Shaft rotated 45 degrees counterclockwise



2. Neutral position



3. Shaft rotated 45 degrees clockwise

**ADEL**

ADEL PRECISION PRODUCTS CORP. • Burbank, Calif. • Huntington, W. Va.

Canadian Representative: RAILWAY & POWER ENGINEERING CORPORATION, Limited

## PRODUCTION

### Design Compromises Cut in Orenda

Production scheme for new Avro Canada turbojet geared to maintain high standards specified by designers.

By Irving Stone

Malton, Ontario—An ambitious and efficient development program highlighting the close relation of production to design is well underway at A. V. Roe Canada Ltd.'s Gas Turbine division.

It is a striking example of the Dominion's recent trend toward a substantially greater measure of industrial self-sufficiency. And one of the most important aspects is the opportunity afforded Canadians to perform creative engineering of the highest order.

Avro's gas turbine activity has amassed extensive technical knowledge through a novel and effective approach to the complex problems in the turbojet field. It has literally learned its design and production know-how "from the ground up."

► **Background**—Roots of the program go back to Canadian jet engine activities which began in 1943 at Winnipeg with the setting up of a cold-test station by the National Research Council to evaluate British gas turbines. In the summer of '44 the Canadian government formed Turbo Research Ltd. to carry on study and development of both aircraft and industrial gas turbine powerplants, and the Winnipeg cold-test station came under Turbo's jurisdiction.

In the spring of '46 Turbo was closed and A. V. Roe undertook a contract to design and develop specific turbojets for the RCAF. Majority of Turbo's personnel, about 80, were carried over to participate in the new project. Today, about 10 times that number are employed.

First product was the Chinook turbojet, initially run in March, '46. Design of the Orenda was begun in '46, and initial operation was in February, '49. This engine is no scaled-up version of the Chinook. It is a completely new design, closely controlled production-wise to achieve greatest operating efficiency.

► **Design and Production Philosophy**—Early in the program, Avro Canada technicians guiding the design and production phases realized the necessity of stressing the quality of parts for experimental engines.

Following this basic requirement, they reasoned, would result in a mini-

mum of compromise with design dictates in the experimental stages. Then, at a later date, relaxation of these high standards could be made in favor of lower production costs, with full knowledge of the effect it would have on engine efficiency.

Accordingly, philosophy behind the Orenda project is to attain maximum self-sufficiency—not placing too much dependency on outside contractors—thus lessening the number of compromises imposed by the conservatism and normal restrictions of established manufacturing techniques. Aim is to make all parts except specialties such as accessories, bearings, etc.

► **Develop Own Machines**—One example is blade fabrication. Avro designed and built numerous machines and developed many processes for casting and machining turbine and compressor blades.

An ingenious pantograph-type grinder was constructed for making master blades and forging dies. Avro believes that no similar machine is used industrially. Developed to ease the die-maker's problems, its use permits the die to be hardened before finishing, only necessitates a light polishing operation, and gives a greater measure of accuracy than normally attained with hand die-sinking methods.

Whereas basic techniques are more or less common to all precision casting processes, there are considerable variations in quality of the product as a result of refinements in the procedure. And it was with this in mind that Avro technicians developed their own know-how. They started from scratch and perfected a technique for precision blade-casting, which, they feel, gives qualities of surface finish, physical properties and accuracy of form equal to or better than that offered by highly skilled fabricators.

► **Quality Control Assured**—And Avro had its hand in the control of parts which were sub-contracted. Thus, for major castings such as compressor casing, intakes and backbone (between turbine and compressor), it assisted in the development of manufacturing techniques to achieve the close tolerances required. For this purpose, it built the initial patterns and set up a standard of pattern fabrication considerably

higher than found in commercial practice.

Looking to the future, Avro's intensive spadework will permit it to:

- Quickly set up its own production facility in the event of an emergency and run it with complete assurance.
- Assist a sub-contractor who needs help in developing a suitable technique for a particular part, thus saving time and insuring the quality of work in initial phases.
- Formulate an accurate cost analysis as a check on prices quoted on a production basis by sub-contractors.

Despite the many phases of the engine development which Avro has undertaken to do on its own, it feels that costs to date have been substantially less than any other comparable turbojet project.

Personnel piloting the work in the gas turbine engineering phase are Paul B. Dilworth, manager and chief engineer, and Winnett Boyd, assistant manager and chief designer. Heading up the production activity are Maurice G. Nix, manager, and Earl K. Brownridge, assistant manager.

## PRODUCTION BRIEFING

► **Directional Instruments Corp.**, formerly in New York City, has completed its move to Raleigh, N. C. Firm has completed flight tests of its prototype electronic automatic direction finder and pre-production pilot models are now being assembled.

► **Fairchild Aircraft**, Montreal, has completed the sale of buildings and land at Longueuil, Quebec, to Leyland Motors of Canada for \$600,000.

► **Aeronca Aircraft Corp.** obtained agreement from "substantially all deferred creditors" to a proposal for refinancing. Proposal involves a preferred stock issue of not more than \$400,000 of which \$200,000 would go to deferred creditors in compromise for claims totaling approximately \$1 million. Remainder of the issue and a proposed \$200,000 RFC loan would be used as working capital.

► **De Havilland Enterprises Ltd.**, Hatfield, England, has recently acquired some American Hufford "stretch wrap" presses of the type recently purchased by North American and Boeing for use in forming metal aircraft wing and fuselage parts.

► **Curtiss-Wright Corp.** Airplane division at Columbus has been awarded an Air Force contract to install measuring devices in F-80s and F-84s for Air Materiel Command flight testing. Program is expected to be extended to the B-45 and B-50.



## Latest Air Force Bid Awards

Air Materiel Command Procurement Division makes available to AVIATION WEEK the latest bid awards, shown on this page. Requests for further information should be addressed to Contracting Officer, AMC, Wright-Patterson AFB, Dayton, Ohio, attention: MCPSSX72.

### ABSTRACTS

For 10 stand assemblies (49-2205): Scintilla Magneto Div., Bendix Aviation Corp., Sidney, N. Y., on a bid of \$4000.  
For indicators (50-56): Lewis Engineering Co., Naugatuck, Conn., on a bid of \$22,586.78.  
For aircraft generators (50-61):

General Electric Co., Dayton, on a bid of \$44,700.

For trainer-mockup, trainer-demonstrator (49-2225):

Companies sharing—Aero Training Industries, Ypsilanti, Mich., on a bid of \$6181.25; G. W. Holmes Co., Columbus, O., on a bid of \$806.74; Carleton R. Elliott Co., Dayton, on a bid of \$6888; Design Fabricators, Inc., Dayton, on a bid of \$3737; Burton-Rodgers, Inc., Cincinnati, on a bid of \$11,796.84; Management & Research, Inc., Primos, Pa., on a bid of \$11,570; G. Felsenthal & Sons, Inc., Chicago, on a bid of \$6063; Imagineering Associates, Inc., Hollywood, Calif., on a bid of \$6443.97; American Automatic Type-writer Co., Chicago, on a bid of \$3335, and Donald L. Atkins & Associates, Natick, Mass., on a bid of \$400.

For indicators (50-41):

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., on a bid of \$22,192.16.

For radio frequency adapter, plug & cable (50-22):

Companies sharing—Diamond Manufacturing Co., Wakefield, Mass., on a bid of \$4144; and American Phenolic Corp., Chicago, on a bid of \$3477.60.

### INVITATIONS

No invitations issued this week.

## Navy Bid Proposals

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

Cotton webbing, 40,000 yd., unbleached, type VII, 1 1/4 in. wide; 500 yd. ditto, 3/4 in. wide, lightweight, type I, 100 lb. breaking strength, specs. JAN-W-530; invitation No. 8779; bids due Oct. 31.

Hydraulic and pneumatic hose swivel fitting ends, 14,150 ea., AN782-3, Spec. AN-F54; invitation No. 8845; bids due Nov. 16.

Hard copper bar, 1000 lb. 1/4 in. thick, 1/2 in. wide, 99.9 percent pure, flat; 10,000 lb. ditto, 4 in. wide, spec. QQ-C-501a; invitation No. 8850; bids due Nov. 17.

Stroboscopes, 21 ea., for 105-125 volts, 60 cyc., 600-14,400/min. flashing speed; invitation No. 8864; bids due Nov. 14.

Glider, 33,000 ea., chair leg, for metal furniture, spec. JAN-C-486; invitation No. 8881; bids due Nov. 22.

Wattmeters, 310 ea., DC microammeter, 0-15, 0-60 watts, Bird Electronics 75045; invitation No. 8916; bids due Nov. 23.

Female plugs, 1240 ea., silver plate, 1 1/4 x 3/4 x 3/4 in., for ME-11/U meter; invitation No. 8925; bids due Nov. 22.

Slide fasteners, 33,000 ea. stop, brass, cl. B; 4 items slide, interlocking, V-F-106; invitation No. 8943; bids due Oct. 31.

Automotive parts, 12 items, small quantities, Autocar nos.; invitation No. 9024; bids due Oct. 31.

Cellulose nitrate lacquer, various colors, 710 qt., total 48,640 gal., spec. 52-L-26Aer, dest. Philadelphia & Oakland; invitation No. 9027; bids due Nov. 3.

Brass machine screws, 42 items, round hd., NCTS, type B, Navy spec. 42-S-5e; bid invitation No. 8598; bids due Nov. 1.

Antifouling paint, 200 gal., for natural rubber, BuShips spec. 52-P-89(Ships); invitation No. 8601; bids due Oct. 31.

Milling cutters, 32 items, high speed steel, various sizes, Navy spec. 40-C-2; invitation No. 8665; bids due Nov. 1.

Bolts, 18 items, aircraft, eye, clevis, internal wrenching, specs. AN-B-3c, NAS-159; invitation No. 8681; bids due Nov. 1.

Wire rope clips, 5500 ea. 1/4 in. dia.; 24,600 ea. 1 in.; 200 ea. 1-1/4 in., "Tiger"-galv. steel; invitation No. 8699; bids due Nov. 1.

Abrasive belts, grinders & sanders, 22 items, endless, aluminum oxide cloth, Behr-Manning; invitation No. 8701; bids due Nov. 1.

Hexagon cap nuts, 4 items, steel, spec. 46-S-18e, total 11,500 ea., dwg. 12-Z-16; invitation No. 8726; bids due Oct. 31.

Rubber caps, 5 items, tube & thread protector, spec. AMS 3208B, dwg. NAS-244; invitation No. 8741; bids due Nov. 1.

Drills, 24 items, portable electric, masonry, twist, BuShips spec. 40-T-3(Int); invitation No. 8751; bids due Nov. 1.

Anti-friction bearings, 380 ea., needle bearing unit, 3/4 in. bore, Torrington Co.; invitation No. 8767; bids due Oct. 31.

Gyro horizon indicators, 7 items, mfgs. nos.; total 745; also 701 power control units, BuAer specs. 88-L-2, -7, 88-C-11, NAF dwgs. 1260, 1240, 1263; invitation No. 8776; bids due Nov. 3.

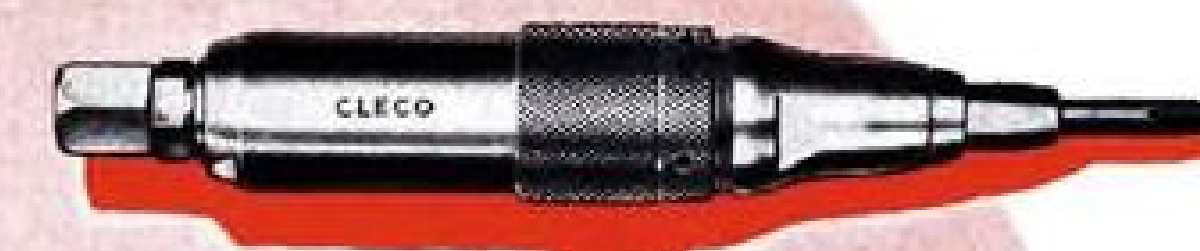
Top & bottom fuselage lights covers, 6 items, total 2400, dwg. AN3099, spec. AN-C-70a; invitation No. 8773; bids due Nov. 14.



**CLECO LIGHT RIVETERS**  
Fast in action, light in weight, easy to handle. Write for Bulletin No. 82



**CLECO ROTARY DRILLS**  
Light in weight, dependable, easy to handle. Write for Bulletin No. 83



**CLECO SCREWDRIVERS**  
Reversible or non-reversible. Fast, easy to handle, light in weight. Write for Bulletin.



**CLECO REVERSIBLE IMPACT WRENCHES**  
The fastest way to apply or remove nuts and bolts. Write for Bulletin No. 1W-48



**CLECO SQUEEZE RIVETERS**  
Plenty of power to set the hardest rivets, yet light in weight and convenient to use. Write for Bulletin No. 82

# CLECO AIR TOOLS

Air power is safe, clean, flexible and highly productive. For air-powered tools built to highest quality standards, insist on CLECO air tools, bearing this familiar trade mark

**CLECO**

Back of CLECO Products... with 25 years experience in precision manufacturing, is the REED ROLLER BIT COMPANY, one of the largest companies of its kind in the world.

AND DON'T FORGET...  
CLECO furnishes a complete line of valves, couplings, nipples and line fittings. Ask for Bulletin HF-747.

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## SENSITIVE POLARIZED RELAY FOR D. C. CONTROL CIRCUITS

*Micropositioner*

OPERATES ON VOLTAGE OR DIFFERENTIAL CURRENT



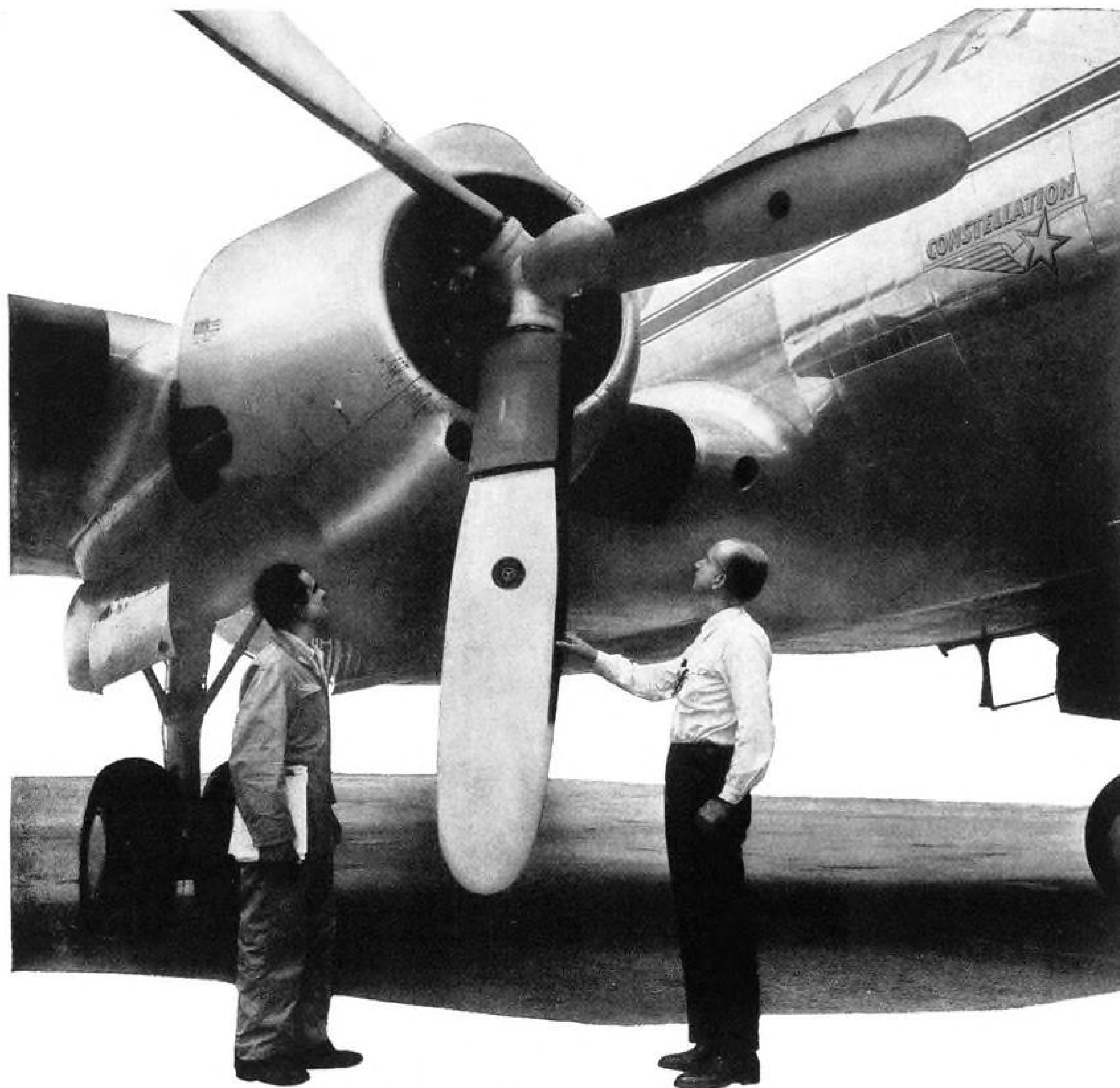
1. Alnico permanent magnets used for polarizing field. 2. Nicolol armature suspended in the air gap between the pole pieces. 3. Coil. 4. Contacts. 5. Shunt bars for sensitivity adjustment. Pat. No. 2,443,784.

An extremely sensitive polarized relay used in numerous aircraft control applications. Made in 12 standard sensitivities ranging from 50 to 1800 microwatts. Can be operated in excess of 100 cps. Various models include solder-lug and terminal-block bases, and octal plug-in bases open or hermetically sealed. Principle of operation is a floating armature which makes one side or the other of SPDT contacts depending on circuit conditions. Single coil type is actuated by polarity of applied voltage, double coil type by differential of two currents. Basic applications include remote positioning, synchronization, temperature control, and detection and amplification circuits. Barber-Colman Micropositioners meet Army-Navy specifications. Write today for new Bulletin F-3961 giving complete data and suggested uses. Consult your Barber-Colman representative for any engineering assistance needed.

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## New Curtiss Propeller

### FOR THE NEW L-749A CONSTELLATIONS

A new Curtiss propeller has been approved by the CAA for unrestricted operation on Lockheed L-749 and L-749A Constellations. This propeller's high solidity provides improved take-off, climb and cruise speed at higher gross weights, and its rugged construction assures long service life.

Other service-proved Curtiss features incorporated in this new pro-

PELLER are . . . *reliable feathering* . . . *reverse thrust* for smooth, air-cushioned landings . . . *automatic synchronization* for passenger comfort and ease of control . . . *durable hollow-steel blades* for abrasion resistance.

The acceptance of this new propeller, after extensive stand and flight testing . . . under conditions surpassing the severest stresses of service use . . . is further evidence of Curtiss-Wright's leadership in the field of aircraft propellers.

**CURTISS** ELECTRIC PROPELLERS  
A PRODUCT OF  
PROPELLER DIVISION CURTISS-WRIGHT CALDWELL, NEW JERSEY  
FIRST IN FLIGHT



## SALES & SERVICE

### CAA May Finance Spray Plane

Bids to be asked on production of agricultural aircraft developed by Fred Weick if flight tests show promise.

By Alexander McSurely

Tentative plans to let government development contracts to personal aircraft manufacturers on a competitive bidding basis, for "a few prototypes" of the new agricultural airplane under joint development by CAA and the Department of Agriculture at Texas A & M College, were revealed last week.

CAA Administrator Del Rentzel disclosed that the first flights of the new experimental plane, designed by Prof. Fred E. Weick, head of the Personal Aircraft Research Center at the college, are expected probably by May 1950.

► **Initial Tests**—After primary tests of the plane and the dispensing apparatus which is being developed simultaneously for aerial spraying, dusting, seeding, etc., the additional planes will be sought.

"If results of this work appear to warrant," Rentzel said, "We plan to interest manufacturers, bidding competitively, in building a few prototypes of this aircraft at a figure which will cover small-lot tooling making use of pertinent information, hitherto unavailable, worked up with the first aircraft. We will not release or make available information which is a matter of competitive engineering technique and which is strictly aeronautical information."

► **Surplus Planes**—"I want to emphasize that the agricultural aircraft project is one of research and development. We feel that there is a great potential in the exploitation in agricultural aircraft of the full advantages of high lift devices, controllability at low speed, etc. A large portion of dusting, seeding and spraying is being done with military surplus airplanes and even with the almost 30-year-old Huff Daland Petrel.

"We in the Civil Aeronautics Administration, and I think I can speak for the Department of Agriculture also, are merely interested in providing the 'catalytic agent' as it were to really get this agricultural aircraft potential started. If we can avoid unfortunate publicity of the '\$700 aircraft' type (a reference to the early 1930 Department of Commerce specification for a \$700 personal plane sponsored by Eugene Vidal) I believe that farmers and the

aircraft industry will both stand to gain."

► **Rugged Individuals**—That at least one of the three personal airplane companies which would be the logical contractors for CAA's small-lot production order prefers to develop its own agricultural airplane, has been indicated to AVIATION WEEK.

Piper Aircraft Corp. is going ahead independently with development plans for a new agricultural plane. Its two-place tandem trainer, modified as a sprayer and duster, is probably the most widely used commercially built airplane in the agricultural field.

Consistent with the attitude William T. Piper, Sr., company president, has previously taken on government fund expenditures for airports and other aviation projects, he is reportedly opposed to the Texas A & M project as a form of government competition.

► **Other Companies**—A check with officials of the two other principal light-plane companies whose commercial planes are now being used in similarly modified form in dusting and spraying, indicates a much less strong reaction from them.

• Cessna Aircraft Co. has no current development plans for an agricultural plane. Spraying and dusting equipment for Cessna 120 and 140 two-placers, and 170 four-placers, is available from the Yingling Company, Wichita, Cessna distributor.

Recent poll by the company among its distributors indicated a majority did not consider that there would be a large enough market in a specialized agricultural plane to warrant its development at this time. "We are just watching and waiting at present," was the summarization of the Cessna position.

• Aeronca Aircraft Corp., Middletown, Ohio, would be interested in a government-subsidized competition to build a small quantity of agricultural planes, if all the "hitherto unavailable information" is not let out too early. This company has no plans for development of its own agricultural plane, but expects increased interest next year in its Aeronca Sedan, modified by a western company as a duster and sprayer. Most Aeroncas used now in this work are Camptons and Chiefs, two-seaters comparable to the Piper J-3 and PA-11

trainers. Aeronca likewise has conducted a survey indicating a wide divergence of opinion between dusters and spray operators on the type of plane they want. Survey indicated to Aeronca executives that no one plane would meet a sufficiently general demand to make it reach a large market.

Piper has been close-mouthed about its new development but presumably it will follow along the lines which the company has sold successfully for agricultural modifications, probably with either 90 or 115 hp. engine.

► **Requirements Analyzed**—Analysis of the difference in requirements for agricultural planes indicates that for broad flat acreage in the West, and for high altitude work, relatively high-powered planes which can carry a large load are desired; in smaller, cut-up acreage especially in the East, the low-powered lightplanes, with low wing loading and ability to get in and out of small fields readily, are preferred.

It is understood that the Weick plane will be designed for a 185 hp. engine, but that it will be stressed for use of larger powerplants up to 300 hp. in order to accommodate operators who want more power.

► **High or Low**—Interesting sidelight on the Weick design is the fact that it is for a low-wing monoplane, while all of the three companies mentioned as probable principal competitors for an agricultural plane market, are currently in production only on high-wing monoplane designs, and have never produced low-wing planes in quantity.

Improved visibility factor of the low-wing design is an important factor in selecting this configuration for the agricultural plane since poor visibility is blamed for a large number of the duster and spray plane crackups and crashes, reported in recent years.

### Private Pilot Forum

A new kind of forum designed to give private pilots the chance to get authoritative answers to their queries on CAA regulations, weather reports, customs and immigration laws, and other matters concerned with private flying is to be conducted in San Diego County, Calif.

Private pilots in that county and adjoining Imperial County have been invited to attend a Sunday Pilots' Forum, Nov. 6, in the Institute of Aeronautical Science Building. It is an experiment and if it works, CAA has indicated similar forums will be encouraged throughout the country.

Invitations to the Sunday Pilots' Forum were issued by the San Diego Chamber of Commerce aviation committee, of which Bill Gibbs, owner of Gibbs Flying Service, Inc., is chairman.





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well as machine  
it to .0005.

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## BRIEFING FOR DEALERS & DISTRIBUTORS

**PROPELLER PROBLEMS**—CAA technical officials expect to ask revisions soon in Civil Air Regulation Part 14, dealing with propeller certifications, because of recent problems which have developed with composite structure lightplane propellers. Present regulation has been unchanged for a long time, does not take into account some of the advances in testing which are now in use. As long as propellers were solid wood there wasn't any serious vibration problem but with various combinations of wood, metal and plastics in blades, shanks and hubs, things have changed. CAA technicians think that a lot of propeller difficulties that show up after certification, could be caught in certification tests if requirements were changed.

**SMOG CONTROL**—Bill to authorize CAB to study need for smog control in the vicinity of airports to promote safety in air navigation was introduced in the House of Representatives last week by Rep. Cecil King (D., Calif.) but was not expected to survive the last minute urgency of Congress to adjourn. Bill would authorize the Board to investigate need for control of discharge of smoke contributing to formation of smog, best means for such control, and to report back to Congress with recommendations for legislative action to authorize the controls.

**NON-SCHEDULED MEETING**—CAA's Advisory Committee on Non-Scheduled Flying was to get together with CAA regional heads and Administrator Del Rentzel last week at Oklahoma City for a combined meeting and inspection of the CAA's training center there.

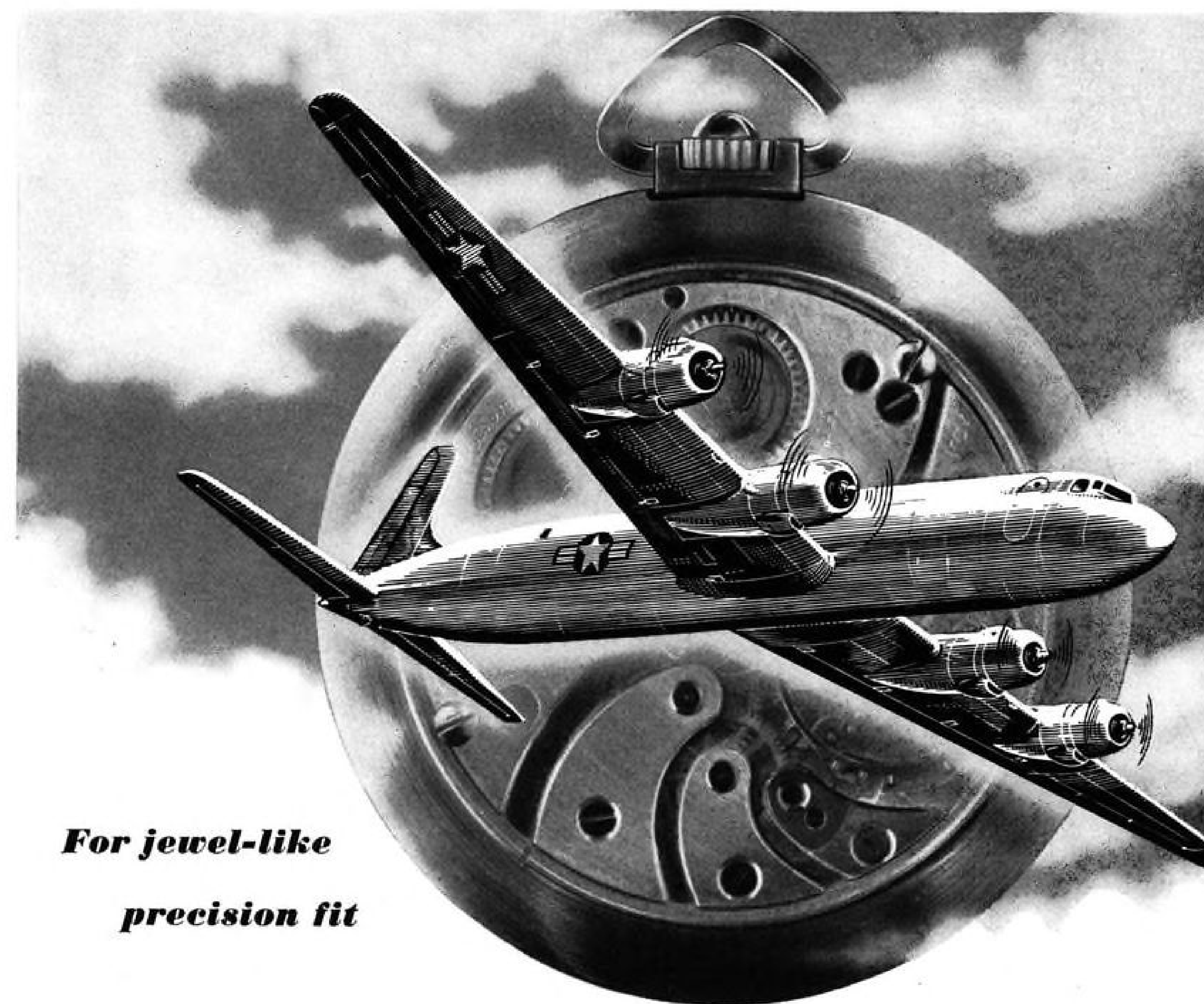
**OVERLOADED CLIPPER**—An overload may have been the cause of the crash of a chartered 115 hp. Piper Clipper in the sea six miles from Provincetown in a flight from Boston. Daniel Lacey, Westwood, Mass., of Cape Cod Flying Service, reported by radio he was "going in" just before the plane went down. With him on the flight were a mother, her two small children and another woman passenger. All were drowned.

**ACCESSORIES PANEL**—At the final Nov. 11 session of the Aviation Distributors and Manufacturers Assn. meeting at French Lick, Ind., manufacturers representatives will be called upon to present a panel on "increasing utility of present day aircraft through use of accessories." Fred Lee, of R. M. Hollingshead Corp., Camden, N. J., will have on his panel representatives of companies making instruments, propellers, crosswind landing gear, radio, airport and aircraft lighting, landing flares, skis, oxygen equipment, etc. As usual a large part of the three-day meeting beginning Nov. 9 will be taken up with conferences between the various manufacturers and their distributors. Richard Bomberger of Sensenich Corp., ADMA president, will preside.

**AIRPORT COVERAGE**—Dr. Leslie A. Bryan, director of the University of Illinois Institute of Aviation thinks that the U. S. airport picture is getting encouraging numerically. He estimates there are more than 6000 airports in the U. S. and that if properly located, 7500 fields would give the nation a "passably adequate landing area coverage." He pointed out however that the distribution of the present airports is still generally not the result of careful study and planning, that the number of large airports is not adequate, and that there is a general deficiency in service, restaurant and ground transportation facilities. He considers that the move toward construction of close-in airstrips such as those in Chicago, Milwaukee, Cleveland and Oklahoma City, is a healthy sign of improved service to the private flyer, and looks to the crosswind landing gear and tricycle landing gear to bring about more one-strip fields which can be located more conveniently and less expensively.

**OVER 700 CLIPPERS**—Jake Miller, Piper sales manager, says sales by Piper of the four-place 115 hp. Clipper will total well over 700 this year. The Clipper which has been a leader in the quiet personal plane industry this year, has helped materially in bringing the Piper organization back into the best financial shape it has been since the boom days of 1946. This is probably the explanation for Piper's more ambitious development plans for a twin-engine executive transport, and a new agricultural plane, as reported elsewhere in this issue. There are also reports that Piper has a new smaller all-metal experimental craft well along in development stages.

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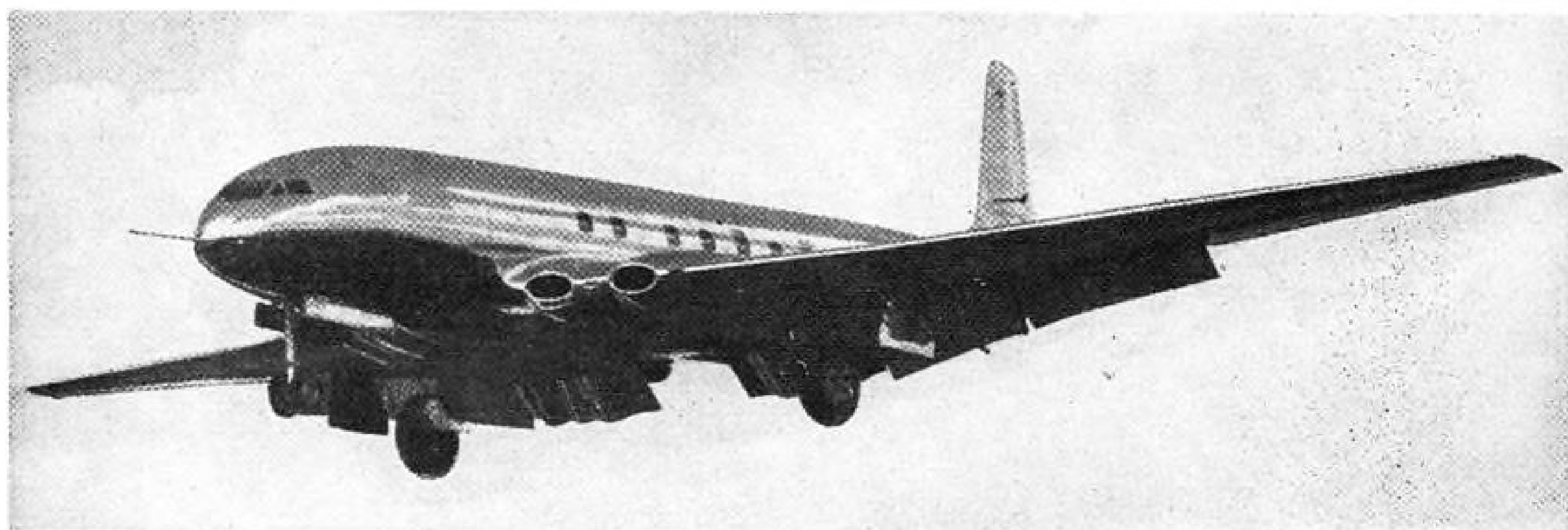
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# AIR TRANSPORT



GENEROUS FLAP area gives Comet landing speeds comparable to present airliners. Lower portions of Ghost nacelles form part of flaps.

## DH Comet: British Firm's Private Gamble

Jet transport center of airline interest, while future is dim for plane government said carriers would need.

By Robert Hotz

**HATFIELD, ENGLAND**—Perhaps the most significant fact about the de Havilland Comet is that it is primarily a product of private enterprise rather than government subsidy.

Ironically, the first transport to take the air specifically designed for turbojet power was developed more along the traditional pattern of U.S. manufacturers than that of the British postwar government financing of prototype development. According to de Havilland officials, the Comet was developed by the de Havilland enterprise as a privately-financed venture at a small fraction of the \$20 million usually cited by U.S. manufacturers as the minimum cost of a turbojet transport prototype. **► No Subsidy**—Contrary to general opinion, de Havilland officials point out, there is no British government money in the direct development of the Comet. Nor was the Comet built to meet any government specification for transport aircraft.

The privately-developed Comet, which has set the international aviation world abuzz, offers an interesting contrast to the British government's idea of the airliner of the future—the giant 290,000-lb. eight-engined Bristol Brabazon I which has already cost every one of the 42 million Britons one tax dollar. If and when the 100-passenger turboprop version of the Brabazon ever gets around to making a weekly trans-Atlantic crossing it is likely to find a

single Comet carrying twice its passenger load for the same period at considerably less cost to both passenger and operator. As a further hedge against the Comet, the Ministry of Supply has financed design studies with Vickers, Bristol and Handley Page for a long-range Empire type that could be built to do the Comet's job if necessary.

**► Comet History**—Briefly, the Comet history began when the original Brabazon committee laid down a specification for a 600 mph. tailless trans-Atlantic jet mail plane. De Havilland was given a Ministry of Supply contract for high speed flight research preparatory to the mail plane project. This program resulted in the three sweptwing tailless DH 108 jet research planes which began the first British inquiries into transonic flight much as the USAF-Navy-NACA program with the Bell X-1 and Douglas D-558 operated in the United States. It was during the DH 108 program that young Geoffrey de Havilland was killed when the second model disintegrated in compressibility troubles and DH test pilot John Derry dived the final model to Mach 1. As a result of this research, de Havilland decided that the Brabazon specification for the tailless mail plane offered little future and sought to interest the Ministry of Supply in a turbojet passenger transport of lesser speed and more conventional design.

The Ministry agreed to allow de Havilland to proceed with the new turbojet transport project at their own ex-

pense and gave approval for use of critically short materials for the Comet prototype. It also agreed to buy two Comets for experimental use if the de Havilland could deliver its guaranteed performance. British overseas airways signed up for 14 more on the same terms. These 16 Comets were contracted for at a commercial price based on quantity production. The price to MOS and BOAC includes only a small fraction of development costs. To recapture its development costs and break even on the project de Havilland will probably have to sell at least 100 Comets.

**► Withdrawal Clause**—Both MOS and BOAC contracts carry a clause allowing both government agencies to withdraw from the project if de Havilland fails to meet either guaranteed performance or price. If de Havilland cannot deliver on both guarantees the deal is off and the enterprise faces a whopping loss. Guaranteed performance is believed to be cruising speed of 500 mph. at 40,000 ft. with a range of about 2500 mi.

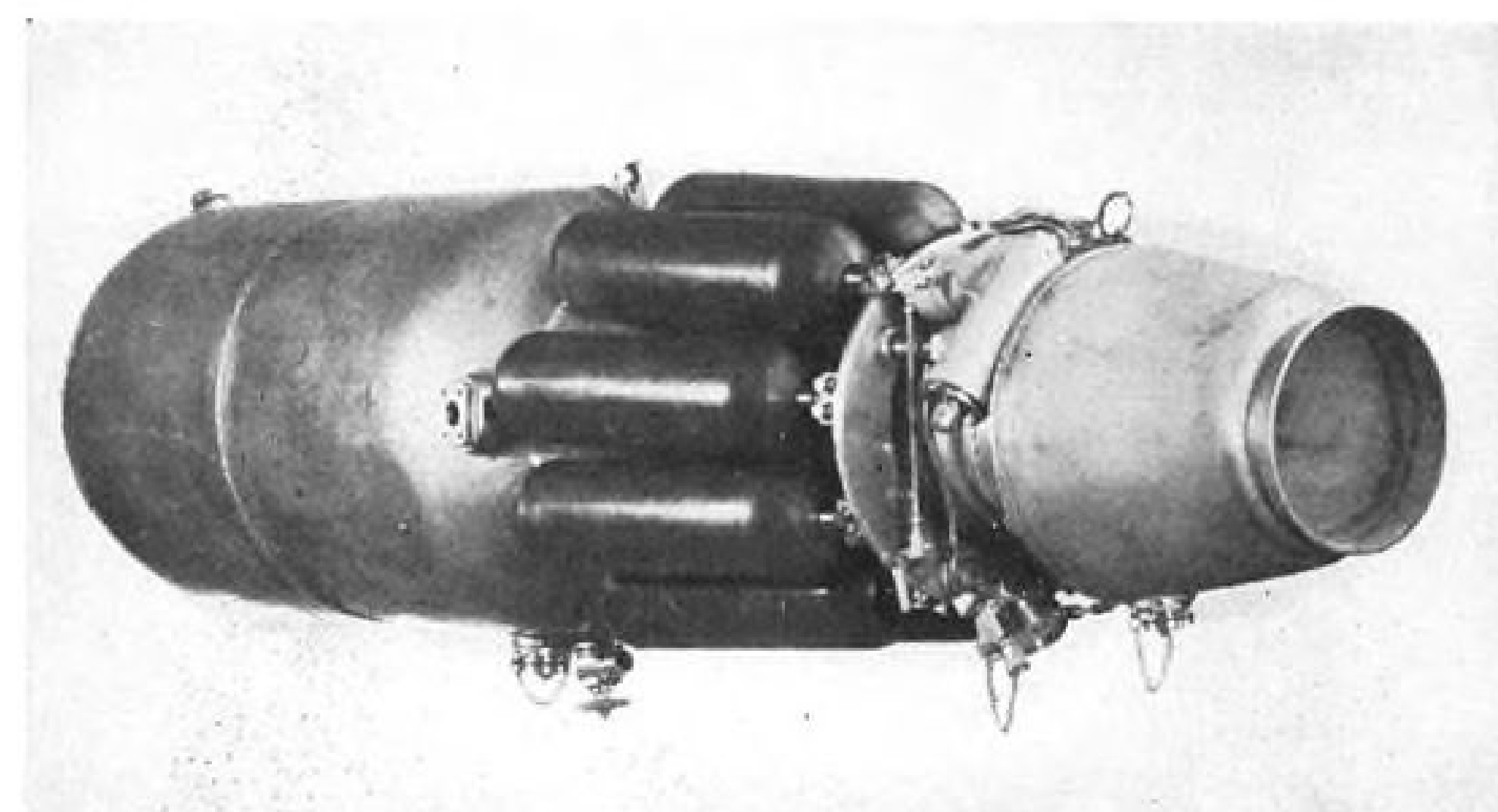
This picture is in sharp contrast to that painted by some Americans who explained the development of the Comet as another triumph of the "subsidized" British aircraft industry and contend that no U.S. jet transports can be developed without government funds or a guaranteed market. If anybody thinks the British manufacturers consider an order for 16 planes a guaranteed market, they should listen to the snorts of disdain coming from British manufacturers over an offer of British European Airways to buy 15 of a special feeder-liner type it wants de-



WITH LEADING EDGE SLATS fully open and flaps partly down, the Comet displays wing profile during takeoff. Meanwhile . .



PRODUCTION LINE set up at Hatfield already was busy turning out Comets for BOAC and BSAAC prior to first flight.



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veloped for British Isles internal services. No British manufacturer is rushing to take up the BEA proposal.

De Havilland officials are frank in admitting they face a loss on the Comet project unless they develop commercial sales far in excess of the 16 now on order. They are already dealing with six foreign airlines on the subject but are demanding as rigid financial guarantees from buyers as they are willing to put up on price and performance. Pan American World Airways is among the negotiators but indications are PAA will have to meet a stiff ante with firm commitments to play in the Comet game.

The de Havilland enterprise is capitalized at about \$10 million and showed a net profit after taxes of just over \$1 million for fiscal year ended September, 1948. Bulk of company's profits come from export sales with three out of every four aircraft manufactured sold abroad.

► **Successful Design Team**—If the de Havilland organization is showing unusual confidence in its design team by staking so much on the Comet and going into production before the prototype has completed flight tests, it is because the combination of Frank Halford (engines), R. E. Bishop and C. T. Wilkins (airframe) and C. C. Walker (technical director) has been extraordinarily successful in similar flyers taken by de Havilland.

The Plywood Mosquito was a privately-developed de Havilland item that was later sold to the Royal Air Force on a large scale. Similarly the DH-113 night fighter version of the Vampire (Britain's first jet night fighter) was built by the firm on its own and only recently sold to the RAF with a sizeable production run now in sight. The Dove feederliner was developed to meet an MOS specification with government funds but has had a wide commercial sale that more than recovered initial development costs.

In addition to financing the high speed flight research program, the only other government support for the Comet came in engine development. The centrifugal flow Ghost now rated at 4450-lb. static thrust for civil use (but soon to jump to 5000 lb.) was developed, as are all U. S. turbojets, under government contract. The Ghost is also used in the new de Havilland Venom, high altitude fighter.

► **Guaranteed Performance Tests**—The Comet prototype now has more than 30 flights behind it with test pilot John Cunningham at the controls. Initial handling tests have been completed and the current phase of flight testing is concerned with establishing a performance parameter and proving the MOS and BOAC guaranteed performance. De Havilland will not release any detailed

performance figures until this phase is completed and both performance and economics involved can be based on actual flight tests rather than theoretical calculations.

Many observers feel de Havilland is carrying this commercial conservatism to an extreme in not releasing external dimensions and other data that became fairly obvious the minute the Comet emerged from the experimental hangar for its first flight last July. It is no secret however that so far the flight testing has gone extremely well. The Comet made its first flight three months ahead of schedule and de Havilland technicians privately admit that there has been an extraordinary lack of "bugs" in the Comet during its early flights. However, two of the biggest hurdles—pressurization at 40,000 ft. and range—lie ahead.

The Comet is roughly about the size of the Lockheed Constellation with a wingspan of 115 ft. against 123 ft. for the Connies and a fuselage length of about 95 ft. compared with 95 ft. for the Lockheed transports. Gross weight of 107,000 lb. for the latest Lockheed model 749 Connies is slightly heavier than the Comet's gross.

► **Redux Replaces Rivets**—Construction of the Comet is relatively simple due to the extensive use of redux, a metal bonding process, as a substitute for rivets. The redux process offers the twin advantages of low structural weight with increased strength plus the superslick aerodynamic finish required for high speed aircraft. Substitution of redux for riveting in the main fuselage section saves about 50 percent in weight over riveting and about 30 percent in wing structure. The difference between the heavily riveted nose section and the use of redux on the rest of the fuselage offers an excellent weight contrast where extreme strength is required to withstand the 8-to-1 pressure ratio of the Comet's 40,000 ft. cruising altitude. Redux work also eliminates rivet holes as possible leaks in both the cabin pressurization and the integral fuel tanks of the wings.

In addition to the integral wing tanks the Comet carries its kerosene fuel in a large rubber cell fuselage tank. Fuel totals more than half the plane's gross weight.

► **Sweepback is 30 Degrees**—De Havilland designers rejected the radical configuration of the DH-108 using only about 30 degrees of sweepback on the Comet in contrast to 45° on the DH-108; adding an empennage with considerable dihedral on the horizontal fins for stability; and using an extremely high aspect ratio wing combining taper with sweepback to get a large wing area and a wing loading of less than 50 lb. The low wing loading of the Comet

contrasts with the 80 lb. of the current Boeing Stratocruisers at full gross and 65 lb. for Lockheed's Constellation. Other features aimed at insuring adequate control at low speeds include leading edge slats; and an enormous flap area that extends for three-quarters of the wing span and under the belly including the underside of the engine nacelles, similar to the arrangement on the Boeing B-50 bomber. The flaps are also extended beyond the 45 degree maximum on U. S. airliners.

The cockpit is also unusually simple with normal flight and jet engine instruments leaving ample room for installation of new navigational devices. Control pedestal has only four high-pressure fuel cocks and four throttle levers. Of the four man crew (including two pilots, navigator and radio operator), the radio man has by far the most impressive array of gear to manage.

Two sections of the wing are joined underneath the fuselage. Inside the passenger compartment the area compares with the Constellation with provisions for 36 passengers in contrast to the Connie's maximum of 44 on the trans-Atlantic run. Single wheel main gear will be replaced by a double tandem arrangement and the mass balances noticeable on the controls are to be used on the Comet only during the test period.

The four Ghost engines are almost completely buried in the thin Comet wing which swallows the 53-in. diameter of the Ghost in 54½ inches. The single-sided impeller of the Ghost allows direct air intake through holes in the front wing spar and requires no pressurized, heavy cowling to duct air to the rear of a double-sided impeller as used in the Rolls Royce turbojet engines.

Flight tests have indicated that nearly all the available ram effect can be realized at the compressor entry and at speeds of over 400 mph, a net gain in propulsive thrust over intake drag has been attained. De-icing of the inner air ducts is accomplished by bleeding hot gas from the tail pipe.

► **May Mount Sprites Rockets**—Provisions have been made for mounting a Sprite 5000-lb. thrust liquid fuel rocket between each pair of engines on the trailing edge of the wing. De Havilland thinks the two Sprites may be necessary for additional take-off power at some high altitude, tropical, or short fields along the Empire routes. BOAC does not believe the Sprites will be necessary. The Sprite has a 12-second duration at full thrust and can be given a check burst of 750 lb. thrust just before take-off. The Sprite uses a 39-gal. tank of hydrogen peroxide fuel; a 2½ gal. tank of either sodium or calcium permanganate as a catalyst; and nine bottles of compressed air arranged around the re-

action chamber. The Sprite weighs 925 lb. loaded and 325 lb. empty. The Sprite can be controlled from the cockpit and shut off during any phase of its operation.

De Havilland maintenance people have an usually loud voice in the firm's design conferences with the result that all of the Comet's "plumbing" is easily accessible; the jet engines can be reached without the use of maintenance stands; a complete set of four engines can be changed in an hour; the fuel load taken aboard in 23 min.; and only the empennage requires anything much in the way of maintenance stands. Although the Ghost is being used as a military engine, its final development was concentrated on lower fuel consumption and increasing reliability for civil use.

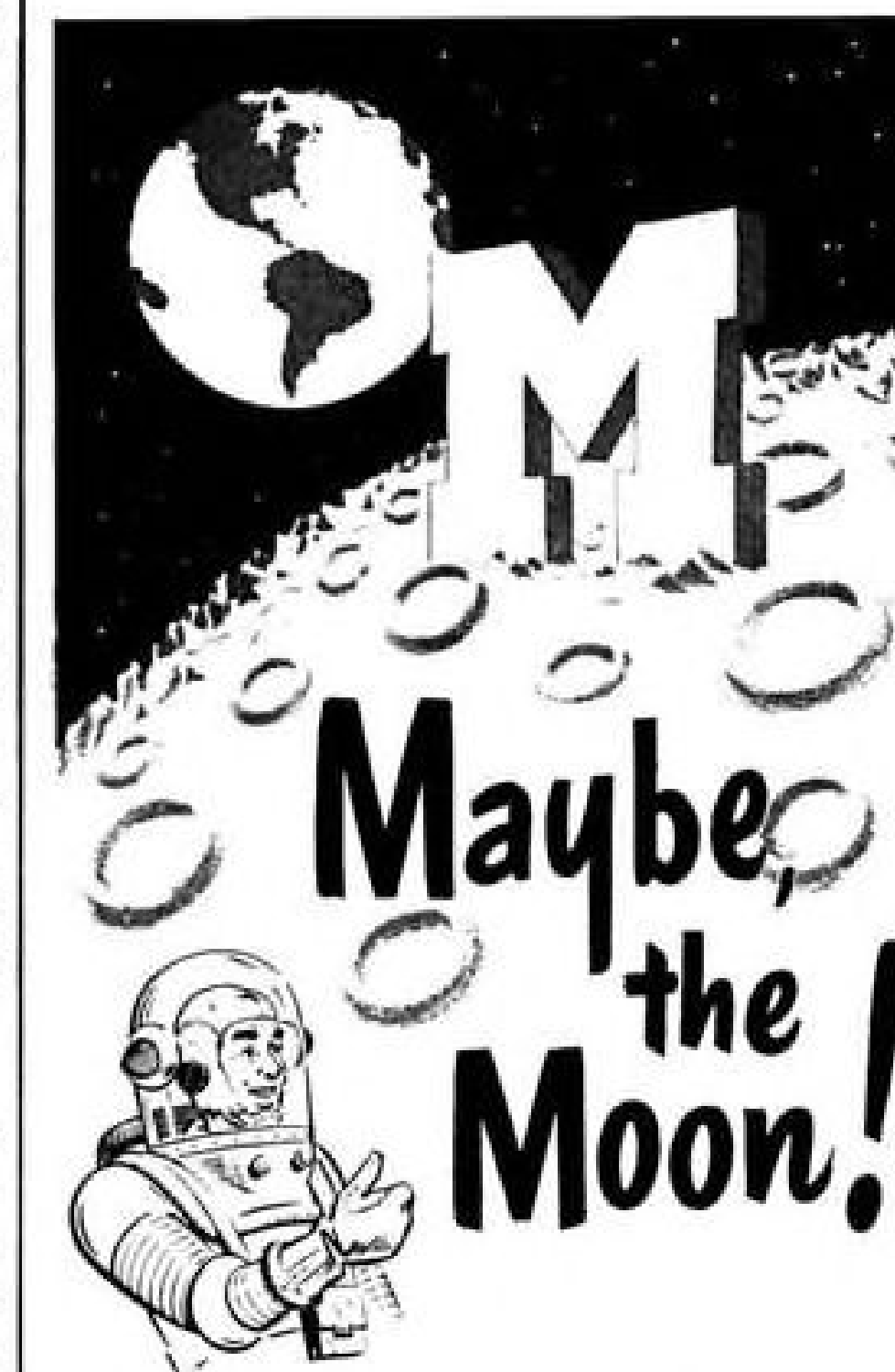
Ghost fuel consumption at cruise is now down to 1.02 and Sir Frank Whittle, BOAC technical adviser on the Comet project, expects the Ghost to begin its commercial airliner service with a 1000-hr. overhaul interval.

► **Performance to Date**—Maximum performance of the Comet to date has been top speed of 510 mph.; Mach 0.8 at about 37,000 ft.; altitude of 40,000 ft., and a landing speed well below 100 mph.

De Havilland is emphatic in pointing out that this extreme range between top speed and landing speed cannot be obtained by re-designing military jet bombers for transport use but must come from airframes designed from the start as transports.

De Havilland has no detailed economic figures to offer on the Comet yet except the comment that it was designed to be as economical per passenger mile as the DC-3. Construction on six fuselages is well advanced with a complete wing undergoing static tests. There is no semblance of a Comet production line as Americans would visualize it. Work is being done in widely separated portions of the plant.

BOAC should be getting its first Comet some time next year with a full year's operational testing scheduled along the Empire routes to Africa before beginning regular service in 1952. It is quite likely that if the Comet turns out well BOAC will order more. Both BOAC and de Havilland are counting on considerable reduction in Ghost fuel consumption during the next few years which would make the Comet a New York-to-London, six-hr. nonstop trans-Atlantic airliner by 1953. Traffic control for the Comet at international air terminals is likely to be more of a political question during the aircraft's early operational trials since the technical means to handle jet aircraft during instrument weather without stacking and terminal delays already exists.



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## Capital Connies

Carrier's competitive position seen aided by recent purchases.

Capital Airlines' pay-as-you-go equipment program—launched in September with the purchase of three Super DC-3s and implemented by the recent deal for three Constellations—marks a new high in the carrier's comeback from the brink of bankruptcy.

In announcing the Constellation contract (AVIATION WEEK, Oct. 17), Presi-

dent J. H. Carmichael contrasted Capital's current position with that two years ago, when the company was scratching for enough money to meet its payroll. It was in October, 1947, that Carmichael succeeded C. Bedell Monro as head of the airline.

► **Switch Into Black**—During the first half of 1949, Capital showed an \$832,117 net profit and a \$345,329 operating profit. In the same period last year, it lost more than \$1 million.

Earnings continued at a high rate during the summer. In September alone the company estimates it showed a net of around \$220,000 as passenger traffic hit a new all-time high—36 percent

higher than the same month last year. Two years ago, Capital was about \$14 million in debt, with \$10 million in debentures outstanding plus a \$4 million bank loan. It was far in arrears on interest payments.

By early this month, debentures outstanding had been cut to \$7,685,000; the bank loan was down to \$375,000; the company was current on interest payments and had \$3.5 million in cash. The bank loan will be wiped out completely next Feb. 1.

Retroactive mail pay increases ordered by CAB last December plus establishment of a new mail rate formula for 1949, have gone far to improve Capital's position.

► **Traffic Gains**—But President Carmichael claims his company's passenger traffic upswing has been so sharp that Capital's mail rate for the past five months has been close to the non-subsidized "service" level. Like other medium-sized carriers, Capital's mail rate is geared directly to its passenger load factor and drops as traffic increases.

Capital's comeback has far surpassed expectations of company officials. At the beginning of this year, Carmichael saw "no reason to expect an increase in Capital's business in the near future." As late as last April he predicted that 1949 traffic would approximate 1948.

Despite higher traffic, Capital this year has felt keenly the competitive impact of other airlines operating Constellations, DC-6s and new twin-engine equipment over parallel routes. By late summer, company officials decided they could not get through 1950 without new transports.

First step was purchase of three 31-passenger Super DC-3s last month. This deal required no further borrowing. By the end of 1952, Capital hopes to have 20 Super DC-3 replacements for its 23 conventional DC-3s.

► **Lockheed Leases**—The deal with Lockheed is unique, involving an 18-month lease-purchase arrangement. Constellations involved are Model 049s, five of which are being returned to Lockheed by KLM under an agreement whereby the Dutch airline will purchase five new longer-range Model 749 Connies.

Lockheed will give the three Model 049 Constellations destined for Capital a complete overhaul and install a new, plush interior. The 56-passenger planes will be leased to Capital for \$17,500 a month each. These rental payments can be applied against the purchase price of \$684,000 per plane.

Carmichael emphasized that Lockheed was not plunging into the equipment leasing business on a broad scale. The present agreement with Lockheed was only possible because of the KLM switch to Model 749 Constellations.

Capital's president said new Connies would have cost up to \$1.1 million

each. Whereas the carrier will receive the former KLM Constellations next June, July and August, purchase of new equipment would have meant a wait until March, 1951, for delivery.

The three ships will be used mainly on Capital's routes between Washington and Chicago. Only four-engine equipment now owned by the company is 19 DC-4s.

► **Improves Financing**—Anticipating additional plane requirements, Capital has taken steps to ease restrictions now tied to its debentures. Under a plan filed with the Securities and Exchange Commission, the company would replace \$7,400,000 in 15-year, 3½-percent convertible income debentures due in 1960 with \$3,700,000 of series A 4-percent debentures and the same amount of 4-percent series B convertible income debentures, both due in 1960.

Carmichael told debenture holders the new issues would "provide the financial flexibility needed to continue with Capital's re-equipment program and the concomitant ability to pay interest and sinking fund charges on the debentures." Approval of the move would mean relaxation of restrictive provisions relating to the creation of funded debt and pledging of assets.

## Rickenbacker Not Worried By British

U. S. manufacturers of transport aircraft and government planners were the targets for barbs tossed by plain-spoken Capt. Eddie Rickenbacker, Eastern Air Lines president and general manager, at a recent meeting of the aviation press in New York, when he spoke on the commercial outlook for jet planes in this country.

Despite the disconcerting U. S. picture in this field, Rickenbacker feels "there is no need for worrying about Americans buying British jet jobs"—because of the problems imposed by use of the metric system and the further weighty factor of replacement parts, both as to availability and price.

► **Forecast**—He believes that in the next five to seven years U. S. manufacturers will have better and more economical jet transports than the British will have to offer.

And that probably within this time, such a degree of jet economy will be attained as to make unnecessary the need for a propeller.

► **Development Lags**—Yet, Rickenbacker feels that our industry needs some "burrs" to get it started. He believes that our manufacturers have been negligent in advancing the advantages of jet propulsion for transport aircraft.

He realizes that manufacturers "could go off the deep end" and easily build a jet transport, but the prime



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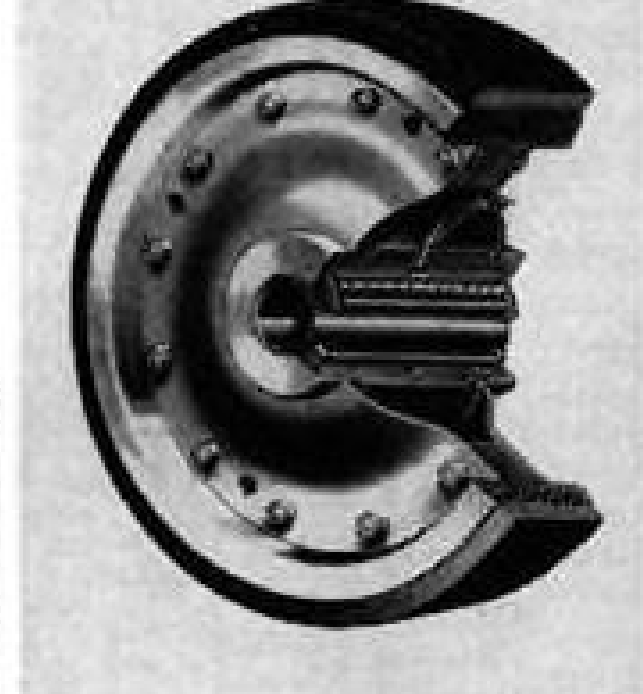
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consideration would be "will it be the right job for our industry?"

► **Speed Problem**—He said that complementing the desirable factors of speed, lack of vibration, and maintenance economy is the very realistic hurdle of traffic delay, which even now presents serious problems with our "slow" transports.

► **Other Obstacles**—Also, heat of jet exhaust will pose serious problems of unloading and loading on the ramp.

Existing fuel supply facilities at airports are another consideration. Were jets to replace existing craft under present conditions, fuel supply would not be sufficient to service them.

► **Initial Proving**—Rickenbacker caustically observed that he "never saw a transport any good before two years of operation on the airlines."

He said that Eastern would use jet liners if the manufacturer would pay initial operating costs. Under this arrangement, he said, the craft would be tried for a 6-12 month period under conditions he thought it should be operated for the airline public.

► **Government Role**—Emphasizing the Government's obligation in the jet transport picture, Rickenbacker said that it would have to support development of a prototype, because no airliner or group of them could afford to undertake the venture.

He believes that the Government should appropriate \$75-100 million, get specifications from the airlines, select two or three of the better manufacturers and give them the green light. He feels that cost of a jet liner should not exceed \$1 million, but that the manufacturers would probably want closer to \$3 million for the craft.

## SHORTLINES

► **Alaska Coastal Airlines**—CAB has approved a proposal whereby the Reconstruction Finance Corp. would become a 90 percent participant with a Juneau bank in a \$100,300 loan to the carrier.

► **Braniff**—Doubled its DC-4 tourist service between the U. S. and Peru. Four roundtrips weekly are being scheduled using combination passenger/cargo craft with fares 25 percent below regular rates.

► **British Commonwealth Pacific Airlines**—Lost 160,000 pounds sterling during its first complete year of operation. Ownership of the line is held jointly by the governments of Great Britain, Australia and New Zealand on a 20 percent, 50 percent, 30 percent ratio, respectively. The three governments have been asked to make up for the deficit in proportion to their shareholdings.

► **British European Airways**—Has announced fare reductions up to 30 per-

cent between London and nine foreign stations for British military personnel and their families.

► **Robinson**—Has become the first feeder stockholder in Air Cargo, Inc.

► **Northwest**—Asked CAB permission to cut upper berth rates on transcontinental Stratocruiser flights to \$25 and lower berths rates to \$50. Company now has a straight \$90 charge for berths. . . NWA directors have declared the regular quarterly dividend on the 4.6 percent cumulative preference stock.

► **Pan American**—Will inaugurate daily Stratocruiser service between New York and Bermuda Nov. 1. . . PAA and other American-flag carriers operating to Panama have transferred their operations from Albbrook Field, Canal Zone, to the new Tocumen National Airport.

► **Sabena**—Reported an operating loss of about \$380,000 in 1948, but the deficit was counterbalanced by a similar amount from a special provision made in 1946. Carrier handled 146,111 passengers and had a 62.5 percent load factor in 1948, compared to 186,127 passengers and a 63 percent load factor in 1947.

► **Scandinavian Airlines System**—Has inaugurated direct DC-6 service between New York and Hamburg, Germany.

► **Tasman Empire Airways**—The New Zealand carrier has received the first of four new Short Solent flying boats. Carrying 44 passengers on two decks, the craft will be used on the Sydney-Auckland run.

► **TWA**—Trans-Atlantic cargo handled during the first eight months of 1949 increased 50 percent over the same period last year. Eastbound cargo, totaling 1,538,245 ton miles, was up 45 percent; and westbound cargo, aggregating 906,978 ton miles, rose 58 percent over 1948.

## CAB SCHEDULE

Oct. 24—Oral argument in New England service case. (Docket 2196 et al)

Oct. 24—Hearing in enforcement proceeding against Mt. McKinley Airways. (Docket 4035)

Oct. 25—Reopened hearing in PAA-AOA North Atlantic route transfer case. (Docket 3589 et al)

Oct. 31—Oral argument on Board's investigation of directional commodity rates. (Docket 1705 et al)

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

Nov. 16—Hearing on transcontinental coach type service. (Docket 3397 et al)

Dec. 5—Hearing in New York City area helicopter case. (Docket 946 et al)

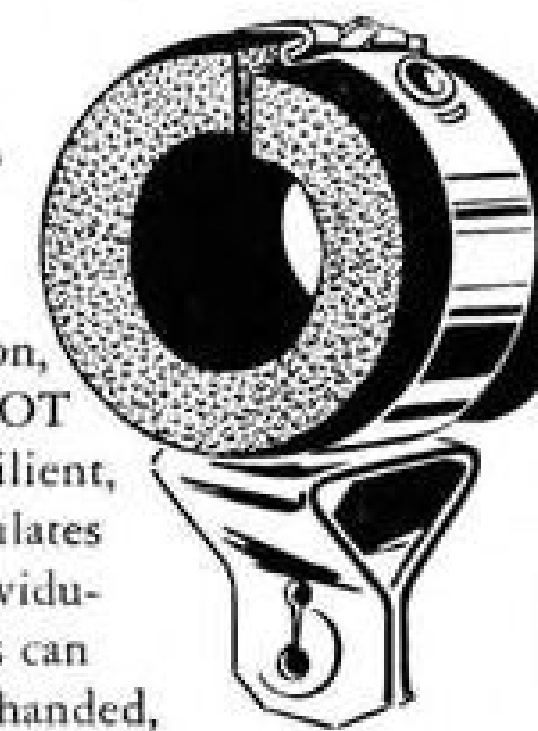
Dec. 5—Hearing in Western-Inland mail rate case. (Docket 2870)

Dec. 6—Hearing on renewal of Trans-Texas Airways' feeder certificate. (Docket 3720)

Jan. 9—Hearing on air freight accumulation, assembly and distribution tariffs. (Docket 1705 et al)

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

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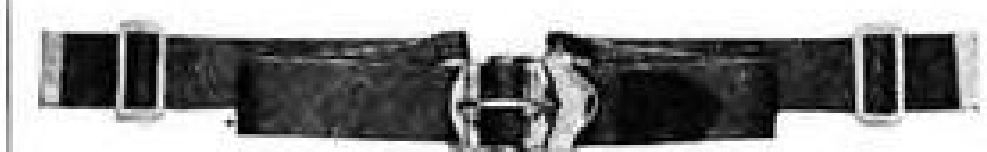
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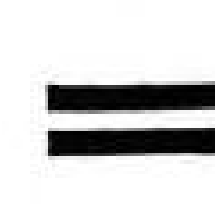
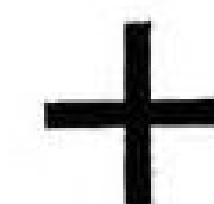
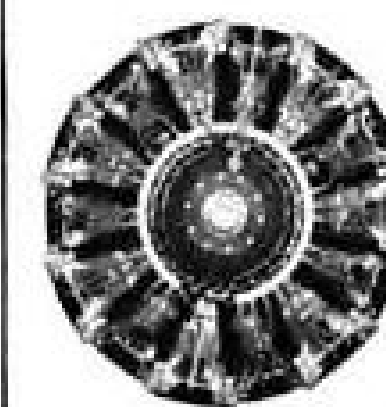
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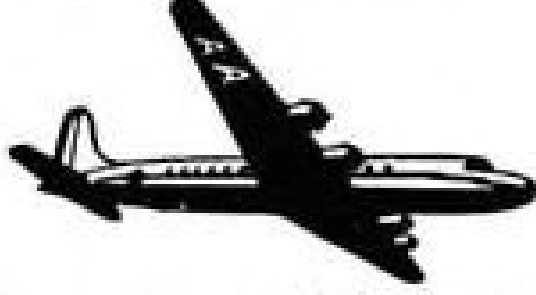
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# LETTERS

## Edison Detectors

In your "Industry Observer" column Sept. 19, your editor states, "American fire and smoke detectors are activated by photo-electric cells and carbon dioxide detectors."

He missed the most widely used detector of all: the Edison Thermocouple Fire Detector!

The Edison Fire Detection System, which we have manufactured and supplied to the aircraft industry for many years, utilizes thermocouple detectors exclusively (and is the only fire detection system which does). What further makes the omission hard to understand is the fact that the Edison Fire Detection is used by nearly all major airlines, conforms to all CAA requirements, and is approved by the U. S. Air Force and U. S. Navy.

In the interest of accuracy we hope you will straighten out anyone who may have been misled by your statement.

K. R. DUEE, JR.  
Aeronautical Sales & Service Manager  
Instrument Division  
Thomas A. Edison, Inc.  
West Orange, N. J.

## H O & Rockets

In reviewing the article, "Evaluating Nitromethane for Rockets," in AVIATION WEEK May 16, we find that the section dealing with 90 percent hydrogen peroxide omitted recognition of those characteristics which enhance the value of this material in the field of rocketry.

We, therefore, wish to inform your readers of its properties and clarify any misconceptions which may have arisen as to supposed hazards surrounding hydrogen peroxide.

The experience of the Buffalo Electro-Chemical Co., Inc., and the many organizations using it, has been that hydrogen peroxide can be handled with complete safety if certain established simple rules are followed.

This requirement bears comparison, for example, with that for the handling of gasoline. For at one time gasoline, too, was considered "dangerous" to handle. This "danger" practically ceased with the enormous growth of experience and knowledge surrounding its use and attendant care in its handling.

The I. C. C. classes hydrogen peroxide as a corrosive liquid for shipping purposes. It is considered no more difficult to handle in transportation than many common commercial chemicals.

Ninety percent hydrogen peroxide is not an explosive and is insensitive to shock except when under extremely high confinement. Extensive tests by the U. S. Bureau of Mines, the Navy, and ourselves have proved this.

In addition, F. Bellinger, et al, in "Chemical Propellants," which appeared in Industrial and Engineering Chemistry, 38,

310, 1946, described shock sensitivity tests which they performed in the interest of the armed forces:

- (A) 90 percent hydrogen peroxide in aluminum containers was subjected from a range of 100 yards, to machine gun fire, with .50 caliber armor piercing, tracer, and incendiary bullets. The only damage caused was the perforation of the container walls.
- (B) A piston driven upon a sample of 90 percent hydrogen peroxide by a 200-gram hammer through a distance of 350 cm. caused no detonation.
- (C) A 2000-psi. jet of air rammed 90 percent hydrogen peroxide at the closed end of a 1 1/4-in. diameter pipe and no detonation occurred.

Hydrogen peroxide stored in its special aluminum drums or tanks and exposed to intense sunlight will not explode because of the heat effect. Our standard test on all lots of 90 percent H<sub>2</sub>O<sub>2</sub> is to heat a sample at 212 degrees F. for 24 hours. No explosion ever results. The only effect is a slight decomposition of about 2 percent strength loss for the test period.

Furthermore, this material has, for a number of years, been stored and handled in bulk at the Buffalo Electro-Chemical Co., Inc., at ambient temperatures ranging from -8 degrees F. to 98.2 degrees F. with no more than a few minor burns to personnel from accidental spillage.

Finally, the selection of materials of construction for handling and for long term storage of any quantity of 90 percent hydrogen peroxide is no longer a procurement problem. We have confirmed the commercial availability of a large number of suitable materials for this purpose.

Limitations of space preclude mention of other factors. Nevertheless, we trust that this account will contribute to a fuller appreciation of the potentialities of hydrogen peroxide as an oxidizer for rocket motors and kindred uses and that it will, perhaps, dissipate the unwarranted fear existing in some quarters that hydrogen peroxide is "too hot to handle."

NOAH S. DAVIS, JR.  
Special Projects Dept.  
Buffalo Electro-Chemical Co., Inc.  
Buffalo, N. Y.

(The article was a summary of an address made before the S. A. E. in New York City by Dr. Fritz Zwicky, director of research at Aerojet Engineering Corp., and C. C. Ross, Aerojet's chief engineer of the liquid engine department. Dr. Zwicky writes:

"It was not our intention to discourage the application of hydrogen peroxide in rocket propulsion. Admittedly pure hydrogen peroxide in contact with suitable materials and properly handled presents little or no hazard. However, it is often difficult to maintain these conditions, especially

when a rocket is merely an auxiliary to, say, an airplane, and is being handled by personnel who may not know all the safety requirements. Also, when a rocket is part of a larger system, and accidental spillage or breakage is possible, it may be difficult to construct the entire system of materials inert to any oxidizer. We certainly have no objection to your pointing out that pure hydrogen peroxide can be handled quite safely in the proper equipment."—Ed.)

## Bevo Dissents

I have noted your editorial, "Dangerous Exhibitionism," Sept. 12. It is, indeed, unfortunate, that Bill Odom and two others were lost in an accident in the Thompson Trophy, and I certainly cannot say anything that could justify the loss. . . With this in mind, if a safer race course can be laid out then it should be done. . .

I do not agree with you, however, that the National Air Races no longer serve any useful purpose, and that they should be discontinued. In my opinion they justify themselves from a spectator and show standpoint alone and should be continued on that basis if nothing else.

I am not prepared, or do I have all the facts before me about things that have been developed through racing competitions and shows like that at Cleveland, but I am sure that they would add up considerably.

The fact that is a big show and that air pilots and aeronautical engineers have the opportunity of competing against one another for prize money certainly does a lot to strengthen the industry. . .

This same opportunity of competition and free initiative and enterprise went a long way in building our World War II air force, and if allowed to continue can and will contribute heavily to a sound industry in this country in peacetime and in preparation of another wartime air force.

Certainly we should not leave it to just the long-haired engineers and factory test pilots to build and fly our airplanes. Surely they can do the job, but the job definitely will not be so good as if we have the ideas and spirit of free enterprise and initiative in them, and races like Cleveland certainly develop the spirit of free enterprise, initiative and competition.

There seems to be still a lot of argument pro and con about air shows, and I for one am convinced that good air shows have a definite place in our industry and I think we should accept this fact and go about helping plan and produce better and safer air shows.

BEVERLY HOWARD, President  
Hawthorne Flying Service  
Charleston, S. C.

(We think Friend Bevo's evidence of NAR technical benefits is very thin. We favor safe, educational air shows. But no stunts, please, despite Bevo's brilliant, safe record of aerobatics. Why court accidents, Bevo? Aviation needs you, alive, for a long time.—Ed.)



**Col. Mark J. Maidel,**  
Vice President in Charge of Operations,  
Scandinavian Airlines System, Inc.

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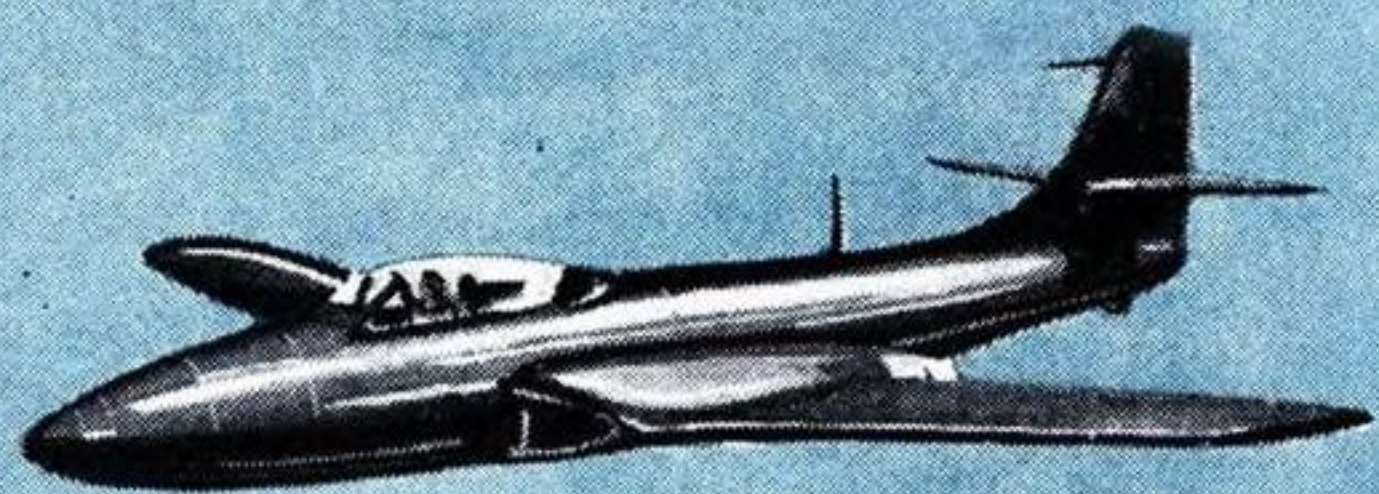
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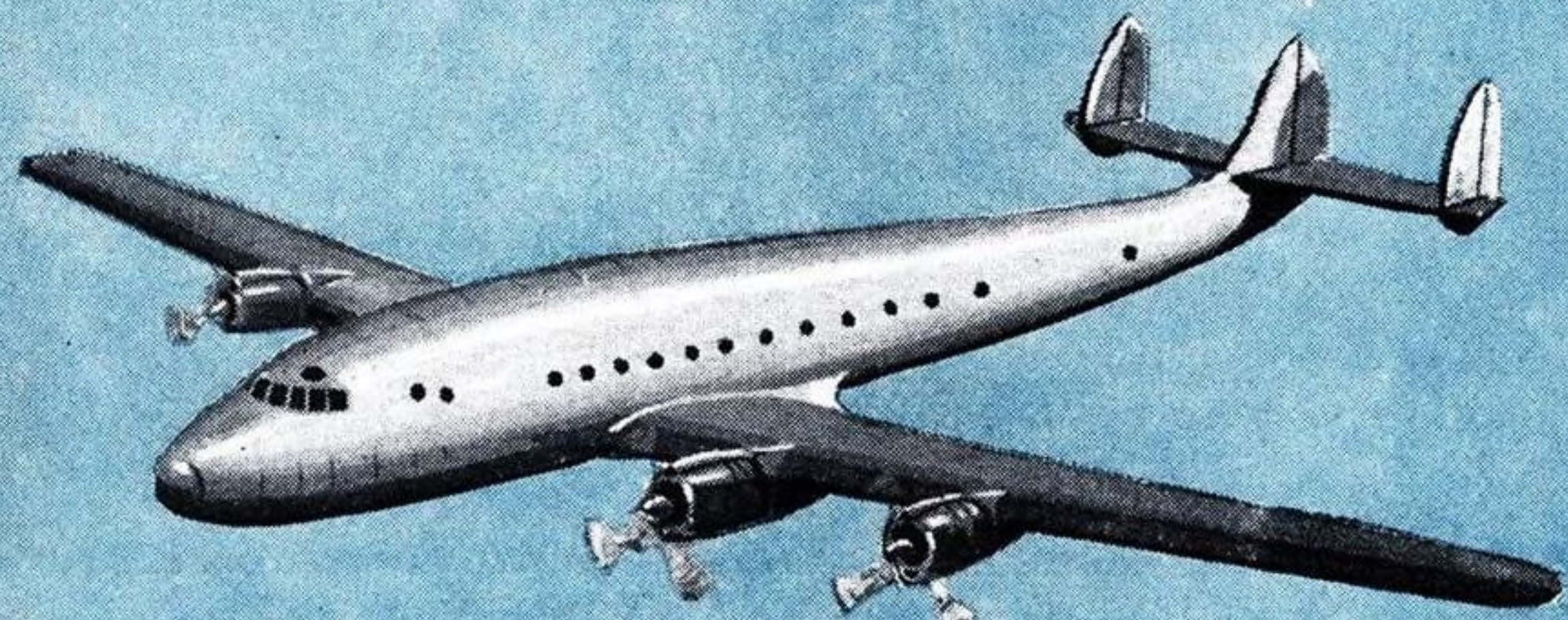




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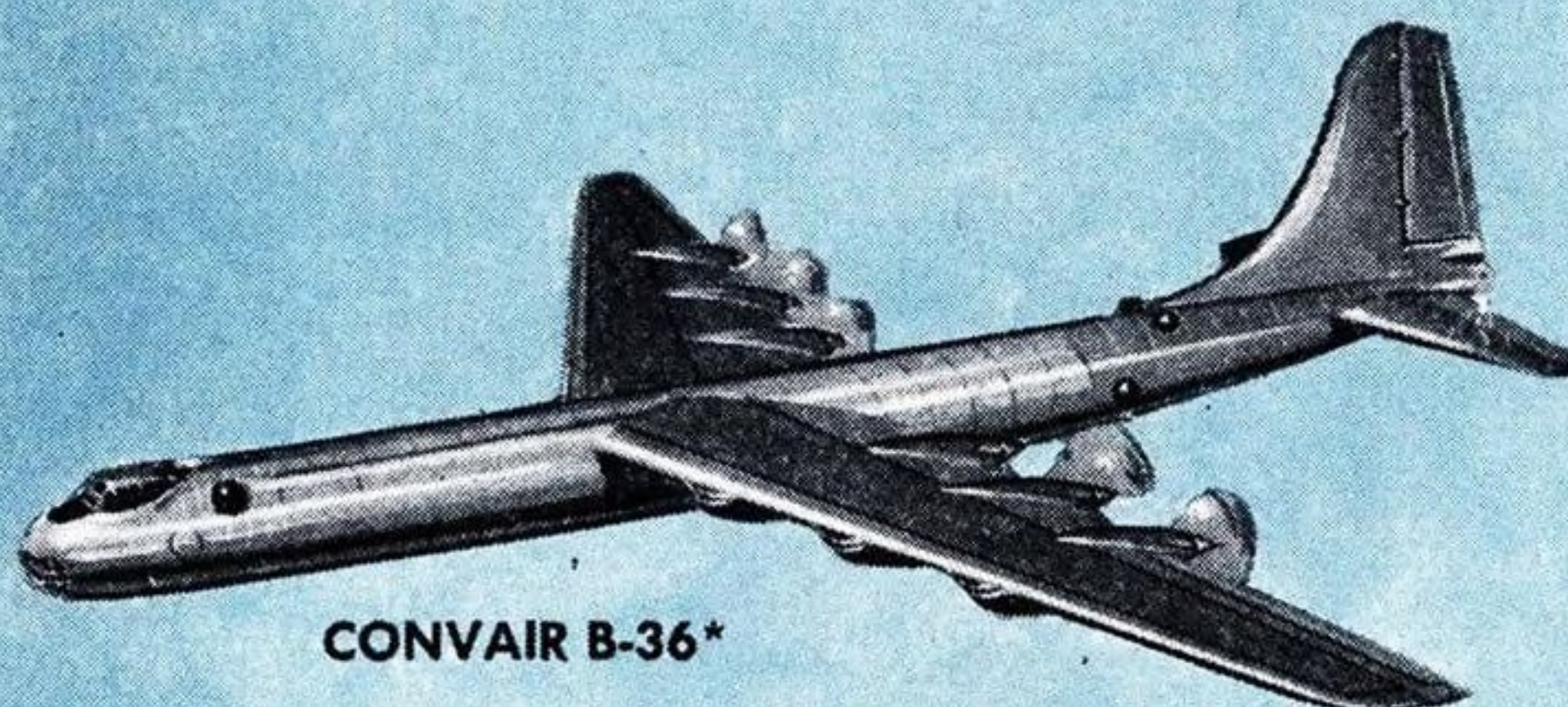
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