

# AVIATION WEEK

NOV. 24, 1947

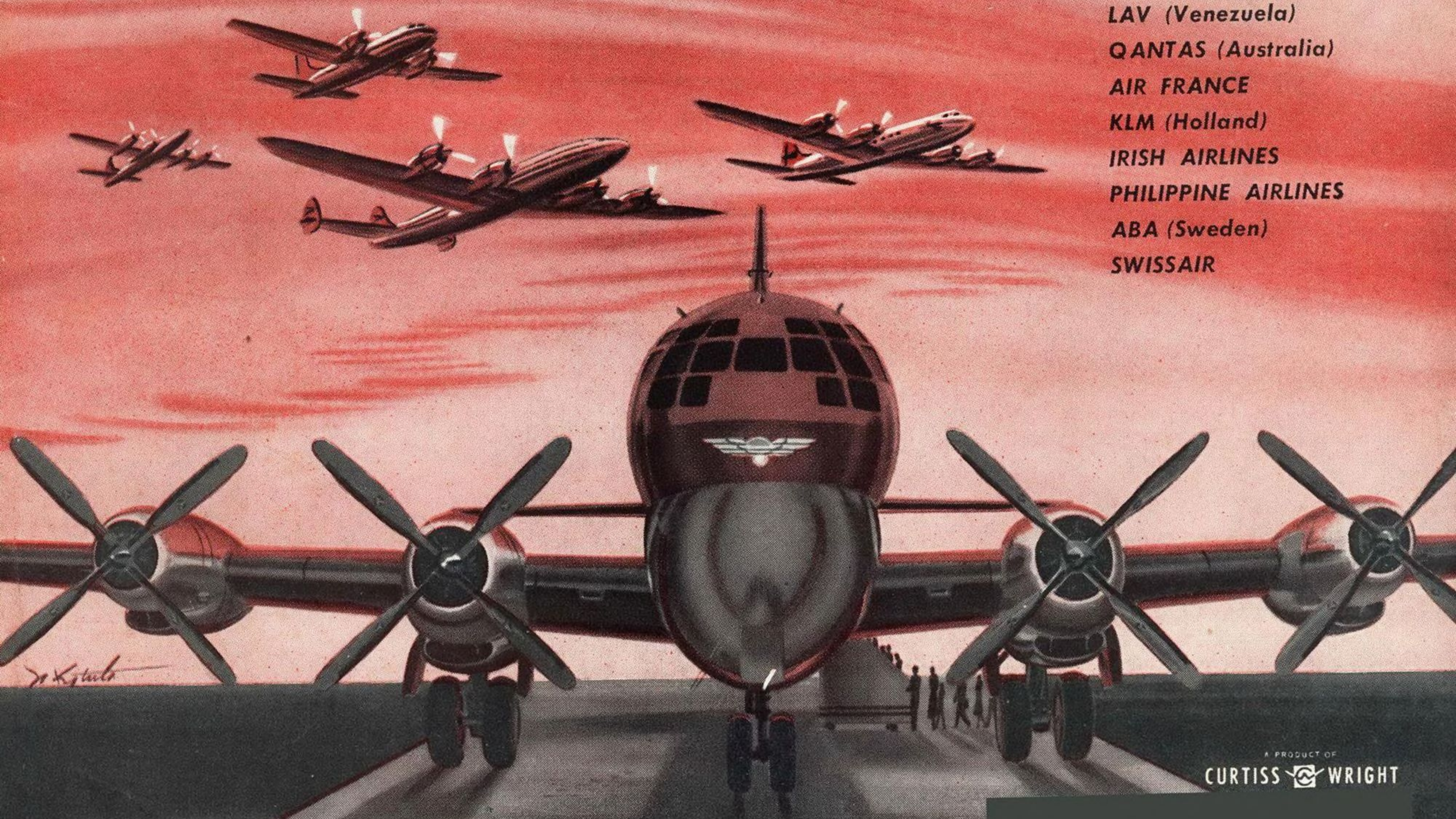
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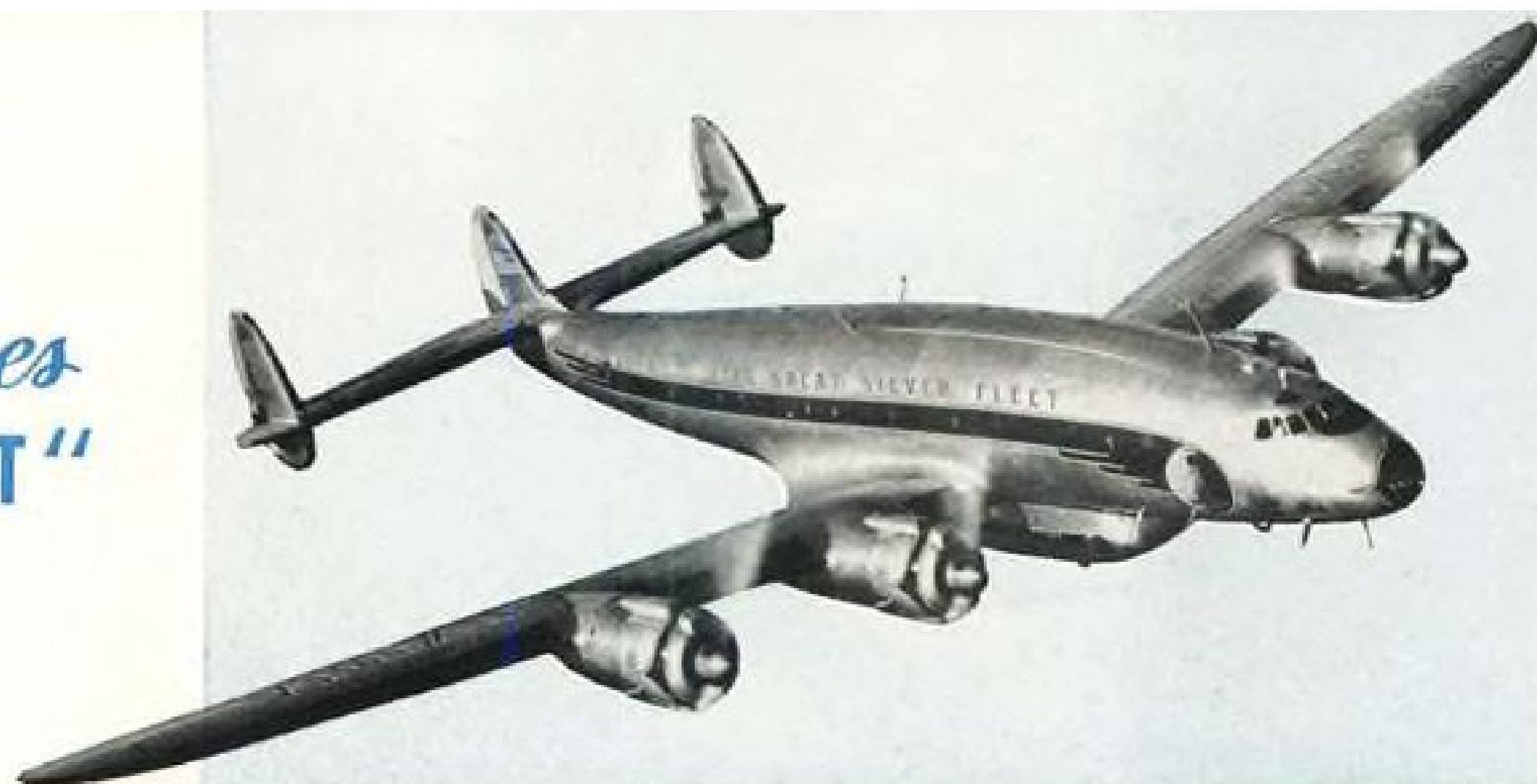
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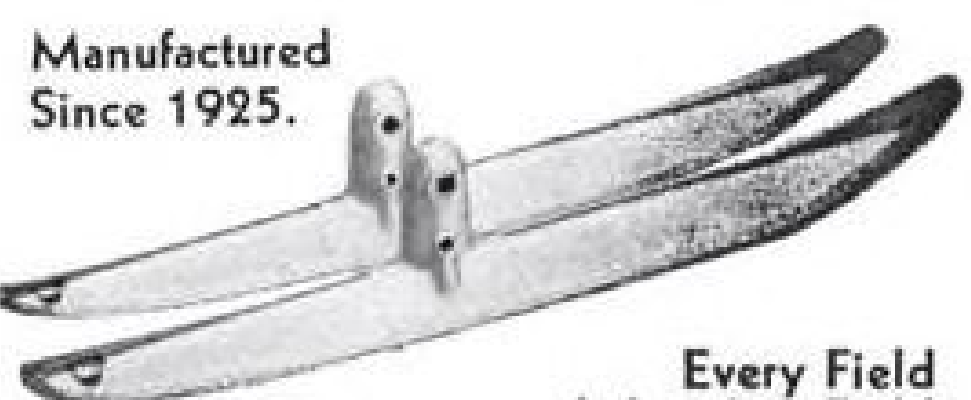
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# AVIATION WEEK

Vol. 47 No. 21

Nov. 24, 1947

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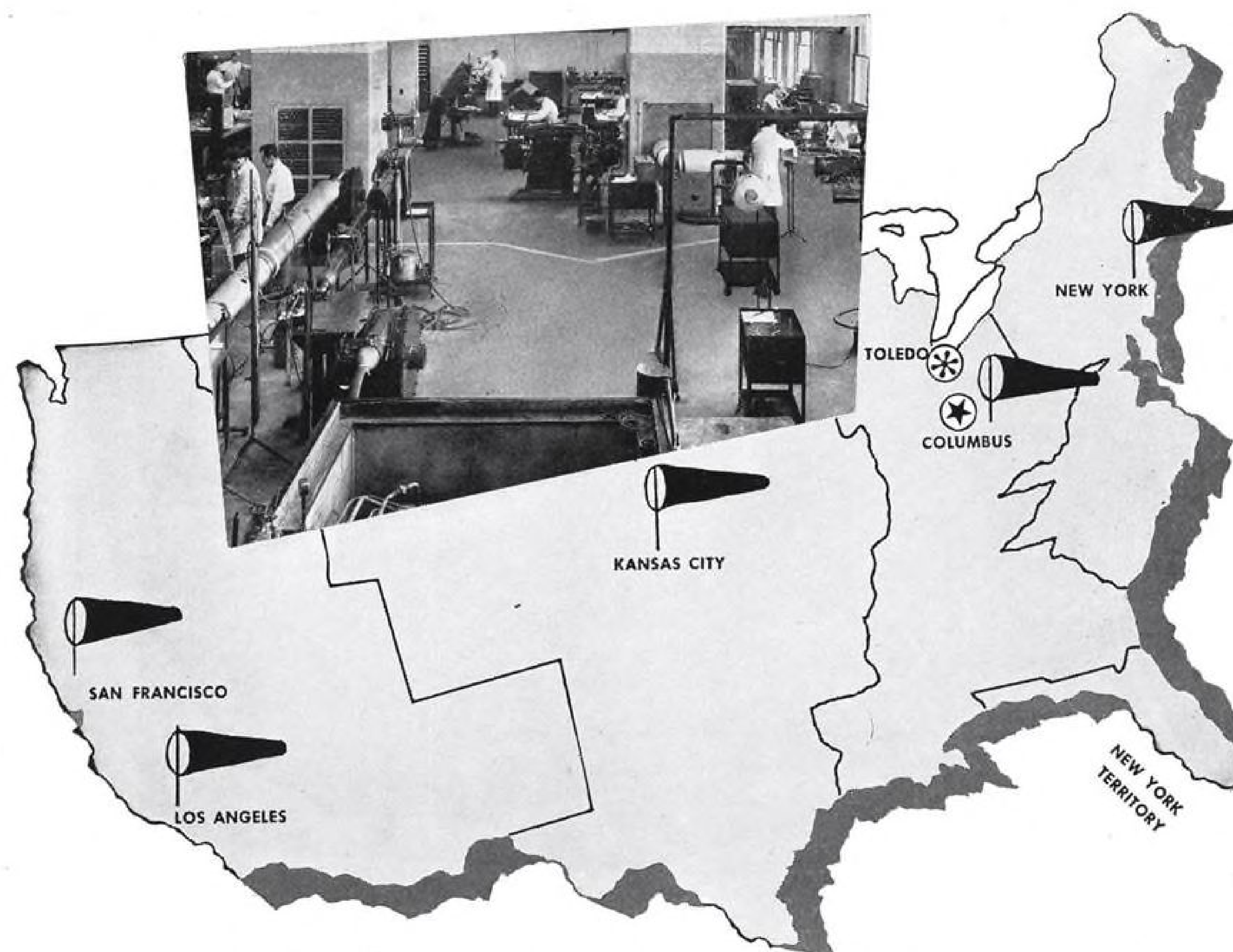
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## THE AVIATION WEEK

**LABOR PROBLEMS**—Management in the aviation industry had notice this week of new problems on its labor front. From Capitol Hill rang President Truman's appeal to a special session of Congress for "selective" price and wage controls and allocation of scarce industrial materials as a means of aiding Europe and coping with inflation. In Atlantic City another president, peppery Walter P. Reuther of the United Automobile, Aircraft and Agricultural Implement Workers, took a firmer grip on the UAW-CIO which will have repercussions in the aircraft plants and airline maintenance shops.

Truman's program is primarily for Congress to deal with. But, it too, has a place in the labor picture. Price controls, rationing and allocation of materials were advocated by the CIO. If they are not adopted, organized labor will claim justification for a third round of wage increases.

It is true that Truman also asked for wage controls in those limited areas where prices would be controlled. This is meaningless. It appears to have been tossed into the 10-point program to give the appearance of balance.

Truman, for instance, asks "authority" to prevent wage increases which make it "impossible to maintain price ceilings." In the same breath, he admits "there would be few occasions for its use." The explanation is that Truman feels more wage increases can still come out of profits without raising prices.

**WAGE BATTLE**—Wage increases without price increases. We've heard that slogan before. Its a favorite of Reuther's. Already we are hearing it again, with reverse English. Reuther now says that a 12 percent price rollback is necessary as an alternative to a third-round wage increase. This is no different from a wage increase without price increase.

Reuther, glamor boy of the CIO, stands today as heir-apparent to Philip Murray, CIO president. He openly attacked Communist elements in the UAW-CIO and swept out of the leadership three international officers who had their support. Reuther forces control 18 of the 24 executive board members and 90 percent of the voting strength.

**SECOND PHASE**—Right now, the aviation industry is involved in the second phase of union activity. The first was unionization of the main body of workers—production workers in the plants and pilots and ground personnel in airlines.

The second consists largely of signing up the smaller groups, like office and clerical workers, supervisors, technicians, and stewardesses, and raiding other unions. This is when the unions struggle for control of the industry. Manifestations of this, as well as of the

third phase, are union efforts to obtain more security for their members and to have more say in the management of the business. Major objective of the third phase is industry-wide bargaining and monopoly of labor.

During the next year, then, the aviation industry should expect increased intensity in the struggle between the UAW-CIO and the International Association of Machinists for control over workers in airframe and aircraft parts plants and airline mechanics and other ground personnel. Within the CIO, the UAW, aligned on the right, may try to squeeze the left-wing dominated Transport Workers Union out of the airline field.

**REUTHER SWEEP**—Reuther proclaims he has rid the UAW-CIO of factionalism which has hindered the union's activities. This can hardly be accomplished over night. But even so, there will be more unity of action and of purpose by the union. Reuther men are replacing Thomas-Addes-Leonard supporters in key spots, many of them in aviation.

R. J. Thomas, deposed vice president, will surrender directorship of the air line mechanics department, in which capacity he has been considered a failure. In his convention report, Thomas tried to blame raids by other unions and policies of the National Mediation Board, which he claims consistently favor the AFL and IAM. Among the raids he cited was one by a sister CIO union, the TWU, on the UAW's American Overseas Airlines membership. A new director with a fresh set of organizers will take over this branch.

The staff of the UAW's aircraft department, headed by Reuther himself, will be considerably enlarged. When Reuther took it over last year his executive board, controlled by anti-Reuther men, cut his staff to only two men. During the war it had 97 men.

That's how factionalism saps a union's strength. Now Reuther says that is eliminated and the Commies are out of control. But don't expect a "soft" UAW-CIO.

**MANAGEMENT PROBLEMS**—Reuther is a "rightist" only in comparison with a Communist. Actually, he holds Socialist beliefs, calls himself a Social Democrat.

The aviation industry will hear more about industry councils and industry-wide bargaining, prices, pensions, equal pay for equal work, annual wage, universal job descriptions. In other words, the UAW will seek a share in the management. Already, Reuther has undertaken a "comprehensive study" of "the future trend of the aircraft industry and its prospects in relation to employment, wages and union organization."



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## NEWS DIGEST

### DOMESTIC

Boeing B-29 piloted by Capt. Warren Baulch completed the longest endurance flight without refueling on record by flying 22 hours and 15 minutes and covering a total distance of 4410 miles. The Superfort carried a crew of 13 and two observers.

North American Aviation, Inc. has completed arrangement for the leasing of five units of the government-owned Douglas Aircraft Co. plant at Long Beach, Calif. The lease is for five years at an annual rental of \$226,580.29 payable monthly in advance. The plant currently is used for the production of B-45 four-jet highspeed bombers and employs 2240 persons.

Studebaker Corp. has purchased for \$3,592,000 the government-owned plant it operated during the war at South Bend, Ind. The sale is subject to a return to the government within a specified time in the event of a national emergency.

Captain Albert B. Scoles, formerly director of the Navy air missile test center at Point Mugu, Calif., has been appointed director of technical liaison for the pilotless plane division of Fairchild Engine and Airplane Corp. He will headquarter in Farmingdale, L. I., New York.

### FINANCIAL

Sabena (Belgian Air Lines) reports a net profit of \$2,842,964 for the 1946 calendar year. A total dividend of 8 percent was declared during the year on paid-up preferred stock, which is held equally by the Belgian government and private interests. In addition, a gross dividend of \$1.17 per share was declared on 52,000 shares of no par common stock.

Howard Hughes received refunds and credits from the U. S. treasury totaling \$455,972 for overpayment of his personal income taxes for 1945-46.

### FOREIGN

British Overseas Airways Corp. has formed a new airline in conjunction with Hongkong, China commercial interests to operate air services between Hongkong, Canton and Shanghai.

Australian Air Fares between Perth, Western Australia, Queensland and Tasmania have increased 20 percent due to increased wages and costs. According to the minister for civil aviation, Australian air fares are still among the lowest in the world averaging 4.7 cents per passenger-mile in comparison with 5.1 cents in the U. S. and 6 cents in Canada.

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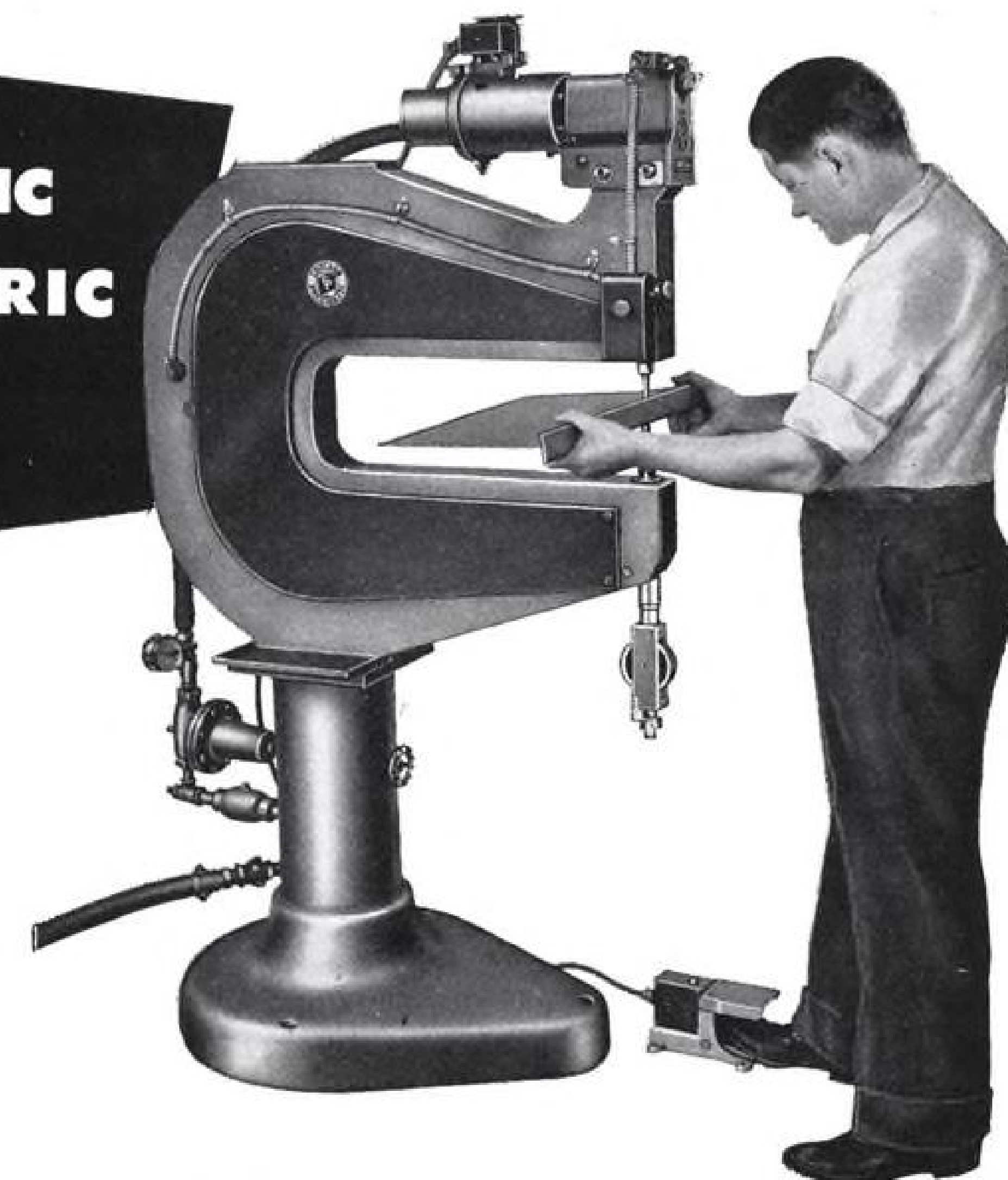
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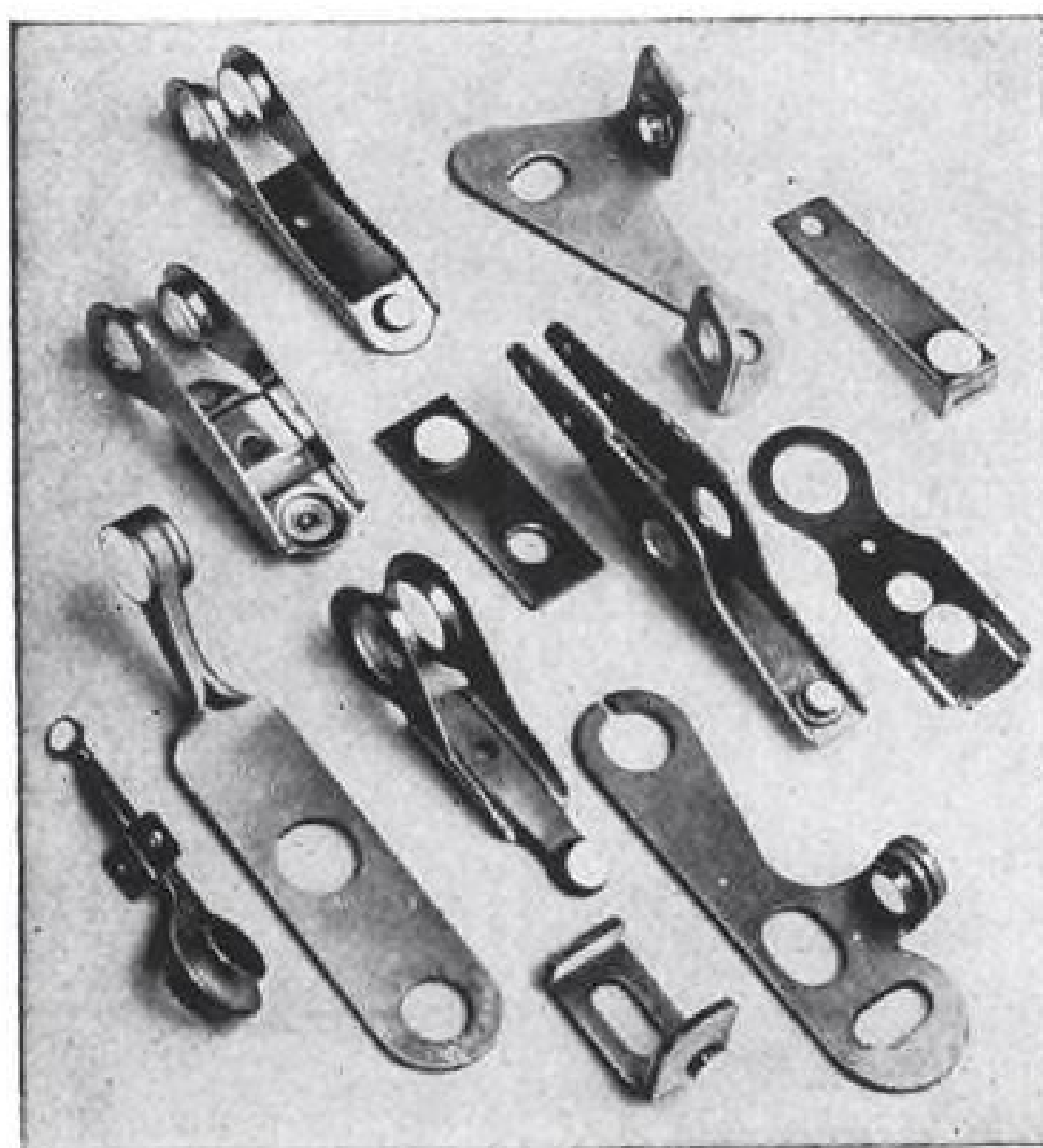
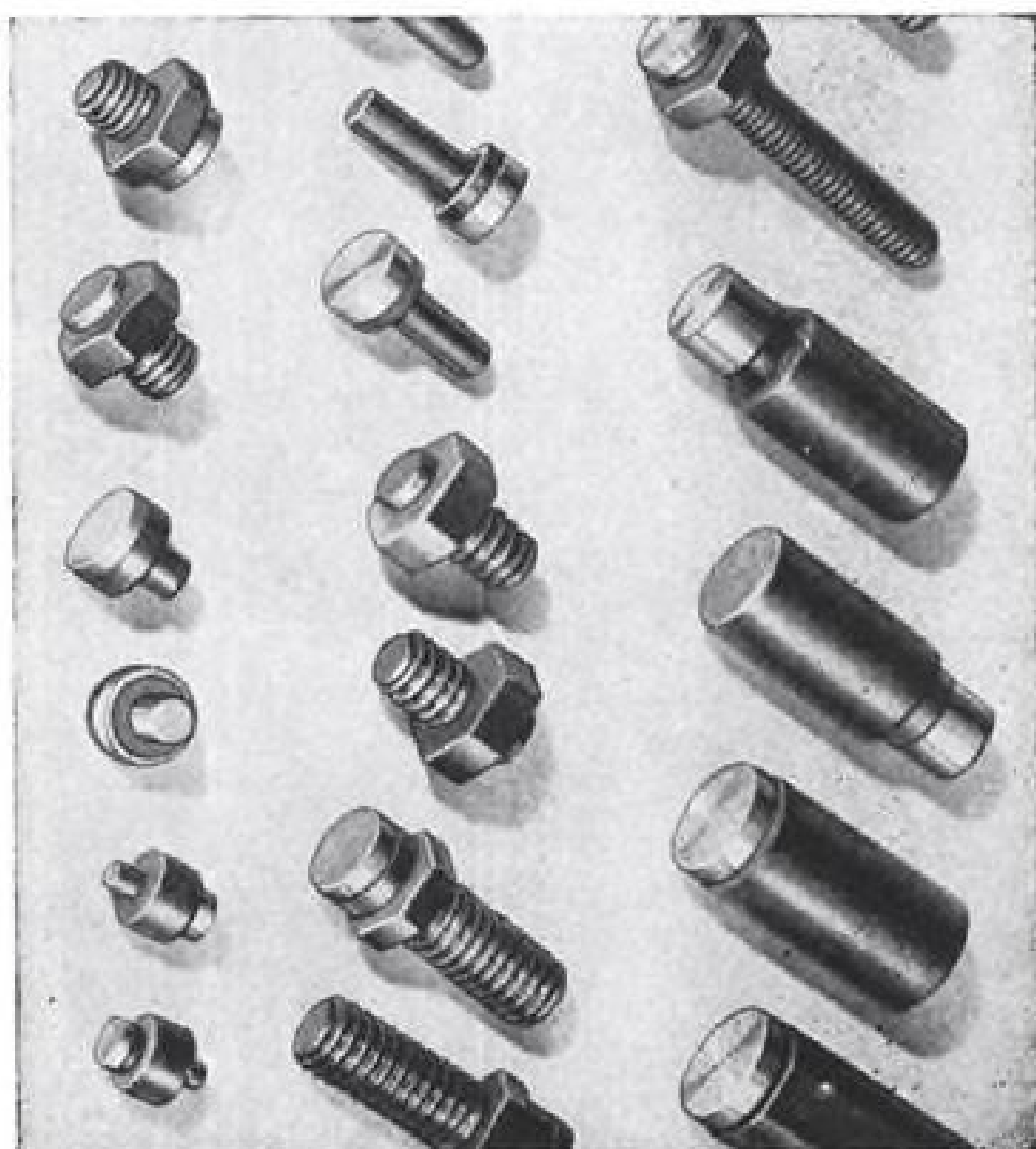
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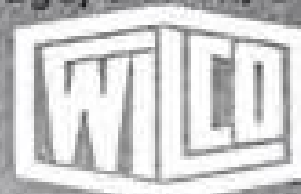
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Vol. 47 No. 21

# AVIATION WEEK

Nov. 24, 1947

INCORPORATING AVIATION AND AVIATION NEWS



LaMarre (Press Assn.)



Meyers (Press Assn.)



Bell (IN Photo)

## AAF Subcontracting Firm Owned By Gen. Meyers, Testimony Shows

Senate subcommittee also hears Wright Field general held aviation stocks while handling procurement; Air Force shelved probe.

Maj. Gen. Bennett E. Meyers and Army Air Force policymakers shared the spotlight before the Senate War Investigating Subcommittee last week. Highlights of evidence presented the group were:

- Meyers held more than \$35,000 in aviation stocks in 1943 while chief of staff of the Air Materiel Command at Wright Field. If proved this would be a violation of U. S. Criminal Code prohibiting government procurement officials from having financial interests of any type in firms with which they deal as government representatives. Maximum penalty is two years' imprisonment or \$2,000 fine.

AAF failed to investigate reports during the same year of aviation stockholding by Wright Field procurement officers and launched a public relations project to "squench" the rumors.

- Aviation Electric Corp. of Dayton, was set up by Meyers in 1940 as a "front firm" for the general according to Bleriot LaMarre, 35, who reported

he was a \$38-a-week accountant at Douglas Aircraft when Meyers (LaMarre's wife had been Meyers' secretary) introduced him into the firm "to watch after his (Meyers) interests." LaMarre served as president and treasurer of the company. Although LaMarre was listed on official records as the firm's owner, he stated that Meyers actually owned 100 percent of the stock.

In 1940, a \$162,000 subcontract for electrical assemblies was obtained from Bell Aircraft for Aviation Electric through Meyers' efforts, LaMarre testified. Lawrence Bell, J. H. Kindelberger of North American Aviation Corp., and Guy Vaughn of Curtiss-Wright, LaMarre said, were among the contacts Meyers mentioned to him would assure the company business. Company engineers set a price of \$11 per unit on the Bell contract, LaMarre reported, but Meyers boosted it to \$44. With the Bell contract accounting for all but \$2,000 of its \$164,000 gross business, the company in 1941 made

sufficient profits to repay a \$30,000 loan from Meyers and pay him another \$30,000. The \$30,000 additional payment to Meyers, LaMarre said, was recorded as his (LaMarre's) salary. LaMarre set his actual 1941 income from the firm at less than \$3,000.

- A detailed letter (June, 1945) containing charges against Meyers, requesting that he be investigated, was pigeonholed by the office of former AAF commanding general, H. H. Arnold. The letter, sent to the FBI by an anonymous source explained, "I am in the AAF at the present time and do not care to suffer the vindictiveness which would be my lot if my name is known."

Officially dropping the curtain on what he termed "the first phase"—award of \$40 million in contracts to planemaker Howard Hughes, subcommittee chairman, Sen. Homer Ferguson (R., Mich.) shifted into "the second phase" of the group's probe of wartime aircraft procurement with Meyers as the target.

Most of the witnesses who paraded before the War Investigating Subcommittee are well known in aviation. Among them were:

- Lawrence Bell, Bell Aircraft president, who testified on Meyers' recommendation in the fall of 1940 that he subcontract on a French (later taken over by the British) contract with Aviation Electric. Meyers, Bell reported, said only that the firm was run by "friends of his," gave no indication that Meyers

AVIATION WEEK, November 24, 1947

HEADLINE NEWS

11



might be the owner. Bell placed the subcontract with Aviation Electric before the year's end and channelled a total of \$1,530,000 in subcontracts to the firm during the war.

• **Maj. Gen. Oliver P. Echols**, wartime chief at Wright Field, declared that he had "heard no rumors" and that "it never occurred to me" that Meyers might have aviation stockholdings, although testimony showed that such rumors were widespread in civilian aviation circles and in AAF's public relations division. Early in 1940, Echols admitted being informed of Meyers' interest "in a Dayton electric company." He said he directed Meyers to "get rid" of the connection, and left Wright Field late in the year "with the definite impression" that he had.

• **Col. William Nuckols**, AAF public relations officer in 1943, proposed to his chief, Maj. Gen. George Stratemeyer, that the public relations staff "gather ammunition" to "squell rumors of high ranking officers holding large blocs of aircraft stocks." Nuckols replied "that was not my function" when Ferguson asked why he did not refer the "rumors" to the air inspector's office for investigation.

Stratemeyer, at the direction of Arnold, sent a memorandum to ten top procurement officers, including Meyers, requesting reports of their aviation stockholdings. "Certain rumors have been fomented which tend to undermine morale within the AAF and impair confidence in the high command," the memo began. "Positive steps are to be taken which, while not calling attention to these rumors, or assuming a defensive attitude, will counteract them." Stratemeyer assured that "this request is by no means to be regarded as anything in the nature of an investigation" and "will be used only with the greatest discretion."

Meyers reply showed that he held only 200 shares of General Electric, as of Feb. 5, 1943. Committee investigator Carmine Bellino, formerly of the FBI, disclosed that he held over 2,700 additional shares of aviation stock, valued at over \$35,000 on that date which was later transferred as a "gift" to his wife and listed under her maiden name, Ila Rae Curnett.

• **Col. Jacob Smart**, Secretary of Air Staff and Arnold's assistant, was unable to "recollect anything whatever" about the anonymous letter calling for investigation of Meyers. The direction to "file" over Smart's initials doomed the letter to a pigeon-hole. Smart told the subcommittee the letter did not merit an investigation "since the person who wrote it lacked the intestinal fortitude to sign his name." Isaiah Matlack, head of the FBI war frauds unit, differed. Had it come within Justice Department's province, Matlack testified, an

investigation "definitely would have been made on the basis of the letter." A wartime War-Navy-Justice agreement required that investigations of military personnel be left to the services.

• **Maj. Gen. Junius Jones**, air inspector, called the letter "the crack-pot type," agreed with Smart that it did not warrant an investigation. Jones didn't have "the slightest idea" why it was not routed to his office. The air inspector did not see the letter until after it was requested by the Senate subcommittee in May. The subcommittee had to appeal to Secretary of Air W. Stuart Symington to obtain the letter from Jones' office, and then received it only after quoting excerpts from it.

## Airlines Ground DC-6 For Accessory Changes

Temporary grounding of the Douglas DC-6 for the second time within a fortnight last week touched off intensive investigation of the plane's innards and forced six major airlines to slash and revamp their crack, extra-fare schedules. Second grounding was caused by emergency landing of an American Airlines DC-6 with a blazing belly at Gallup, New Mexico. Local fire department extinguished the fire after the plane's carbon dioxide fire extinguishers had failed to stifle the flames. CAB safety investigators rushing to Gallup from their Bryce Canyon probe of the crash of a flaming United Airlines DC-6 that killed all 52 persons aboard, found sufficient similarity between the two fires to warrant official grounding of all DC-6's had not the airline and Douglas voluntarily taken such action immediately after the Gallup landing.

► **Airlines Wary**—Indications were that airlines and the Douglas company, both wary after a similar series of fires in flight forced CAA grounding of all Lockheed Constellations in the summer of 1946, would keep the DC-6's on the ground not only until the fire hazard was licked but numerous other airline complaints against the plane were eliminated.

American and United Airlines who operate the bulk of the 93 DC-6's flown by U. S. domestic airlines (Braniff and National operate the rest) were flying about 80 percent of their normal schedules using Douglas DC-4's on their crack DC-6 schedules and bolstering the DC-4 runs with additional Douglas DC-3's. Both lines will take considerable financial loss from their extra-fare transcontinental DC-6 runs. Panagra and Sabena, only foreign DC-6 operators, are filling in with DC-4's.

Although origin of the United and American DC-6 fires is still undetermined the joint CAA, CAB, Douglas and airline investigation has yielded

several concrete results. Among them:

- Removal of all fiberglass insulation and soundproofing from the cabin floor. Fiberglass is fireproof but was found to collect leaking oil and hydraulic fluid and act as a wick in burning the inflammable fluids. This accounted for the first temporary grounding of the DC-6 after the United fire.

- Douglas order to discontinue operation of cabin pressurization and heating systems at the same time. Tests at Douglas's Santa Monica plant proved that defective oil seal rings on the cabin air blower drive shafts permitted a spray of fine lubricating oil to be blown under pressure into the cabin heater where it caused a fire. Air ducts to the cabin would carry smoke from a heater fire to the passenger compartments. The American DC-6 had been flying without using cabin blower or heater but pilots turned on heaters shortly before fire warning indicators went off and smoke filled the cabin.

- All parachute flares carried to aid in emergency night landings were ordered removed. In the United fire the magnesium flares, carried at the wingroot, were ignited and contributed to the high intensity of the fire.

- There were indications that carbon dioxide fire extinguishing systems now carried on all U. S. transport planes are not adequate for all types of fires in flight.

- Complete inspection of all electrical, hydraulic, heating, fuel and other auxiliary systems was ordered before Dec. 1.

Douglas Co. spokesmen at Santa Monica indicated that they would not be satisfied to allow the DC-6 back in airline service until engineers produced a mechanical device for positive shutoff of fuel and electric lines serving all DC-6 accessories. This means that Douglas plans to eliminate all electrical controls now regulating cabin heater and pressurization systems and those serving as safety cut-out devices.

Financial responsibility for the DC-6 grounding has not yet been assessed but in the parallel situation involving TWA and the Lockheed Constellation, Lockheed assumed the major financial burden.

## Red Tape Cut

Passengers traveling by air from the Orient to the U. S. via Alaska will save time by a new arrangement for immigration clearance at Anchorage, Alaska. CAA has been advised by the Immigration and Naturalization Service that after inspection at Anchorage passengers will be able to land anywhere in the U. S. with no formalities other than showing they had been cleared in Alaska. Similar action has been taken on Orient-U. S. traffic stopping at Hawaii.



Convair's roadable airplane in test before its recent crash. (Press Assn)

## Roadable Plane Crashes In Test

**Fifth design of "fly-car" by company goes down in Calif; pilot not seriously injured.**

Consolidated Vultee brought from under wraps the fifth of its series of flying automobiles only to have the craft crash in test flights at Chula Vista, Calif. The automobile section of the four place Crosley engine powered model was badly damaged. Coming on the heels of Convair's announcement of test flight, the craft had already made news when it went down. The pilot, Lawrence Phillips, was not seriously injured.

With smart body lines strongly suggestive of a Studebaker in miniature, the craft is equipped with a detachable wing which was not seriously damaged in the accident.

The 34½ ft. wing, carrying an engine nacelle that overhangs the hood of the automobile, is attached by simple bolt connections through the roof of the auto. Entry through the roof of the auto likewise accepts the wing-attached flight instruments and control cables that attach to the steering wheel.

Designed by Theodore P. Hall, this roadable airplane is a departure from the designer's original model (AVIATION NEWS, Feb. 4, 1946) in that the 190 hp. Lycoming engine for aerial power is mounted on the detachable wing. Hall's original model, road-tested and flown in the San Diego area in 1939, utilized the same motor for both ground and aerial travel, with a detachable propeller and wings. This new model has two contained engines.

War demands on Hall's time caused him to turn his project over to the Southern Aircraft Co. for additional development. Convair's new model is the latest example of Hall's work now that he has time to devote to the roadable aircraft project.

Convair had no immediate intention of entering the "fly-car" in the personal aircraft market, but had begun tests that may be conducted for several years in

perfecting design and having an entry ready if conventional personal airplane market lags and evidence is obtained that the market will accept the combination of an automobile with detachable wing. Convair's emphasis upon the design of the automobile indicates that it might be sold initially without wing, as a conventional small automobile, with the wing later either rented or sold as preferred.

At press time no comment was available from Convair on the cause of the accident.

## CAA Studying Plan For Lightplane Rentals

Rental of lightplanes from local flight contractors for use by CAA inspectors is being considered by Civil Aeronautics Administrator T. P. Wright.

The plan has been recommended to the administrator by a special CAA committee after study of methods to en-

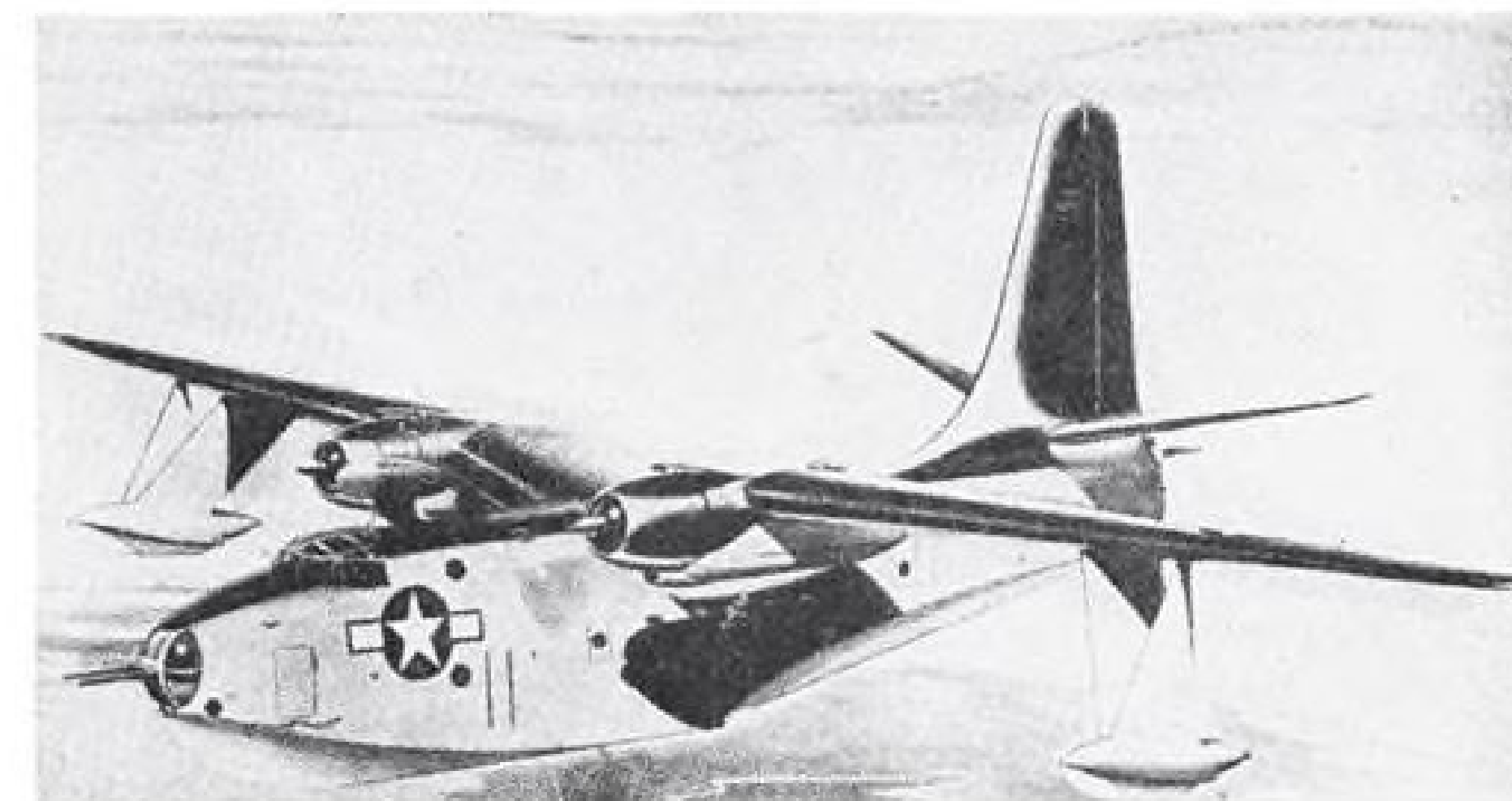
able inspectors in the field to cover their extensive itineraries throughout the year. The committee said fund limitations for maintenance and operation of CAA aircraft would not permit necessary inspection travel under present arrangement systems.

Use by inspectors of CAA-owned war surplus planes—AT-6 advanced trainers which cost about \$25 an hour to fly—already has resulted in almost complete curtailment of inspector flying for the remainder of the year because of inadequate funds. Transfer of these planes to CAA was authorized by Congress in 1945 in lieu of appropriations to purchase new light aircraft. If the proposal is adopted, these planes will be turned over to War Assets Administration for sale.

Rental of civil airplanes, which the committee believes should be possible on an annual contract basis at about \$10 an hour, would enable CAA inspectors to stretch their flying time to the 40,000 hours estimated as necessary for the transaction of official duties in fiscal 1949. At the same time it would be possible to continue operating CAA's twin-engine planes in airway patrol, foreign operations and standardization training at the existing rate of about 34,000 hours annually.

## More Planes

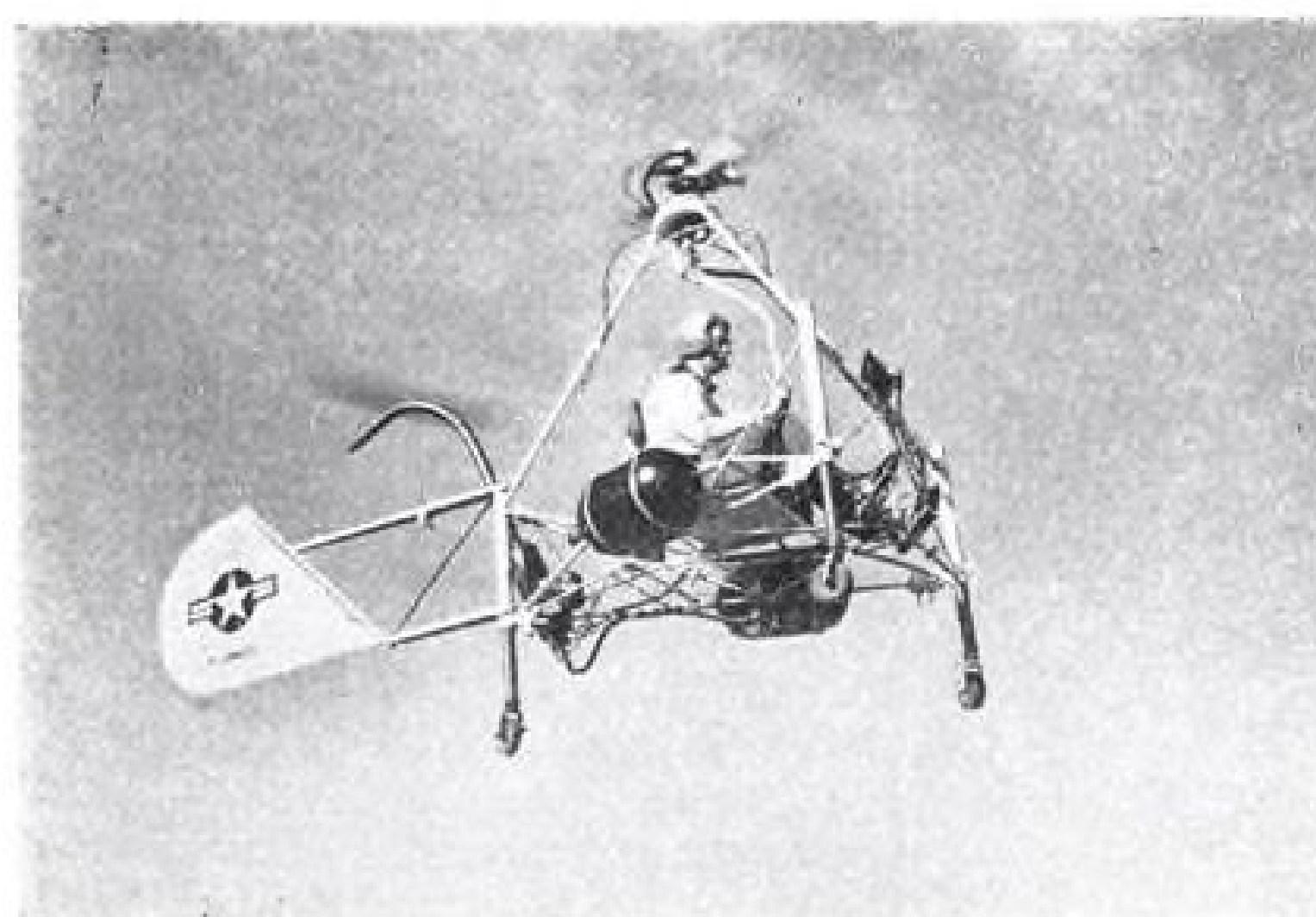
U. S. Air Force is adding 650 fighters and bombers to its tactical groups. The planes, now in storage, will be unpickled and readied for service before Jan. 1. Among the planes going back into service are 130 Boeing B-29's and 400 fighters about equally divided between North American P-51's and Republic P-47's.



## NAVY UNVEILS MARTIN XP5M-1

Artists concept of new Martin flying boat reveals radical new planing tail hull lines developed by NACA. A standard Martin PBM-5 flying boat design has been redesigned to incorporate longer, thinner hull lines with afterbody surface continuing to stern. Single vertical tail replaces canted twin tails of standard Mariner. New float supporting structure reduces drag. Planing tail hull provides rugged rough water characteristics. XP5M-1 hull will be test flown first on converted Grumman J4F "Petulant Porpoise." (Navy Drawing)





## McDonnell Flies Ramjet Helicopter

**Experimental craft built for Air Force lifts own weight; has hit 50 mph.**

**By ROBERT McLARREN**

The world's first ramjet helicopter has been flight tested successfully by McDonnell Aircraft Corp. under a research contract with the U. S. Air Force. The tiny craft is not an actual tactical aircraft but simply a flying test stand to develop ramjet propelled helicopter blades.

The 'copter weighs only 310 lb. but has lifted a useful load of 300 lb., phenomenal helicopter performance. It consists of a simple welded steel tubing frame with a single rotor and a large rudder to provide directional control. Because the thrust is delivered at the blade tips, no torque is created and neither counter-revolving rotors nor an anti-torque tail rotor is required.

**► Major Problems**—A ramjet powered helicopter presents several major problems, all of which have been substantially overcome by McDonnell engineers headed by Constantine L. Zakhartchenko, chief helicopter engineer. The subsonic ramjet engine has always suffered poor efficiency through its inability to produce a sufficiently high pressure ratio. The 9-ft. rotor blade of the McDonnell jet helicopter operates at a speed of 410 miles per hour at which speed the ramjet attains a pressure ratio only of the order of 1½:1 (compared to the 6.5:1 of a typical reciprocating engine and 8:1 of the supersonic ramjet engine).

To accommodate this low pressure ratio the rotor can be turned up to high subsonic speeds but this creates severe losses in blade efficiency resulting in poor lift of the machine. Determining the proper blade diameter and tip speed in which both blade efficiency and ram-

jet efficiency are at an optimum value is the objective of McDonnell's Air Force research contract.

**► 100 Mph. Speed**—Designed for a forward speed of 100 mph., the helicopter has already been flown at 50 mph. on numerous occasions. This forward speed increases the ram air speed into the ramjet engine on the upwind side to 510 mph., near the maximum for blade efficiency.

Another major purpose of the research investigation is to determine the effects of yaw on ramjet efficiency. The ramjet engine has heretofore proved extremely sensitive to changes in the angle of incoming air, only two or three degrees being required to upset its combustion. McDonnell engineers have improved this characteristic to accommodate yaw angles as high as 15 degrees to accommodate both the rotation of the jet about the rotor head and the change of blade pitch during rotation.

**► Ramjet Weight**—The rotor tip ramjet engines weight only 10 lb. each and are operated by liquid propane, which is carried in two tanks on either side of the frame. A small combustion heater, located on the stern post of the framework, is used to pre-heat the fuel before entry into the engines. A large exhaust stack projects upward and rearward to carry the fumes of combustion away from the pilot.

Air Force contract no. AAF W-33-038 AC 14856 was awarded McDonnell in June, 1946 and the helicopter first flew on May 5, 1947. The ensuing months have seen innumerable changes in the tiny craft with many more in immediate prospect. Flight tests have been in charge of Charles R. Wood, Jr., former Navy Lt. comdr. in charge of rotary wing testing at Naval Air Station Patuxent. He is chief test pilot and manager of helicopter contracts at McDonnell.

**► Eliminates Torque**—The use of jet

propulsion for helicopter power has offered attractive possibilities through its elimination of torque and accompanying heavy rotor head forgings and fittings, tail rotors, etc. The first jet helicopter development was pioneered by the German Doblhoff design which was powered by a conventional thermal jet conducted out along the blades and issuing from the tips.

The high fuel consumption, noise and open flame of the ramjet helicopter may prove significant obstacles to its widespread use either in commercial or military operations but both McDonnell and Air Force engineers feel the potentialities of the type are significant enough to warrant an exhaustive investigation. Next phase in the McDonnell research program is conversion of the ramjet engines and fuel systems for the use of ordinary gasoline.

### XB-46 Record

Convair XB-46 four-jet bomber set new multi-engine speed records during its delivery flight to Wright Field for detailed performance tests following USAF acceptance of the plane a month ago. The bomber averaged 507 mph. on its 2 hr. 15 min. first-leg flight from Muroc Air Base, Cal., to Tinker Field, Okla. Following day it averaged 533 mph. on Oklahoma City-Wright Field, Dayton, Ohio flight, covering the 800 miles in 1 hr. 40 min.

Capt. Glen W. Edwards, USAF pilot, said he made no attempt to set any records and was surprised to learn he had neared jet-fighter mark upon landing at Oklahoma City. The craft will undergo routine flight tests at Wright Field to determine its suitability as an Air Force tactical type.



**ENLARGED GRUMMAN MALLARD:** First photo of Grumman XJR2F-1, enlarged version of the commercial Mallard, shows new Navy transport coming in to land after early test flight. Twin engine amphibian carries crew of three, 14 passengers or 16 litters as rescue plane. Cargo version can carry two tons. Big craft, as yet unnamed, cruises at 180 mph. Two have been ordered. (Navy photo)

### New Aircraft:

## Latest Grumman Amphibian

**Navy's XJR2F-1 completes preliminary land and water flight tests.**

Latest in the long and highly successful line of Grumman amphibians, the Navy XJR2F-1, has completed its preliminary land and water flight tests, according to the Navy. The 12½-ton transport is a geometric progression of the basic Grumman amphibian design pioneered by the "Goose," "Widgeon" and the recent commercial "Mallard."

Roughly twice the size of the "Mallard," the new JR2F is designed to do the same work-horse utility job as its predecessors but will carry about twice the load at a higher speed over a longer range. To accomplish the unglamorous but vital job of a flying supply ship, the new JR2F features flexibility of arrangement with three basic configurations provided for:

- **Passengers**—A single row of seats on either side of the cabin accommodates 14 passengers plus a crew of three.
- **Rescue**—As a hospital plane, 16 litters with two medical attendants can be accommodated. In addition special provisions have been made for air-sea rescue operations for transferring personnel aboard at sea from distressed vessels.
- **Cargo**—The cabin can be cleared for cargo carrying and a load of 2-tons of supplies can be carried. A variety of special tie-down and stowage provisions have been incorporated.

Generally, the new JR2F is compara-

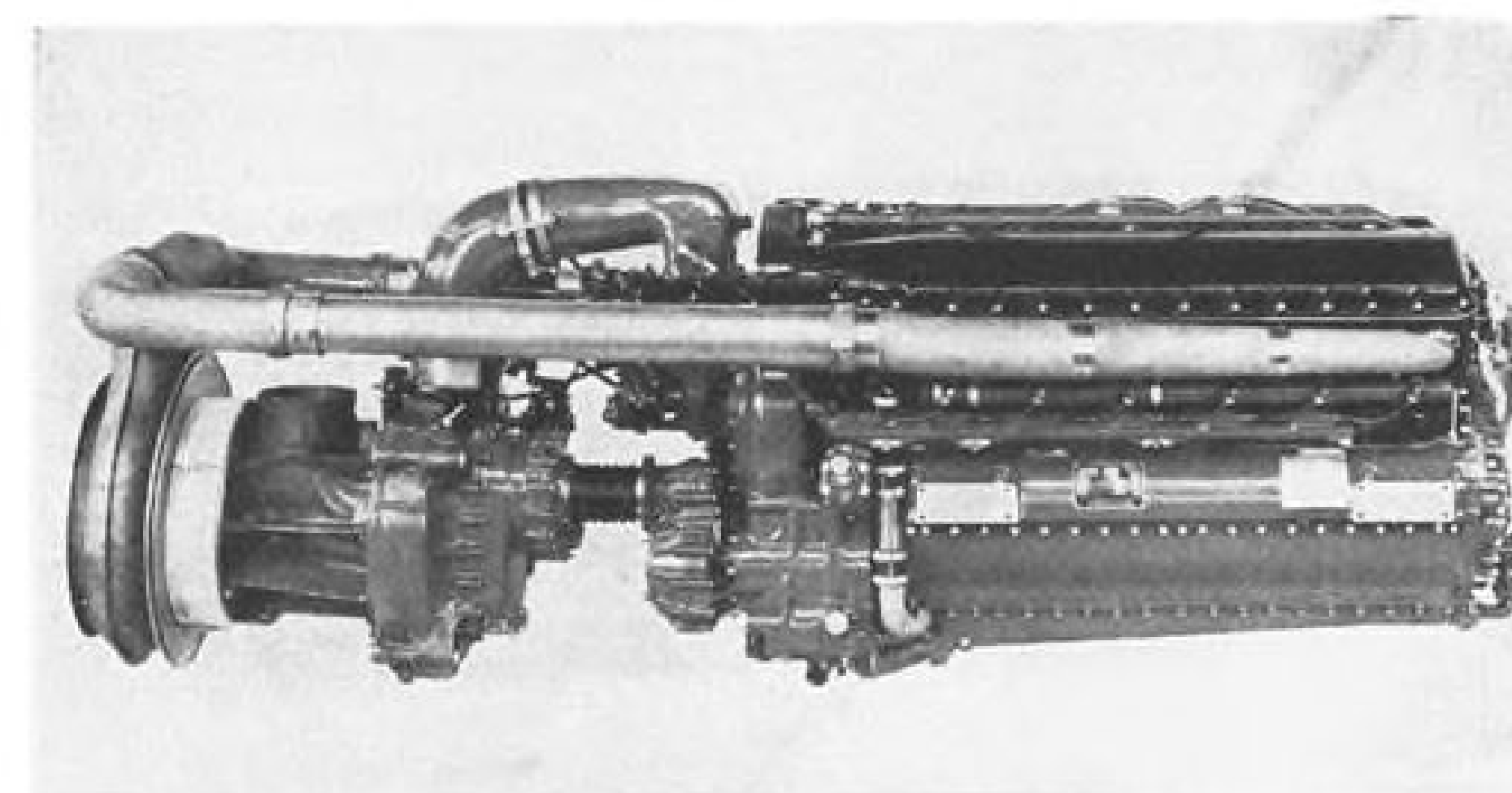
ble to a DC-3 with the additional feature of water operation. The amphibian design robs the craft of about one ton in useful load. Otherwise it is similar to the DC-3 in performance.

Two XJR2F-1 airplanes have been contracted for plus one static test version. Following extensive flight tests at Patuxent and evaluation of the new de-

sign's utility as a Navy transport, production contracts may well be forthcoming.

### GRUMMAN XJR2F-1

Two 1425-hp. Wright Cyclone engines  
Span ..... 80 ft.  
Length ..... 60 ft. 7 in.  
Height ..... 22 ft. 8 in.  
Wing Area ..... 822 sq. ft.  
Gross Weight ..... 25,000 lb.  
Max. Speed ..... 230 mph.  
Cruising Speed ..... 180 mph.  
Ceiling ..... 25,000 ft.



### FIRST PHOTO OF COMPOUND ENGINE

Allison V-1710-E-27, only compound engine completed and tested from contracts to four companies by Air Materiel Command prior to abandonment of the system, upped basic power from 950 hp. to 1,040 hp. and reduced fuel consumption 18 percent to a new low of 0.395 lb/bhp/hr. Horizontal manifolds carry exhaust gases from engine to turbosupercharger at extreme left end of engine. Turbo is geared back through heavy gear box and shaft to main engine crankshaft. Supercharged air is routed through curved manifold into carburetor and thence through main blower into engine intake manifolds. Excessive exhaust gas temperatures of 18-1900 degrees F. proved far too high for safe operation.



## Russians Have 14,000 Combat Planes—Spaatz

Russia now has 14,000 first line combat planes, about three times the numerical strength of the combined U. S. Air Force and Naval Air Service, according to Gen. Carl A. Spaatz, USAF Chief of Staff.

Spaatz told the President's Air Policy Commission that the United States required a minimum of 7,000 first line combat planes backed by a strong reserve, production and research program.

He declined to comment on the quality of the Russian first line planes but said that more than 100 jet planes of several different types participated in this year's May Day celebration in Moscow. Spaatz credited the Russians with the capacity to build from 500 to 1,000 B-29s since this plane first fell into their hands via forced landings in Siberia in 1944. Spaatz also confirmed rumors long prevalent in aviation circles that the Russians had unsuccessfully attempted to buy tires, brakes and wheels required for B-29s from an American rubber company.

## AVIATION CALENDAR

Nov. 29. Dedication of New Castle County Airport, Wilmington, Del.  
Dec. 1-3. Air transport meeting, Society of Automotive Engineers, Hotel Continental, Kansas City.  
Dec. 1-3. Fifth annual meeting, Aviation Distributors and Manufacturers Association, Hotel Adolphus, Dallas, Texas.  
Dec. 1-5. American Society of Mechanical Engineers, Chalfonte-Haddon Hall, Atlantic City, N. J.  
Dec. 2. Air Transport Association air traffic conference, Washington.  
Dec. 3. Air Transport Association board of directors meeting, Washington.  
Dec. 3-4. Aircraft Industries Association board of governors, Los Angeles.  
Dec. 4-5. Air Transport Association meeting of members, Washington.  
Dec. 4-6. Society for Experimental Stress Analysis, annual meeting, Hotel Pennsylvania, New York.  
Dec. 4-7. International aviation celebration, El Paso.  
Dec. 5. Meeting of Air Transport Association directors for 1948, Washington.  
Dec. 10-12. Government-Industry meeting on AN9500 series specifications, New York City.  
Dec. 17. Annual Wright Brothers Lecture, Washington.  
Jan. 7-30. Air Transportation Institute, American University, Washington, D. C.  
Jan. 9-11. All-American air maneuvers, Miami.  
Jan. 13. ICAO statistics division, Montreal.  
Jan. 15-18. Southeastern soaring contest, Sanford, Florida.  
Jan. 26-28. CAA non-scheduled operators of region four, Fort Worth.  
Jan. 26-29. 16th annual meeting, Institute of the Aeronautical Sciences, Hotel Astor, New York.  
Mar. 22. ICAO aeronautical maps and charts division, Brussels.  
Mar. 30. ICAO personnel licensing division, Montreal.  
Apr. 20. ICAO rules of the air and air traffic control division, Montreal.  
Apr. 27. ICAO facilitation division, Europe.  
July. International Air Exposition, Idlewild Airport, New York.

## INDUSTRY OBSERVER

▶ Watch for CAA Administrator T. P. Wright to publicly change his tune on the radar airway system now being installed on a transcontinental route by the Air Force, Navy and Coast Guard. Wright has opposed the radar airway in plugging the CAA sponsored omni-range system with the same stubbornness with which he opposed introduction of radar ground control approach system to civil aviation. Now, in a gesture to relieve Congressional heat on the CAA for failure to cooperate with the military, he plans to invite the services to install their radar beacons alongside CAA omni-ranges. Rep. Carl Hinshaw (R., Calif.) chairman of the aviation subcommittee of the House Interstate and Foreign Commerce Committee strongly recommended standardization on a radar airway suitable for both military and commercial use and criticized the CAA omni-range program because it offered little use for the military or private flyer.

▶ Officials of some airlines operating into LaGuardia Field are so unhappy about the way CAA's first region crews are operating the radar GCA unit there (set was a gift from the Air Force) that they are considering a joint petition to CAA requesting that airline personnel take over the operation. Airline personnel have operated the GCA at Gander, Newfoundland with outstanding success and are scheduled to handle the GCA set now under installation at Shannon, Eire.

▶ Senate War Investigating Subcommittee's probe of Maj. Gen. Bennett Meyers promises to broaden into a sweeping investigation of wartime relations between Wright Field procurement officials and the aircraft contractors. Few aircraft firms, it is reported, will escape the spotlight. Committee sources credit Brig. Gen. William O'Dwyer, G-2 intelligence officer with a "clean up" of Wright Field in the mid-war period, but after O'Dwyer's departure the command lapsed "back to its old ways" and "irregularities" in the dealings of procurement officers with contractors were widespread. Whether life of the committee will be extended by the Senate beyond its present Jan. 1 deadline depends on quality of evidence it produces from now on.

▶ North American's B-45 jet bomber is flying with a new and enlarged fin-rudder configuration, giving greater dorsal area, at Muroc Army Air Base. A stability problem required reworking of the tail surfaces and has delayed completion of experimental tests of the only jet bomber to receive a production order before the prototype was flown. In the meantime Army has accepted the Convair XB-46 jet bomber, which was built on an experimental order for one airplane.

▶ Possibility that Northrop might send its prototype Pioneer transport on a national tour in December are now slim since the plane was hanged to permit a complete teardown inspection of its new Wright C-7 engines by the engine company. Plans for Pioneer display flights remain uncertain, but probably will be conducted after the first of the year to demonstrate performances on critical airports and route segments of interested domestic feeder airlines. A South American tour also claims some consideration.

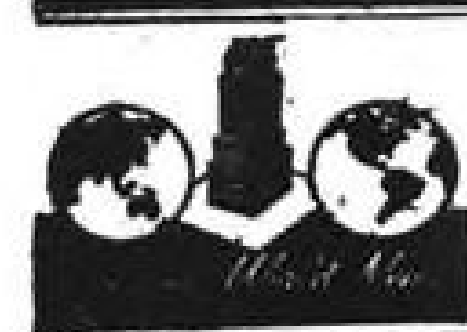
▶ Four major airplane builders are wondering if Slick Airways will be the first air freight line to buy new-production freight planes. Slick engineers have been visiting airframe plants in succession, and at each indicating "strong interest" in the purchase of the Curtiss Wright CW-32 cargo plane; a freight version of the Douglas DC-6; a freight-carrying model of the Lockheed Constellation; and the Boeing Stratofreighter.

▶ Boeing Aircraft orders for Stratocruiser transports now stand at 55 as follows: 20 for Pan American Airways, 10 for Northwest Airlines, 8 for American Overseas Airlines, 7 for United Air Lines, 6 for British Overseas Airways Corp. and 4 for Sila (Swedish Airlines).

▶ New Frederic Flader gas turbine aircraft engine under development for the services is equipped with the new NACA supersonic compressor.

▶ Navy has tested and approved the use of reversible pitch propellers on Martin PBM-5, Lockheed P2V-2, Curtiss SB2C-5, Grumman F8F-1 and the new Martin XP4M-1. Reverse pitch is used on the single engine types as dive brakes.

▶ Douglas AD-1 Skyraider deliveries are rounding out Navy's carrier attack squadrons. Latest to receive the new equipment is CVBG-5 on the U. S. S. Coral Sea. Previously VA-3B on the Sicily, VA-19A and VA-20A both on the U. S. S. Boxer have received their full complement.



## AVIATION WORLD NEWS



### Special ICAO Meeting Studies New Air Code

GENEVA—A new attempt to work out a legal code to govern the commercial phases of international air transport was under way in Geneva last week at a special conference of the International Civil Aviation Organization.

About 25 of the 44 ICAO member nations sent representatives to participate in the search for an overall set of regulations to replace the approximately 100 different bilateral agreements between individual countries that until now have regulated international commercial aviation.

The meeting follows failure of last spring's ICAO assembly to agree to a second draft of a multilateral agreement, the second such disagreement since the 1944 International Civil Aviation Conference at Chicago. A draft multilateral agreement was submitted by the provisional organization's council to the assembly in May 1946, but was considered premature. The second draft was the result. Now the special meeting seeks to reconcile member states' varying views on this latest draft.

Newest and 44th member of ICAO is Colombia, which attains full membership Nov. 30, a month after deposit with the U. S. State Department of its ratification of the convention on international civil aviation. Colombia is the thirteenth Latin American state to ratify.

### South African Air Council Adopts "Patter" Standard

JOHANNESBURG—The Southern African Air Transport Council has adopted the standard radio telephone patter laid down by ICAO for all its members, who include South Africa, Southern and Northern Rhodesia, Nyasaland, East Africa and the United Kingdom.

The council's recommendations will not apply to international services operating in Southern Africa, since British Overseas Airways Corp. and Pan American Airways have standardized their own patter.

The S. A. A. T. C. also arranged to provide airline operators with latest news in condition of airfields through a proposed new system of radio information. And agreed to adopt ICAO standards at all its airfields.

### Melbourne Letter:

## Australia Shakes Off Coma

MELBOURNE—The paralyzing coma of uncertainty which gripped Australia's aviation industry after VJ-Day has yielded to new enterprise and vigor. The industry is less self-reliant and boisterous than during the war, but it has found its bearings and is plotting its postwar course with confidence that it is getting somewhere.

For a long time it was open betting whether the aircraft plants would survive in the peace. The big aeronautical aluminum rolling mill at Wangaratta was closed down. An expensively constructed magnesium refining and alloying plant was sold for scrap. Makers of aircraft components and accessories stumbled over themselves to switch to fast-moving consumer lines.

The postwar program is based on the realization that a completely self-contained production plan, comprising all types of aircraft and all components of each plane, is neither desirable nor feasible under peace conditions.

Consequently, production is limited by RAAF demands for replacements.

During 1947 the volume of traffic on Australian airlines has continued to swell. More airlines and more aircraft are flying more passengers than ever before. But the boom shows symptoms of leveling off.

The Department of Civil Aviation is buckling down to the task of putting into effect all the approved standards and recommended practices which emerged from the year's international aviation conferences. In spite of crippling shortages of manpower and materials, all implementation dates have been met.

To maintain air safety at its present high levels—there was no single fatal accident in scheduled operations during 1946-47—the Department has set up an Accident Studies Branch and enforced revisions in the pilot licensing system. The ASB

is concentrating on analysis of recent foreign aviation disasters and minor incidents and failures in domestic operations.

Private airlines find themselves caught between the ack-ack of the state governments and the withering wing-gun fire of the Commonwealth. Legislation to tax airline operations on a passenger-mile and ton-mile basis is before two state parliaments. Long-distance bus and truck transportation has already been crippled by analogous tax bills. The states fear that state-owned railroads will suffer from air competition.

Commonwealth policy is becoming a headache to private operators on two scores. Gasoline taxes and landing fees, both collected to pay for maintenance of ground installations, have become so onerous that ANA, biggest private operator, is contemplating building its own airports to get relief from this impost.

Private airlines are also bitter about the progressive socialization of international lines and the unrelenting encroachment of the Commonwealth-owned TAA line on interstate routes.

During one year's operations, TAA hatched a fleet of 17 DC3s and four Skymasters. Don't think the government must lose out because government businesses can't compete with private enterprise. TAA is a remarkably efficient super-service setup, and once it has written off its establishment account it will probably be as prosperous as ANA, its principal quarry.

Charges have been made that government airlines are grabbing all available dollars for importation of latest type American equipment while private lines are cold-shouldered when applying for import licenses. The truth, however, is that no order has been placed by any airline since the dollar crisis came to a head late in August.

—Herbert Leopold



## FINANCIAL

### Withdrawal of Aero Insurance May Hurt Personal Plane Market

Retirement of veteran underwriting firm from aviation field may increase premium costs, detract from loans.

The proposed withdrawal of Aero Insurance Underwriters from the aviation field may be expected to have a serious adverse effect on the already slow-moving personal plane market. Other phases of aviation are also bound to feel the repercussions of Aero's retirement.

The Aero syndicate has announced that it is withdrawing from writing aviation risks Dec. 31, 1947. Policies in force at the end of the year will continue to be serviced until expiration and when all outstanding commitments have been fulfilled, the organization "in its present form" will then be dissolved.

The reasons for this decision are not difficult to find. As previously indicated, (AVIATION WEEK, Oct. 6, 1947), a high rate of insurance losses in the personal plane field was of serious concern to the underwriters. Of considerable importance at the present time is Public Law No. 15 which raises some question on the part of many insurance companies whether it would be violation of the anti-trust laws to write such aviation risks, as a combine, after July 1, 1948. The fire and casualty phase of the insurance business was specifically exempted from the federal anti-trust provisions, but not aviation. This exclusion has caused a definite feeling of uneasiness for a group of companies who had previously intended to withdraw from the Aero syndicate because of this reason.

► **Not All Agree**—However, not all constituent members of the syndicate appear to be in accord in viewing this anti-trust provision bogey. It is reported that some companies have been inclined to seek Congressional clarification of this law to include aviation insurance underwriting in the exemption category. The group with opposing views are reported to feel that this course would be unwise as, in the aggregate, aviation insurance is relatively unimportant to other forms of insurance currently being written. Moreover, the drive for such exemption would merely invite further government attention and actual intervention in this activity.

The fact remains that if the aviation underwriting business had been profitable, it is reasonable to assume that an incentive would have been present for

the Aero syndicate to remain in business and possibly ways and means would have been devised to remove the uncertainty of the anti-trust laws. No enterprise can be expected to fight to survive for the privilege of losing money.

At present the insurance companies have far more business than they normally handle. Further, the total volume of business that can be written is definitely limited to the extent of available capital and reserves. This is responsible for confining coverage to a finer risk pattern. As the companies can afford to be highly selective, it is quite obvious that the most profitable type of risks will receive preference. Under such circumstances, aviation insurance can hardly be expected to be sought eagerly by the underwriters.

► **Premium Increase Likely**—Aero was formed in 1922 and now has 30 fire and six casualty companies. When the Aero syndicate entered the aviation underwriting field, it exercised a salutary effect in reducing premium rates, the normal reaction of introducing competition. By the same token, it is highly probable that with the elimination of a major group, premium rates may now be inclined to increase.

Along with Aero, the other main groups consist of the United States Aviation Underwriters and the Associated Aviation Underwriters. None of these syndicates issue any insurance policies directly but are merely service organizations for their constituent companies. In addition, there are a few companies who engage in aviation underwriting directly without availing themselves of any of the facilities of the three main syndicates. Some of these companies have been identified with aviation activities for a considerable period of time.

► **Reactions Will Vary**—It is difficult to anticipate the many reactions which inevitably will occur with Aero's dissolution. For one thing, there is a serious question whether the remaining aviation underwriting groups will have sufficient capacity to absorb all of the business to be available. Even without the substantial inroads made on their capital by the unusual loss experiences of avia-

tion underwriting, these companies are definitely limited as to the amount of risks they can assume. It is for this reason that many insurance companies are attempting to increase their capital and reserves so that they can broaden their markets. Similarly, there is some discussion as to the advisability of seeking a reduction in such capital and reserve requirements which would help accomplish the same purpose.

It is little appreciated, but the aviation insurance underwriters are a potent factor in promoting increased safety standards in all phases of aviation. Aero will be sorely missed if for no other reason than the contribution it has been making in this direction. Its safety engineering division is outstanding and has frequently taken the initiative in promoting measures for safe flying.

► **"Basic Doctrine"**—Although a trade organization appeared as sponsor, it was the aviation insurance interests which actively sparked and financed the recently issued "Basic Doctrine and Code of Recommended Practices for Aircraft Service Operators." This is an example of the constructive approach the insurance group has taken to improve the lot of the fixed base operator. This code is a valuable guide for the successful operation of a fixed base. It represents extensive practicable tips gleaned from experience and compiled at considerable expense. To test its effectiveness, this code, its publication and distribution financed by the insurance interests, will shortly be released to fixed base operators throughout Pennsylvania.

As previously indicated here (AVIATION WEEK, Oct. 6), the high rate of insurance losses is proving a serious deterrent to the personal plane market. A widespread market for lightplanes can exist only if proper credit and financing facilities are available. The latter can only prevail if the necessary insurance can be secured at low cost. No credit agency will extend any aircraft loans without adequate insurance protection. With such protection, at existing rates, comprising more than 20 percent of the original purchase price for most planes, the cost becomes prohibitive in developing a broad market.

There are other ramifications of having only a limited number of aviation insurance companies in the field. The premium cost of the various insurance coverage carried by the certificated and non-certificated carriers may increase. This is due to higher loss experiences as well as to the limited amount of insurance that can be written by the remaining underwriters. This vicious circle can be broken by increased safety in the air. Then will aviation underwriting again become so desirable that it will attract an increasing number of companies thereby driving premium rates down.

—Selig Altschul

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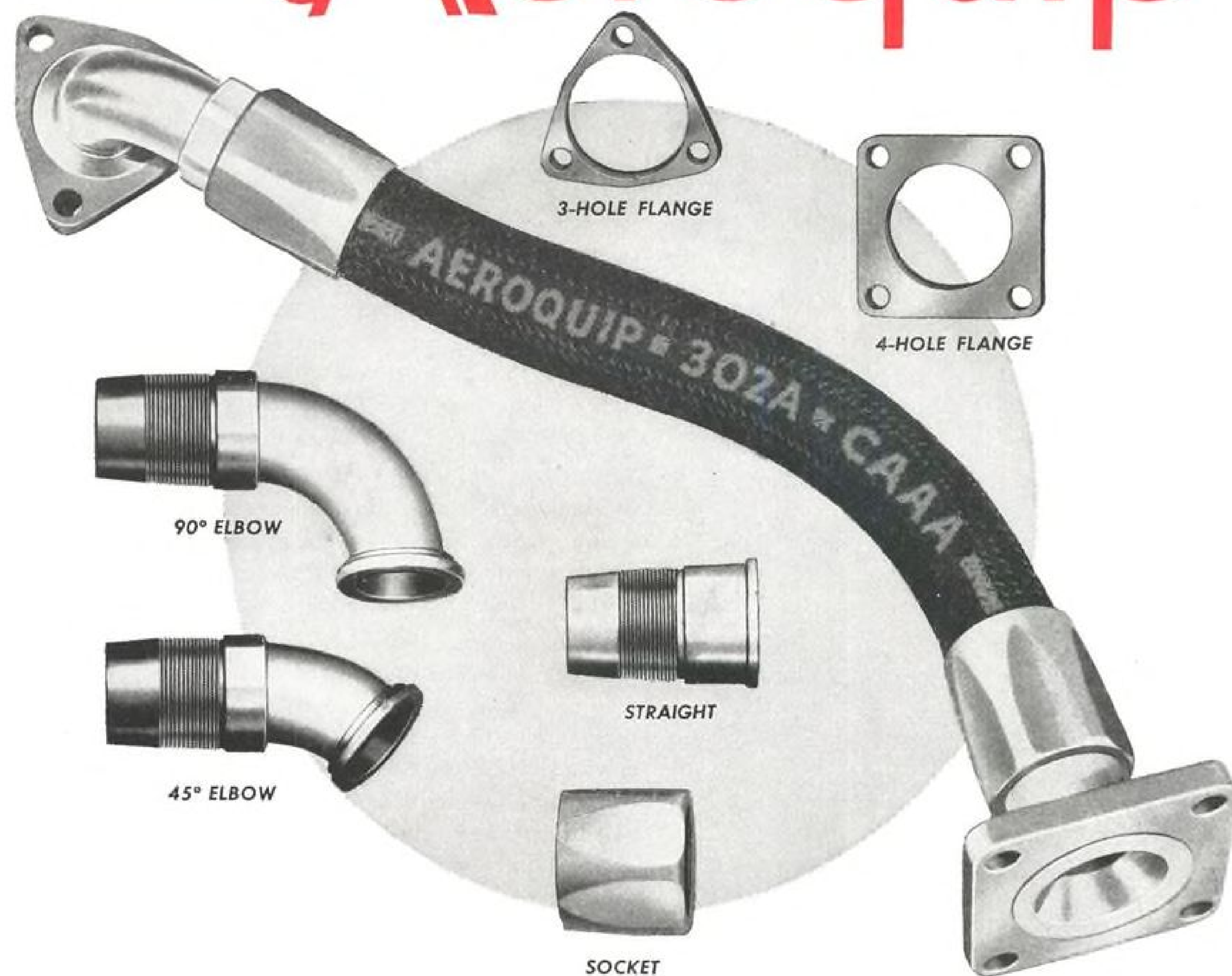
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## ENGINEERING & PRODUCTION



Line-up of Consolidated Vultee's new L-13 liaison plane at the San Diego plant shortly before delivery to the Air Force. Convair

has delivered more than 20 of the planes and is going ahead on the balance of a 146-plane order at the rate of one each working day.

### Export Rally Seen In Lightplane Sales

Foreign personal plane shipments for nine months exceed last year's total.

The export market for aeronautical products, after following the downward trend of other foreign sales in mid-summer, may be rallying slightly, at least in the personal plane category.

Aircraft Industries Association reports that in September 12 companies exported 137 four-place and smaller planes valued at \$695,565, as against the August total of 109 planes valued at \$391,579. In addition, at least one major export distributor in the New York area shows a sizeable increase in October sales.

According to AIA, personal plane exports this year are running far ahead of last year's record, for the first nine months totaling 1,240 planes valued at \$5,212,637 compared with 1,383 valued at \$3,298,342 for the entire year of 1946. Although the number of planes exported in September fell one shy of the monthly average of 138 for 1947, the dollar value for September ran ahead of the 1947 monthly average of \$579,182.

► **Meet Goal**—The September personal plane exports are encouraging from another index. Value of exports was 18.5 percent of the value of total personal plane production, while the number exported was 13.4 percent of the total production for that month. The industry's usual goal in exports is 15 percent of total value and of total production. The September sales exceeded the target in value at least.

By the end of August, overall industry exports numbered 2,240 planes valued at \$42,800,000, and 3,030 en-

gines valued at \$12,700,000. Although the number and value of aircraft of all types continued to drop in August, engine exports showed a lesser decline in numbers, and an increase in the value of engines sold outside the country.

► **Best Markets**—Other western hemisphere countries continue to be the best markets for personal planes and small engines, while the market for larger planes and engines is scattered.

Both Argentina and Canada imported 23 personal planes types in August, with Argentina buying 37 and Canada 14 in the following month. Brazil increased its imports from five in August to 26 in September. These countries were the major markets for personal planes, probably in most part because it has generally been understood that only Argentina and Brazil in South America are able to maintain reserves of dollars. The dollar situation in Canada, while never easy, likewise seldom has been acute.

Sales of larger planes and engines vary, primarily according to the delivery schedules of U. S. transport manufacturers. The August report lists two planes to the Netherlands with a value of \$1,724,100—perhaps Constellations for KLM. Similarly, in that month France bought 17 engines in the 2,500-000 hp. class. While not identified, these could be stepped-up Wright Cyclone 18s which power the Model 749 Constellations bought by Air France.

► **Dollars Controlling Factor**—U. S. aircraft exporters report no slackening in demand for U. S. aeronautical products. The difficulty remains the same as it has been—the obtaining of dollars. Due to this fact, monthly reports of export sales are not as much an index of export activity in those months as it is of the availability of dollars, as import licenses are granted only when there are sufficient dollars in a country to pay.

### Convair L-13 Production Reaches One Per Day

Consolidated Vultee Aircraft Corp. has delivered more than 20 L-13 liaison planes of a \$3,922,430 order for 146, and has reached a production rate of one per day at its San Diego plant.

First production line versions of the all-metal, folding-wing plane have gone to USAF's seventh liaison squadron at March Field, Cal. Two others have been ferried to Wright Field. For ferrying purposes, Convair is installing extra fuel tanks, giving the planes a maximum range of 750 miles.

Another version of the plane, the L-13B, has been modified for cold weather operations and is due for testing in USAF's climatic hangar at Eglin Field, Fla. It is expected that about 20 L-13s will be similarly equipped.

The L-13B incorporates about 15 changes from the standard model, including a 50,000 BTU combustion heater and ducting; heat-retaining blankets on side walls, aft wall and aft windows; and lubrication designed for use in temperatures as low as -650 deg. F. All L-13s can be ski-equipped.

### Jack To Do Research

William S. Jack, who a few weeks ago severed all connections with Jack & Heintz (AVIATION WEEK, Nov. 3), the company he built from scratch into a large industrial concern, has organized a research laboratory on the West Coast to develop aircraft parts.

In a letter to Byron C. Foy, now president of I&H, Jack outlined his new company and expressed the intention of offering to his former firm manufacturing and sales rights to products he may develop. Eventually, Jack stated at his home in California, he would like to return his business to Cleveland, scene of his success with J&H.



## Altitude Blow-Out of Jet Engines Under Widespread Investigation

Mystery of P-80 powerplant failures explained by studies that now offer hope for new designs that would eliminate difficulty.

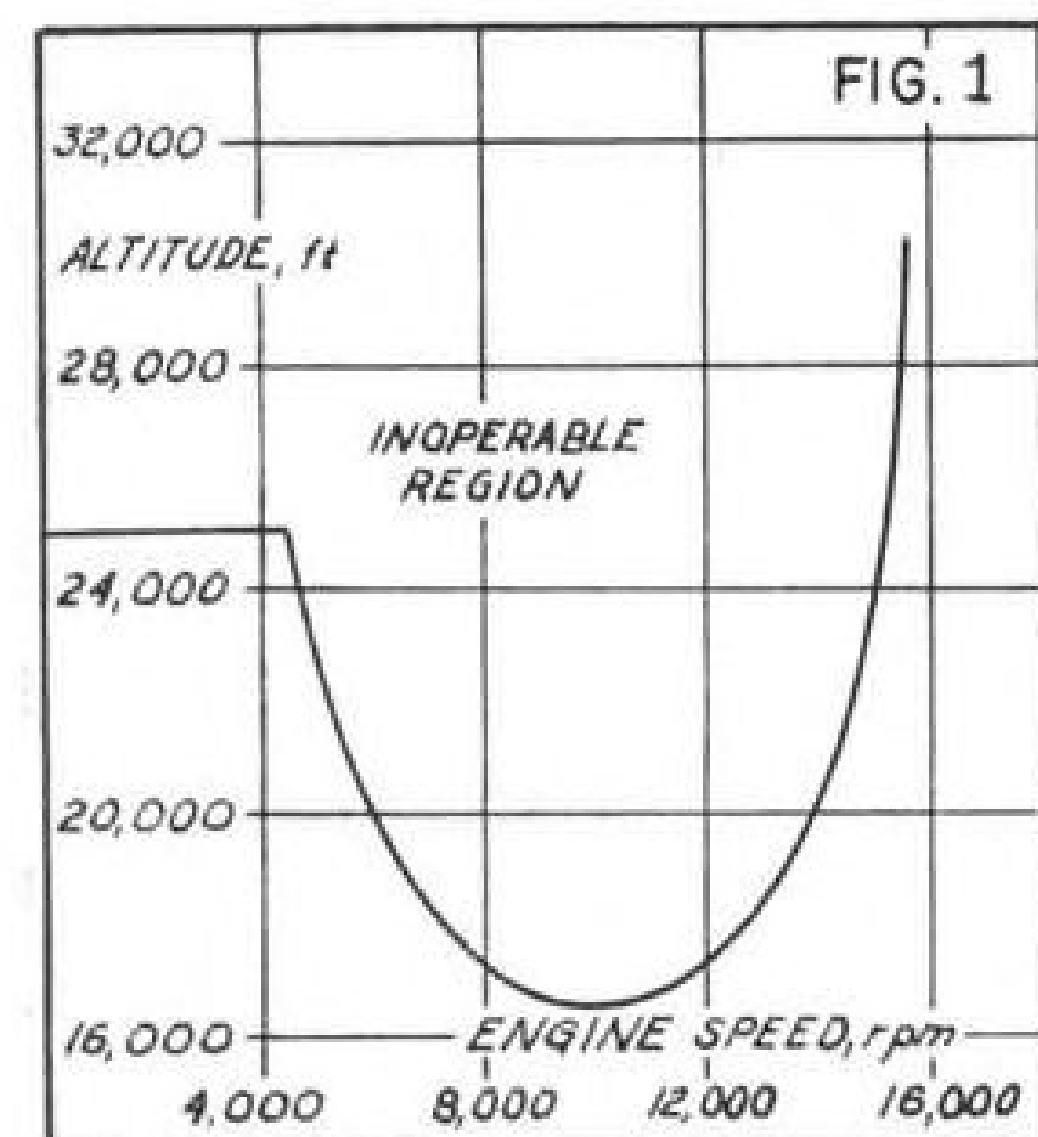
By ROBERT McLARREN

Discovery that the turbojet engine fails to support combustion at critical combinations of engine speed and airplane altitude has come from a number of reports of mysterious engine failures which began shortly after introduction of the Lockheed P-80 Shooting Star into squadron service.

At first it was presumed that this combustion failure occurred above a certain critical altitude of the aircraft, but reports continued to show failures at altitudes as low as 12-15,000 ft. It was then logical to suspect engine overspeeding as the culprit. Information on hand, however, showed failures at engine speeds as low as 5,000 rpm. had been recorded.

For comparison, the rated speed of the General Electric I-40 is 11,700 rpm., the GE TG-180 is 7,700 rpm. and the Westinghouse 19-B is 18,000 rpm. It was clear, then, that neither of these factors alone was responsible and the solution probably lay in some critical combination of altitude and engine speed.

► **Operable Conditions**—Figure 1 illustrates the regions of these failures. The area under the curve represents satisfactory conditions under which the engine is operable, while the area above the curve contains the conditions under which the failures occur. This chart formed the basis for a more direct ap-



proach to the mystery insofar as it clearly reveals that neither engine speed nor altitude are directly responsible.

There are, for example, two engine speeds at which combustion will be maintained at 24,000 ft.: 4,000 rpm. and 15,000 rpm. As another example, if the engine is operating at 10,000 rpm. at 16,000 ft., it will have to be either speeded up or slowed down in order for the fighter to climb.

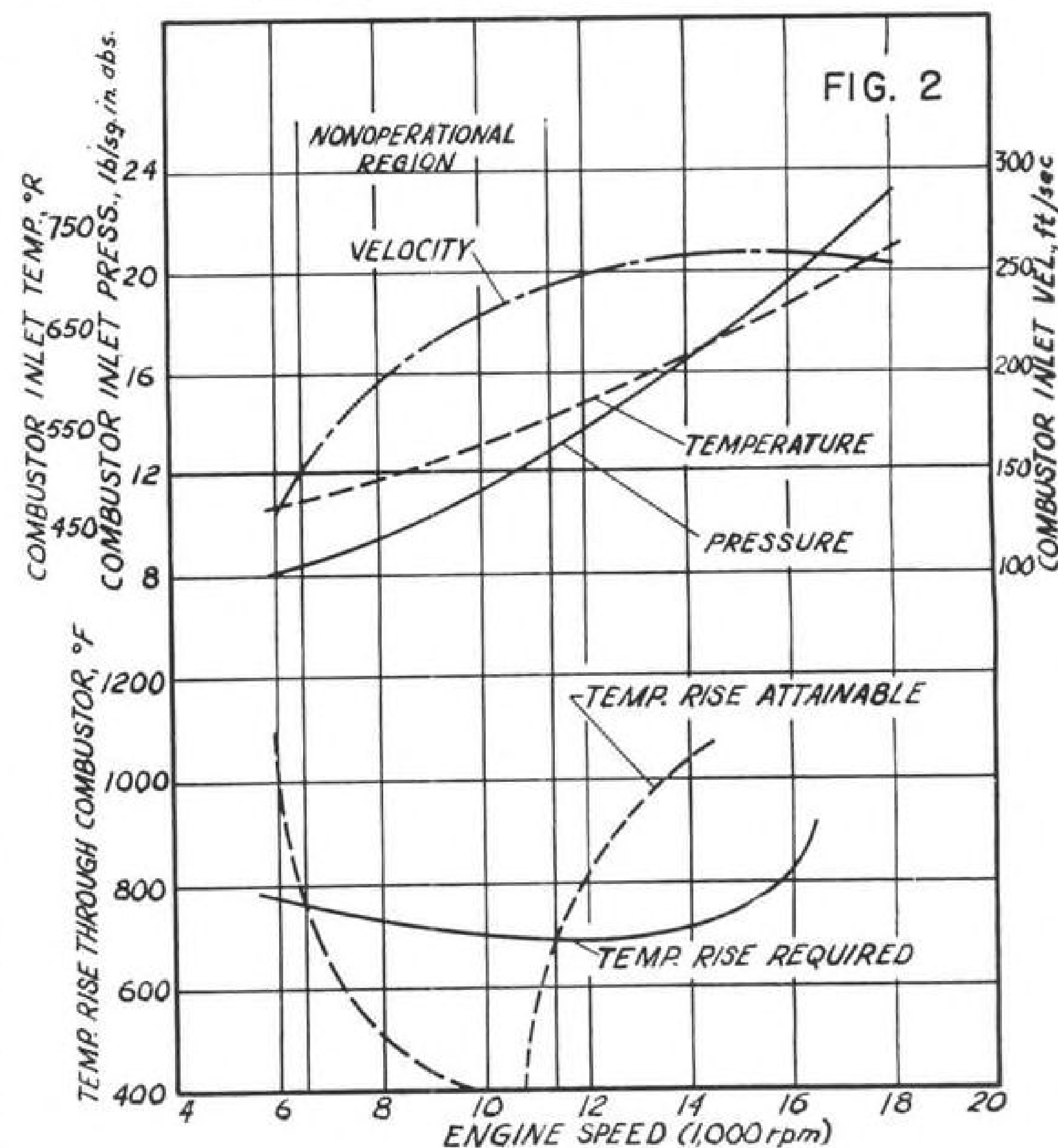
The engine will "blow out" if it is maintained at 10,000 rpm. and the airplane nosed up to about 16,500 ft. If the engine speed is reduced to 4,000 rpm. and the airplane is placed in a climb, the engine will blow out at about 25,000 ft. If it is speeded up to 16,000

rpm., the airplane can be climbed on up to its ceiling.

► **Four Major Factors**—By thus isolating the critical region, it was possible to examine the individual factors involved in turbojet combustion at the exact borderline of failure. The problem was submitted to the Flight Propulsion Research Laboratory of the National Advisory Committee for Aeronautics and a thorough study was made. This study produced Figure 2, which breaks down Figure 1 into four major factors in turbojet engine combustion and reveals their individual affects on altitude blow out.

This chart reveals a critical region extending from 6,000 rpm. to 11,500 rpm. in the combustion chamber tested, and is typical for all turbojet engines. The basic performance parameter for the turbojet engine is the temperature rise through the combustion chamber, i.e., how much heat the burning of fuel adds to the air taken in before delivering it to the turbine.

In the lower portion of Figure 2 is shown the temperature rise required for operation of the engine together with the temperature rise attainable under the test conditions. Operation of the engine is only possible when this temperature rise is greater than that required and this condition exists only at an engine speed greater than 11,500



## Air Transport Service... Coming Up!

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rpm. and lower than 6,500 rpm.

► **Clue to Characteristics**—In a similar manner Figure 2 shows the variation of the static pressure of the air entering the combustor from the compressor, its temperature and its velocity. It is the variation of these four factors that determines the operating characteristics of the turbojet engine: (a) inlet static pressure; (b) inlet temperature; (c) inlet velocity; and (d) fuel-air ratio.

The individual affect of varying each of these quantities, while holding the others substantially constant is:

- An increase in the static pressure of the air entering the combustor produces an increase in the obtainable temperature rise through the combustor.
- An increase in the temperature of the air entering the combustor also produces an increase in the obtainable temperature rise through the combustor.
- An increase in the velocity of the air entering the combustor produces a decrease in the obtainable temperature rise through the combustor.
- An increase in the fuel-air ratio in the combustor increases the obtainable temperature rise through the combustor up to a peak fuel-air ratio value, after which an increase in fuel-air ratio produces a decrease in the temperature rise through the combustor.

Although it would appear from the foregoing that the problem could be solved simply by increasing (a), (b) and (d), while decreasing (c), a reference to Figure 2 will reveal another interesting factor in altitude blow out. It will be noticed that both the pressure and the temperature increase at accelerating rates, as indicated by the progressively increasing slopes of the curves, whereas the velocity increases at a decelerating rate with an increase in engine speed. Therefore, increasing the engine speed creates a favorable acceleration in the pressure and temperature rise which is offset by the unfavorable slowing down of the rise in inlet velocity.

► **Behavior in Dead Band**—Within the "dead band", the non-operational region between 6,500 rpm. and 11,500 rpm., both the pressure and the temperature increase with engine speed and the velocity increases very rapidly. This velocity increase, which is undesirable (see (c) above), offsets the favorable increase in both pressure and temperature to such a degree that the temperature rise attainable at these engine speeds is far below that required for engine operation.

At the low-speed end of the operating spectrum, it is evident that both the pressure and the temperature are low, an unfavorable condition. At these engine speeds, the inlet velocity is also low, which is a favorable condition, and which enables the combustor to produce the required temperature rise in

spite of the very unfavorable pressure and temperature values.

► **Goal**—While these studies cleared up the mystery of altitude blow-out of turbojet engines they did not solve the problem of providing an "all altitude-all engine speed" turbojet engine. This problem can only be solved through extensive research on combustor design. The desired characteristics of a combustor include:

1. Stability of Operation
2. High Combustion Efficiency
3. Minimum Pressure Losses
4. Minimum Volume or Size
5. Minimum Weight
6. Ease of Manufacture
7. Ease of Ignition
8. Strength, Reliability, Durability
9. Ability to Accommodate a Variety of Fuels

NACA, Air Force, Navy Bureau of Aeronautics and the turbojet engine manufacturing industry are jointly at work on extensive research to solve the problems of altitude blow-out. Their investigations center about four major combustor problems: combustor type, cross-sectional area, length-to-diameter ratio and the detail design of such features as the flame tube, basket, fuel nozzles, etc.

► **Possible Solution**—One solution appears promising in the blow-out problem: higher compressor pressure ratios. These higher ratios produce the desired temperature and pressure of the inlet air without the adverse affect of high velocity of the entering air. The multi-staging of compressors has proved a partial answer to this problem in the past but at a considerable cost in turbine power. Another solution is the NACA supersonic compressor, recently announced, which provides high pressure ratios in a single stage.

Until definite solutions are found, altitude blow-out of turbojet fighter planes will remain a major operational difficulty limiting the maximum high-altitude potentialities of the type. Both Air Force and Navy jet fighters must remain placarded against these critical combinations of altitude and engine speed until the results of the present intensive research and development program become available. But "altitude blow-out" is no longer a mysterious factor in jet-powered fighter and bomber operation, it is only another of the countless new technical problems created by jet propulsion.

### REFERENCE

Childs, J. Howard; McCafferty, Richard J.; and Surine, Oakley W.: Effect of Combustor-Inlet Conditions on Performance of an Annular Turbojet Combustor. NACA Technical Note No. 1357. This material, revised for presentation as a Society of Automotive Engineers paper, also appears in SAE Quarterly Transactions, July, 1947.

## Butane Used as Fuel In Lightplane Flight

The first officially observed flight of an airplane using butane (natural gas reduced to its liquid state) as fuel was made in a two-place Cessna equipped with a converted motor.

The flight was observed by CAA representatives. The ship, piloted by Fred Reese of Shawnee, Oklahoma, took off on regular aviation gasoline, but flew on butane.

Landrum L. Hughes, who developed the airplane conversion process, pointed out that perhaps its greatest significance is in the reduction of fuel costs.

"Look at it this way," Hughes said. "Aviation gasoline costs approximately 37 cents a gallon—while the butane used in the test flight cost 9 cents a gallon. Such a possible reduction in fuel costs should have far-reaching effects, or greatly aid in increasing the use of personal planes, to say nothing of reducing costs in operation of commercial aircraft."

"For several years," Hughes continued, "we have operated trucks, tractors, and automobiles on butane—so about a year ago we started working on its use in airplanes."

Seemingly, the average conventional type of airplane motor can be equipped to use either regular aviation gas, or butane, or both at a nominal cost. Likewise, it is possible to switch from the use of one to the other simply by use of a cut-off valve, which cuts the tank of one type of fuel out, and brings in the other fuel.

In short, to make it possible to operate an airplane with butane as fuel, Hughes devised a way to pass the liquid gas near the engine's oil lines where it vaporizes. The vapor then is taken through the regular engine carburetor—and then into the combustion chamber of the engine in the usual manner of operation.

Aside or in addition to butane being cheaper as a fuel, Hughes states it has several other advantages.

"As a matter of fact," Hughes stated. "Butane is much easier on an engine than regular aviation gasoline. The gas burns at an even rate, taking away the constant pistol shot blows to pistons, pins, and bearings."

"In comparing the two fuels," Pilot Reese said, "there seems very little difference in engine performance. On regular gasoline the power plant turned up 2,600 revolutions per minute, while on butane it reached 2,400. However, in as much as this was the first official test flight, it should be a very simple matter to regulate the power plant so that it will produce the same power on either or both fuels."



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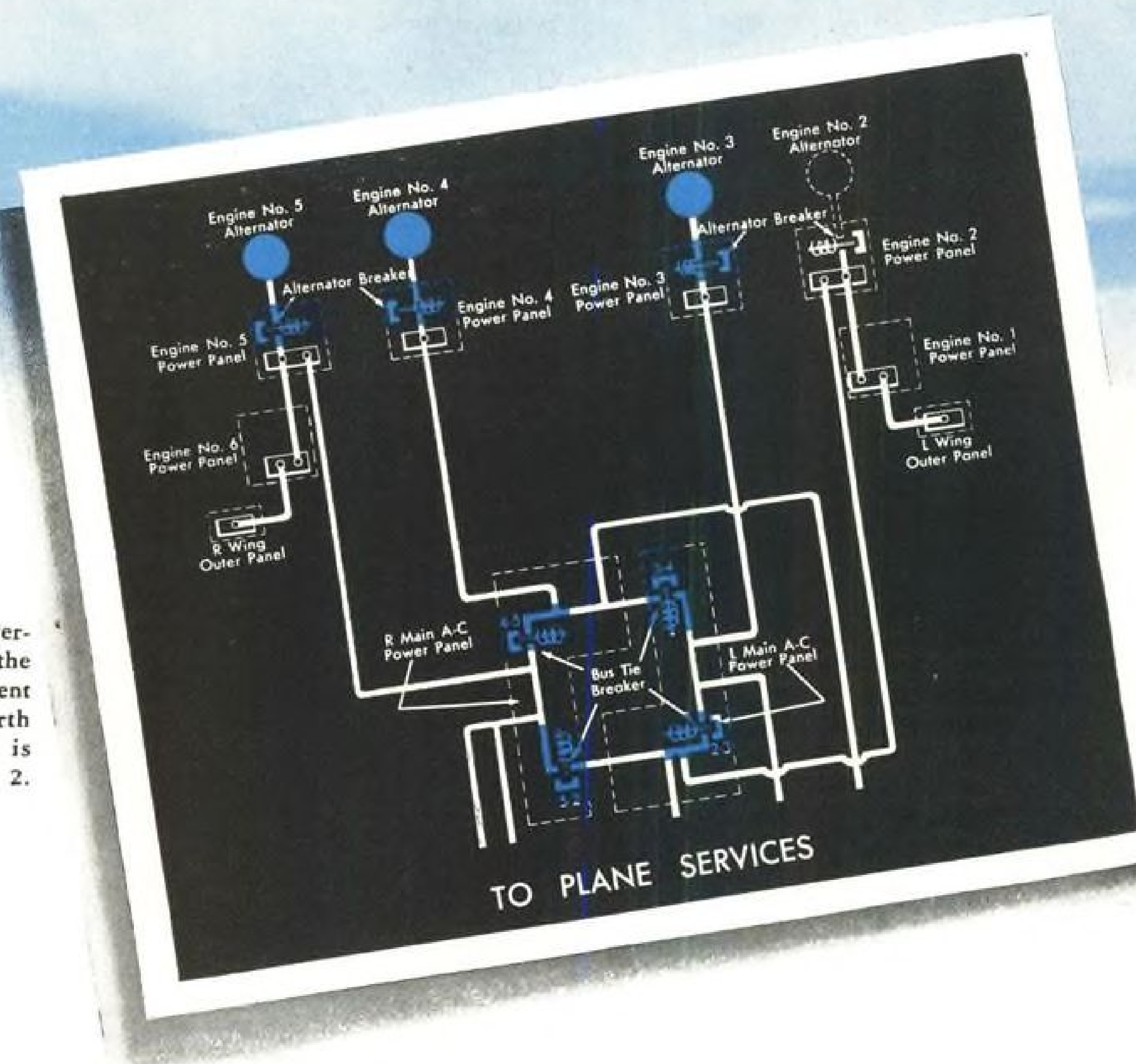
This explains the unusual care exercised in selecting electrical components for Consolidated Vultee's new B-36 bomber—the world's largest! And among the equipment selected for this vital task the Westinghouse name appears with significant frequency . . . particularly in those applications where dependable performance counts most. Typical examples are the Alternators

for engines 3, 4 and 5 and the Voltage Regulators for each . . . the Alternator Breakers and the Bus Tie Breakers.

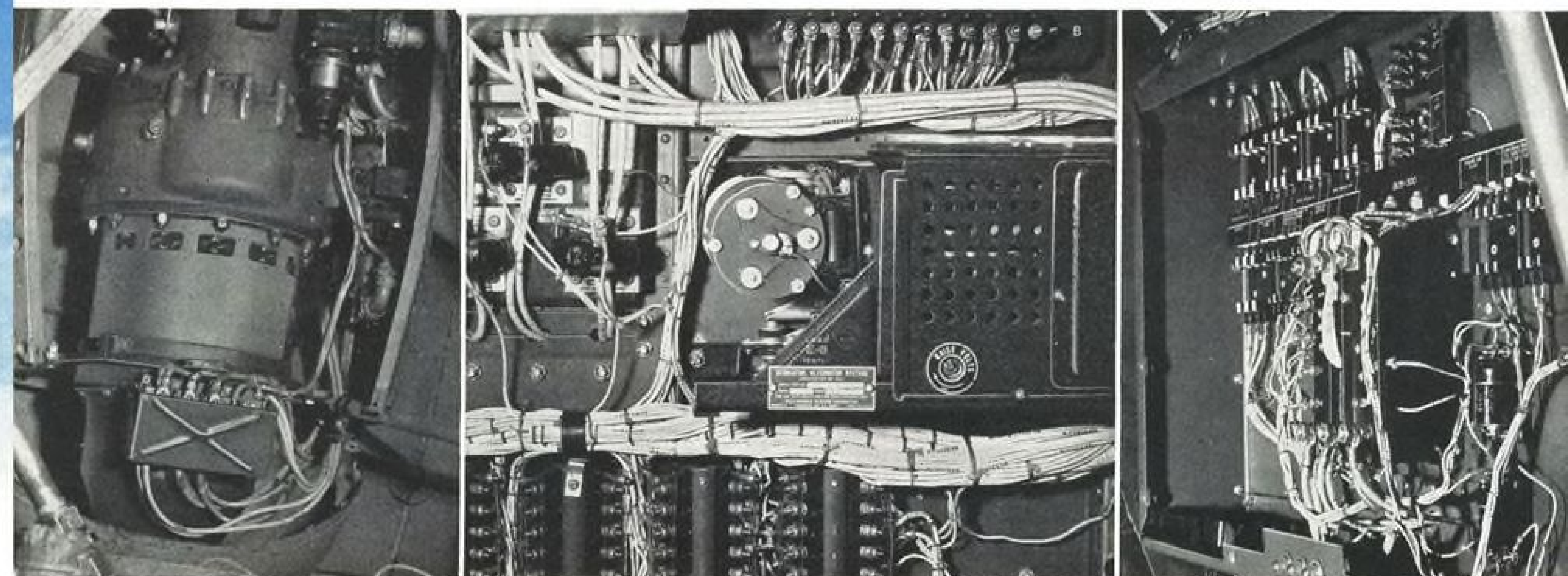
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Schematic diagram of the alternating-current system on the B-36. Westinghouse equipment is shown in blue. A fourth Westinghouse Alternator is proposed for engine No. 2.



Here is an installation view of one of the Westinghouse 40-kva Alternators attached to a constant-speed drive in the forward wing area. (Inspection cover has been removed.) Special impregnation guarantees long brush life at high altitudes. Excitation is furnished by an integral d-c exciter.

This view of an engine power panel shows the Westinghouse Type AVR-370-A Voltage Regulator installation. Regulation provided is within  $\pm 2\%$  over the whole range of 0 to 15% load,  $-60^\circ\text{C}$  to  $+55^\circ\text{C}$ , and 0 to 50,000 feet altitude. Good anti-hunting stability at all temperature and load conditions.

The Westinghouse Type AVR-10 Circuit Breaker (cover removed). There is a Westinghouse breaker for each Alternator in the bomber's electrical system. Arc interruption is accomplished by (1) self pressurized arcing chamber (2) multiple arc gaps and (3) surface deionization.



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## Taxi Tests for Boeing Stratojet

Boeing's swept-wing six-jet bomber, the XB-47, is shown undergoing engine runs, taxi tests and field inspections by pilots and ground crew in preparation for actual flight tests, scheduled for late in the month (AVIATION WEEK, Sept. 22).

Weighing 62 tons and with a fuselage longer than the B-29, the XB-47 is pow-

ered by six General Electric J-35 turbo-jet engines providing 24,000 lb. of rated thrust. Auxiliary power for the jet engines is provided by two groups of nine Jato rocket units mounted on each side of the fuselage just aft of the wing.

The first bomber with swept-back wings and the first airplane with radical sweepback in both wings and tail sur-

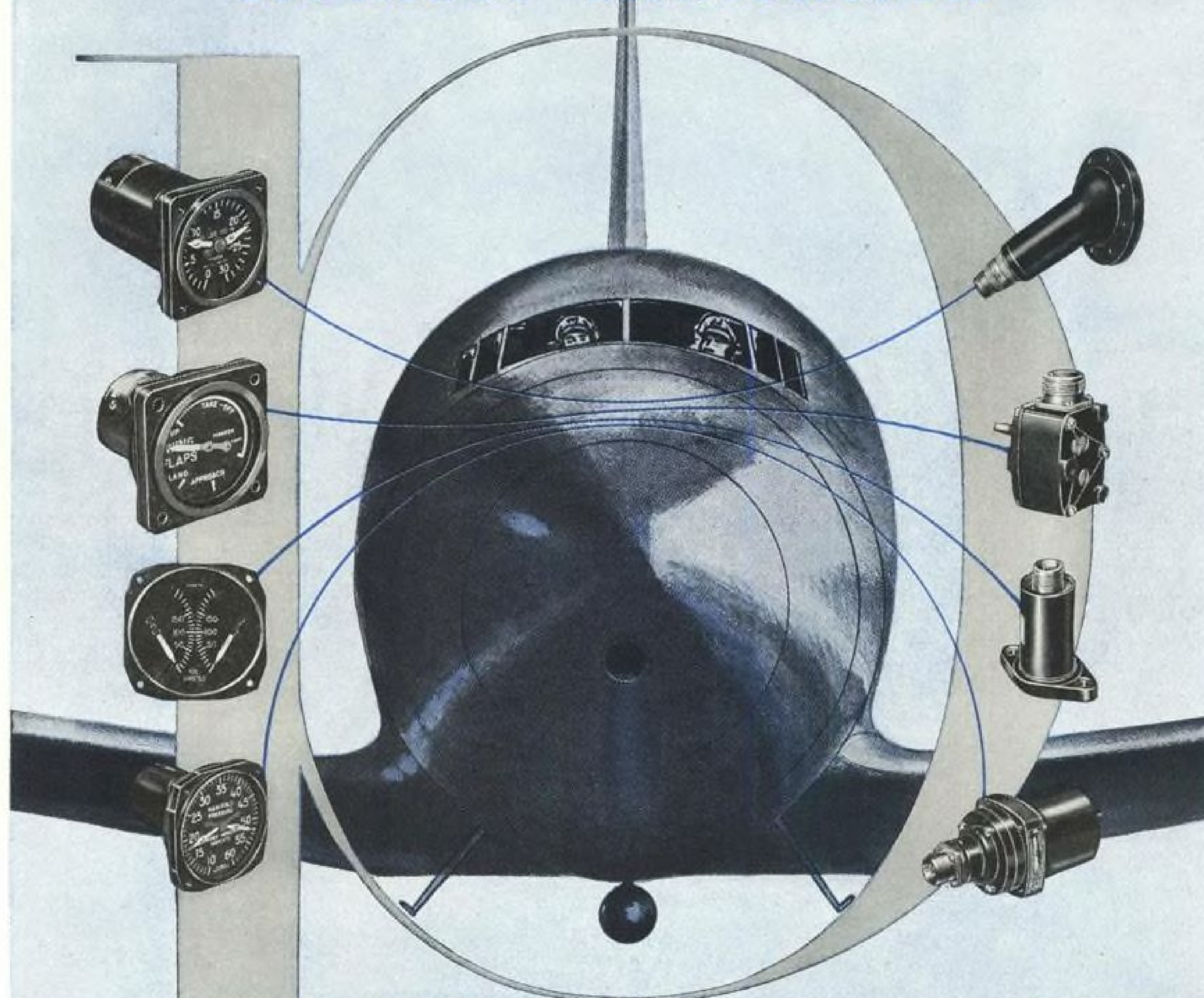
faces, the XB-47 is described by Boeing "as the world's first bomber designed specifically to utilize the tremendous speed possible with jet power plants."

The 2,000-mile range of the bomber is attained by a "tremendous" fuel load. Estimates indicate that approximately 15,000 gal. of jet fuel would be required to attain this range.





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## Telemetry Offers New Benefits In Civil Plane Test and Operation

Various Commercial Applications Weighed... Features of Equipment Are Outlined and Details of Flight Test Program Analyzed.

Evolving from trial-and-error emergency wartime procedures in collecting flight test results of military aircraft, the telemetering of data direct from planes to ground stations has survived the transition to peace, and now holds forth promise of affording still greater safety and economy for civilian application.

Forerunner of telemetering was the practice of recording flight test instrument readings with a motion picture camera. Loss of this data and equipment in crashes dictated the use of television as a substitute method. Faults of this technique—amount of equipment required, space and weight considerations, and extraneous information transmitted—resulted in its abandonment in favor of present-day telemetering systems.

Because of its concentrated application in highly specialized military research, little information on telemetering has been available prior to a report just prepared by the former head of BuAer's Pilotless Aircraft Electronic Guidance Branch, Comdr. Martin V. Kiebert Jr. (now of Sherman Fairchild & Associates), for the Raymond Rosen Co., one of the pioneer developers of telemetering equipment.

► **Telemetering Potentials**—Proved as a valuable aid in military aeronautical development, details of this data reporting and recording method disclose important potential contributions to commercial aviation progress—particularly in studies of aircraft control.

In scheduled airline operations, telemetering could be used for ground control of stabilized, radio-guided pilotless freighters, for economic operation on overwater routes; in automatic instrument landing systems; and as a ground controlled cross-check against pilot's checkoff list in takeoff and landing. And the system provides a potent technique for minimizing the element of human fallibility in flight control.

It is essential that the basic security and performance of any commercial aircraft be accurately and completely ascertained in advance of placing in service. Telemetering can afford accurate information not subject to the limitations of an observer's ability to rapidly read and tabulate data. It can provide a record in event of loss of the craft under test, thus giving the cause of malfunc-

tioning; permit testing and determination, under operating conditions, of safety factors incorporated in full-scale structures, without hazard to test personnel; and may, in the future, provide each range station or other control point with specific flight data on each aircraft within its control area—a great potential aid in safety of equipment and personnel.

► **System Fundamentals**—The overall system has two basic functions—transmission of data for establishing relative attitude and/or position of the aircraft in space (to permit control), and sending of instrument information for indicating performance of the craft, engine, structure, and other flight components.

Applied to aircraft instrumentation, telemetering may be resolved into three elements, comprising the sensory functions (transducers), coding and transmission system (with associated receiving and decoding), and data presentation method (pen, oscillograph, oscilloscope, meter, or indicator).

► **Equipment Details**—Non-expendable high-precision equipment for structural flight test would include high-frequency response devices for transmission of specialized information (flutter, vibration, acoustic levels, etc.), and low-frequency devices for reproducing standard type of instrument readings (air-speed, altitude, direction, etc.). Ex-

pendable, simple lightweight equipment for flight test would be as used in guided missiles.

More than 200 basically similar telemetering systems in existence as of early this year required varying data reduction and ground facilities and maintenance procedures. Hence, standardization was initiated by the Armed Services, specifying the type of signal various test ranges are capable of receiving, decoding, and reducing.

Interim systems have been specified for use during transition from present types to the standardized units.

► **Technical Considerations**—Frequencies assigned to telemetering are established by governmental regulation and are all above several hundred megacycles. As such, they must be considered as "optical" frequencies (also specified as "line-of-sight" frequencies). This puts a limitation on the range over which telemetering may be applied—the receiving location must at all times be capable of "seeing" the aircraft (or missile) under operation.

The craft must not only be "seen" (in sense of "line-of-sight") from the receiving location, but it is also necessary that adequate power be available to bring the received signal above an inherently limiting signal-to-noise characteristic of the particular receiver circuit employed in the telemetering sys-

### "Standard" Telemetering Receiving and Transmitting Equipment

Receiver	Transmitter	Frequency	Characteristics
AN/UKR-5.....	AN/AKT-10.....	215-220 mc.....	FM $\pm 125$ kc./sec. 6 sub-carriers FM $\pm 7.5\%$ Commutation may be used 100 cps. on continuous channels, 3 cps. on commutated channels. PPM or PPM
AN/UKR-6.....	AN/DKT-1.....	2200-2,300 mc.....	8 channels 100 to 200 cps. each channel depending on use of subcarrier oscillators. PPM
AN/MKR-6.....	AN/AKT-11A...	2,200-2,300 mc....	35 channels 200 cps. each channel. Multi-channel, high frequency response PCM, PPM, PFM will most likely be used.
To be developed .....	.....	2,200-2,300 mc....	

### Interim Systems

Equipment	Salient Modifications Necessary
AN/AKT-5.....	Change frequency from 74 to 215-220 mc.
AN/AKT-5A.....	Repurchase AN/AKT-5 and change frequency to 215-220 mc.
AN/AKT-12.....	AN/AKT-5 changed to 215-220 mc.

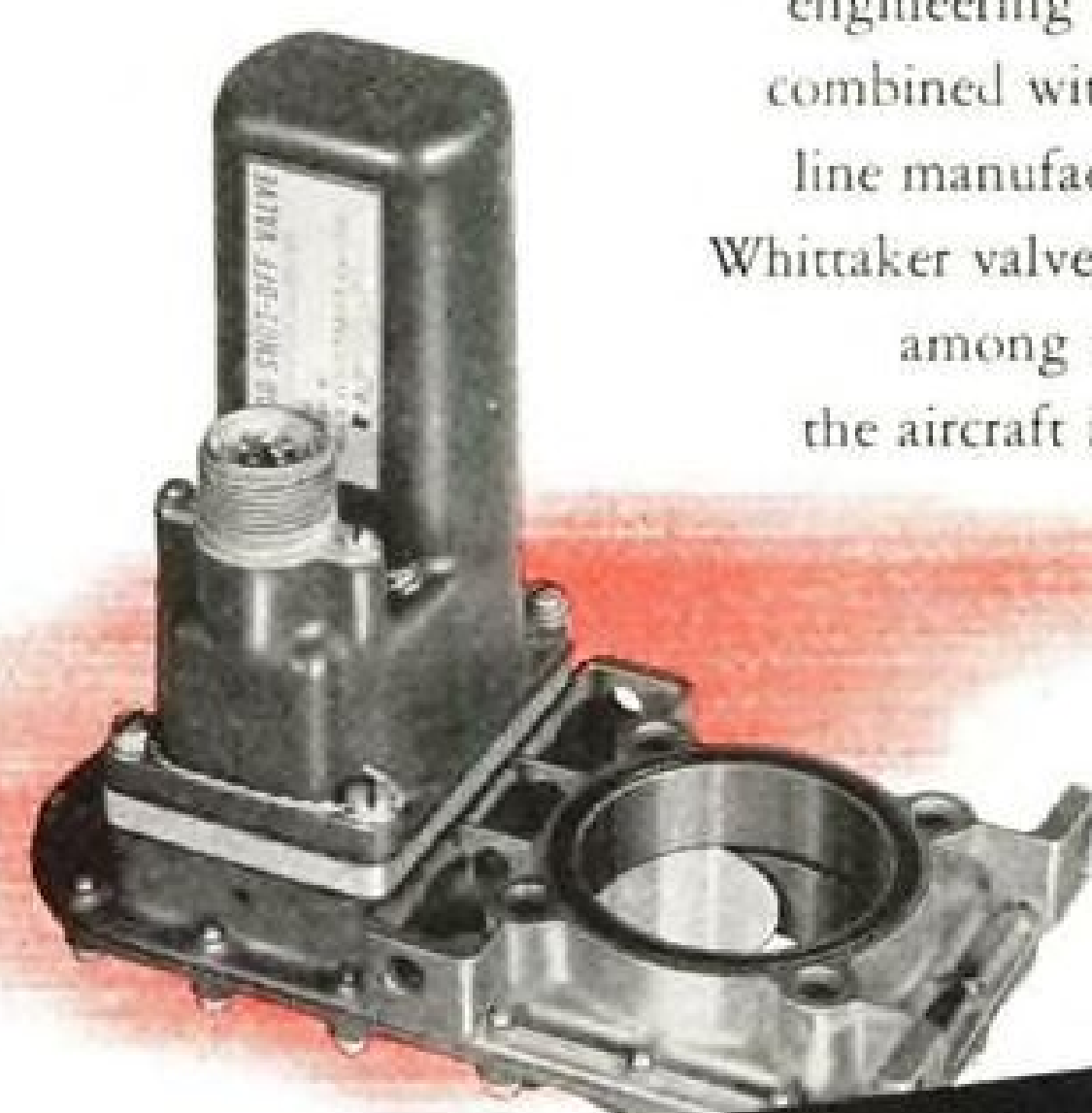


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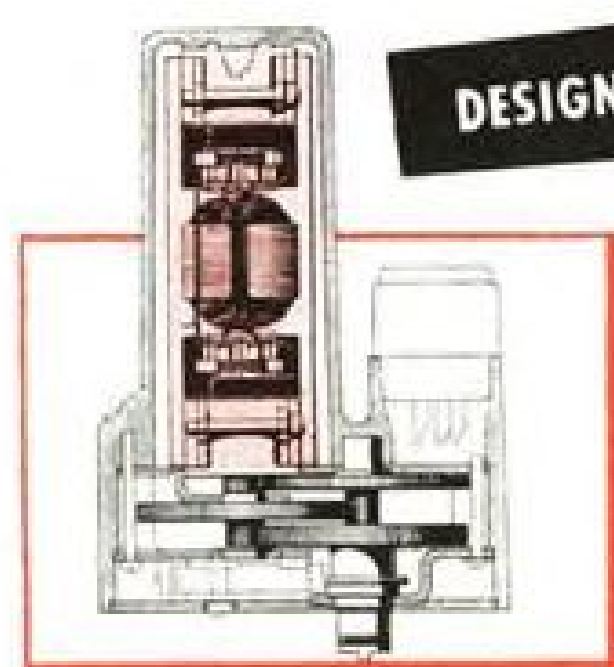


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tem, and above the normal atmospheric (man-made) noise levels at the receiving location.

Relative to the line-of-sight consideration, multiple receiving stations along the flight path may materially result in reduction in size of the airborne equipment.

Distance over which satisfactory telemetering transmission may be accomplished depends upon the transmitting power available at the transmitting or airborne end of the system (also, upon the directivity characteristics of transmitting and receiving antennas). Because of limitations on transmitter space and weight, the unit's power is a major consideration.

Another technical problem is that of the directivity characteristic of the transmitting antenna. This is closely related to basic antenna design and the effect it may have on the drag characteristics of the vehicle on which installed. Although an increase in effective radiated power is easily obtained by increasing transmitting antenna directivity in certain directions (toward receiver), new aircraft whose performance is to be tested will frequently assume attitudes unpredictable until completion of the experimental program. Thus, a highly directive transmitting antenna may result in loss of information just as the craft assumes an unusual attitude, when it is most essential that data be available so as to determine the cause of this flight aberration.

A further consideration relating to transmitter power and antenna characteristics is effect of multi-path transmission. Where a sufficiently directive antenna is used at the receiving location and the airborne vehicle under observation is at a relatively high altitude or large zenith angle, the problem is not great. But where the zenith angle becomes small or data are desired on a millile or aircraft approaching close to ground levels, special considerations must be made as to the effects of multi-path transmission on the accuracy and validity of the received information. In general, multipath transmission must be avoided.

With respect to information to be transmitted, factors to be considered are those of channel frequency response, number of channels of information to be transmitted, and accuracy of transmission. All these have a direct bearing on the ultimate system to be selected for a particular flight test program.

Required power is directly related to the distance over which a signal may be transmitted with a satisfactory signal-to-noise ratio at the receiver, that is, the distance over which a signal may be transmitted to provide the necessary accuracy of the telemetered information. Basically, if a given system satisfactorily

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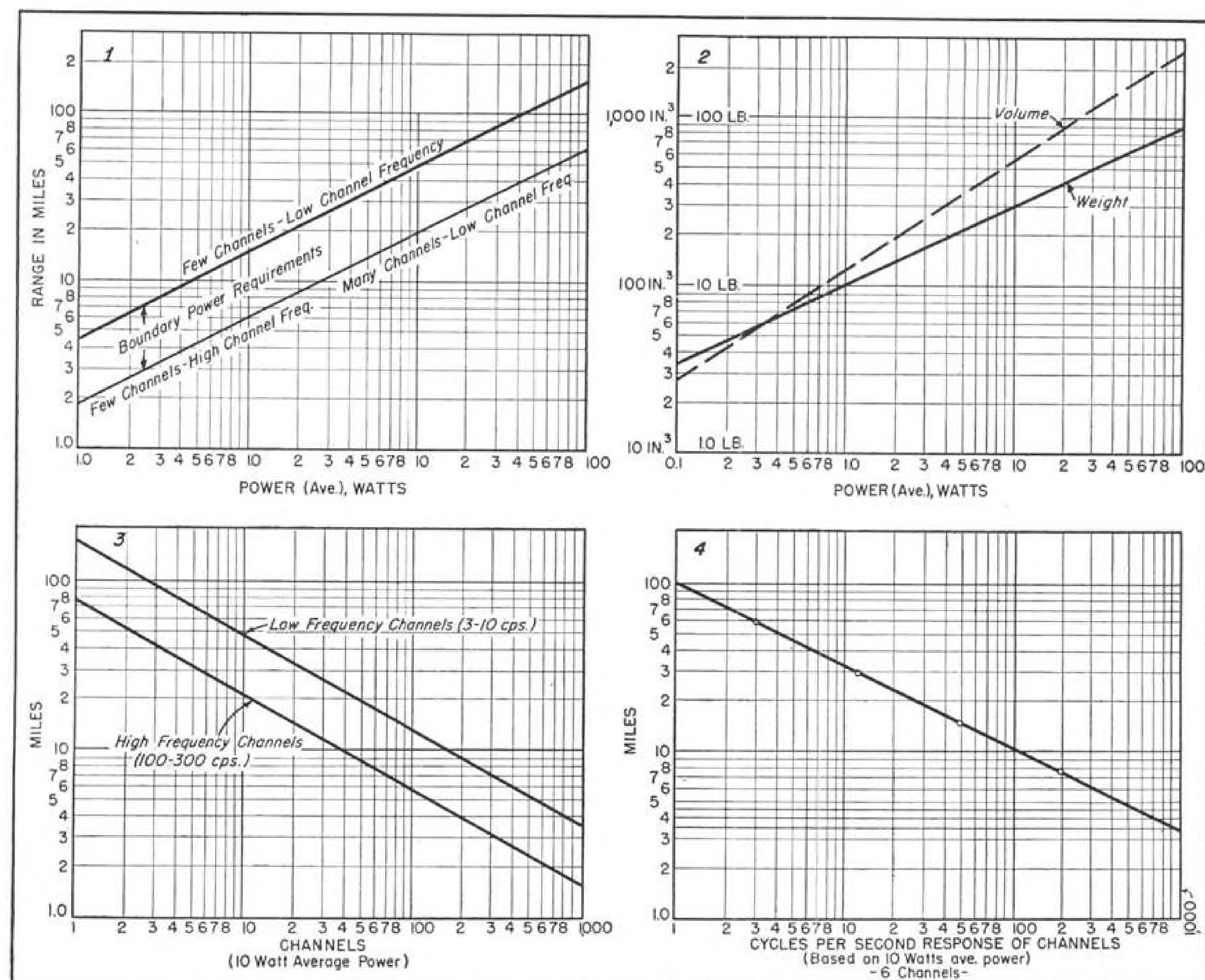
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Figs. 1 to 4. General aspects of telemetering performance: (1) Range as function of power in telemetering system (non-directional transmitting and receiving antennas assumed); (2) Size and weight of system as function of power output; (3) Range as function of

number of channels (non-directional antennas assumed) and power required to provide same signal-to-noise ratio per channel at receiving location; and (4) Range as function of channel frequency response (non-directional antennas). Fixed number of channels.

transmits information over a two-mile range, then to double the range, the laws of radiation show that the power output of the transmitter must be increased four times to provide the same accuracy.

This means that weight and size of the transmitter, with its associated power supply, goes up approximately proportionately to the power output requirement, or four times for a doubling of range. Similarly, provision must be made to provide the necessarily increased primary power as the power output capability of the telemetering equipment is increased—again a factor of four.

In addition to the basic range limitation, which is dependent upon power (and antenna field patterns), the range is also a function of the number of channels being telemetered, and the rate and precision (signal-to-noise ratio) with which this information must be presented. This is because for a given power, only a limited amount of intelligence-

carrying capability is available. As the number of telemetering channels increases, the total amount of power available for transmission of information of one channel decreases in inverse proportion to the number of intelligence channels.

Thus, as the number of channels is increased, and with the limitation of a fixed power, the range is decreased. With the same restriction on power, it is also true that the more rapidly the information in each channel is varying, the less the range over which satisfactory telemetering may be expected (because of the additional noise accepted by the necessarily increased bandwidth). Hence, the frequency response of each telemetering channel must be considered when delineating range limitations of the telemetering system.

► **Performance Details**—Figs. 1 to 4 graphically show general aspects of telemetering system performance and provide a guide in planning installations.

These charts have been based upon "free field" conditions, the use of frequencies in the range of 70–450 mc. The data is based on a large number of results obtained in flight test studies correlated with the physical laws of radiation and detection of intelligence.

New transducers and modern techniques indicate that it is practicable to expect accuracies of 3 to 7 percent for velocities and accelerations obtained from position data by means of telemetering. Other instrumentation, such as temperature and pressure, may approach an accuracy of 1 to 2 percent. These quantities and related accuracies are, in general, comparable to, or better than, the accuracies obtainable in standard aircraft instruments, as shown in the accompanying table of comparison.

Accuracies attainable in a telemetering system are surprisingly good. Limitations on accuracy, or the system errors, are divided between the transmission and receiving system, and the

sensory elements or transducers. With modern techniques, it is found that the major limitations occur in the sensory elements, and that the receiving and transmission is stable and accurate.

Attainable system accuracies are generally comparable with those encountered in standard aircraft flight instruments, since in a sensory element, design compromises are not necessary to provide visual indication to the pilot, as in a standard instrument, and also because the quantitative observation is converted into electrical information at the immediate point of observation rather than "piped" to an instrument panel.

Experience has shown that specifications set up as a result of over-enthusiasm on the part of some prospective users of telemetering have inadvertently called for performance considerably in excess of that obtainable with standard aircraft instruments, which would ordinarily have been entirely acceptable.

► **Data Reduction**—A major problem is that of data reduction. The flight test schedule, to be effective and economically sound, both in time and in dollars, must be predicated upon having accurate data available from the last flight before proceeding with the next flight. This means that data reduction is a large problem which cannot be naively assumed to be ready of solution as soon as the telemetering system and requirements are specified.

A relatively simple telemetering system requires about one man-hour per second of flight time for data reduction, as entirely separate from data analysis. New techniques are now under development to reduce this tedious and time-consuming process to a fraction of the period now required. It is not expected, however, that this system will be ready for operation in a year or two.

The importance of data and the difficulty and time required for data reduction should dictate that only the minimum amount of information be demanded of a telemetering system. Frequently, large amounts of irrelevant data thwart the best plans and delay an overall program, with attendant increase in costs. All tests that can be accurately simulated and evaluated on the ground should be omitted from the telemetering program. Only the most essential "quality control" information should be obtained via telemetering.



### 1,000TH BEECH BONANZA

Delivery of the 1,000th four-place Bonanza, by Walter H. Beech, president, Beech Aircraft Corp., to Neil Fulton, pilot for Atlantic Aviation Corp., Teterboro, N. J., took place recently at Wichita at the Beech plant. The company reports that some of the 1,000 other Bonanzas are flying in virtually every state, all this country's territories, and in 25 foreign countries.

### C-W "Electronic Brain" Aids Turboprop Research

An electronic brain which can calculate three million times faster than the human mind is being used by the Wright Aeronautical Corp. to solve mathematical problems involved in the development of aircraft turbines.

Known technically as an "analog," the device can solve in 1/200 sec. a highly complex problem which would require one day's effort on the part of a highly-trained engineer or mathematician.

The machine is used to develop a simplified system of control for, but it is not attached to, turboprop engine. Electrical circuits incorporated in the analog simulate the operating characteristics of the engine, such as power, speed, temperature, propeller pitch, and fuel flow.

In the operation of a jet engine, a change in one condition does not produce an instant change in engine performance (just as a sudden application of the accelerator in an automobile does not immediately increase the speed from 30 to 60 mph.).

In operation, one man presents the

problem to the machine by setting a number of dials and reading the resulting answer on either of two screens. The answers are given in graphs intelligible to trained technicians, and photographed by a camera placed before the screens.

The machine has been adapted to the solution of various problems covering a wide range of engine types.

### Radio Altimeter Tests Raise Error Margins

New calibration methods developed by the Naval Air Transport Service for checking operation of APN-1 radio altimeters, indicate that safety dictates an increase of 44 ft. in the instrument margin of error used during approaches.

Formerly the altimeters were bench checked for correct operation of radio circuits, and the error margin was calculated as  $\pm 6$  ft. for a properly balanced unit.

Navy tests used surveying instruments spotted at vantage points on the ground and coordinating sights taken simultaneously by pairs of levels. The result indicated altitude errors ranging from + 21 ft. to -25 ft. throughout the 0-400 ft. range. This, together with  $\pm 6$  ft. inherent instrument error resulted in a cumulative error of 52 ft. Navy officials, on a basis of these tests, set an arbitrary 50 ft. margin on all APN-1s is used for GCA approaches.

Officials feel that some slight errors may have been made in the course of tests due to variations in terrain below the plane at instant of observation.

Instrumentation Accuracies				
Measured Quantity	Accuracy of Standard Instruments (%)	Telemetering Accuracy (%)	Probable Overall Telemetering Accuracy (%)	Desired Performance (%)
Airspeed.....	$\pm 1.55$	$\pm 0.5$ to 1.0	$\pm 2.0$ to 2.5	$\pm 1.4$
Altitude.....	$\pm 0.8$	$\pm 0.5$ to 1.0	$\pm 2.0$ to 2.5	$\pm 0.33$
Absolute Pressure.....	$\pm 0.8$	$\pm 0.5$ to 1.0	$\pm 2.0$ to 2.5	$\pm 1$
Rate of Climb.....	$\pm 10$	$\pm 0.5$ to 1.0	$\pm 2.0$ to 2.5	$\pm 1.7$
Turn and Bank.....	$\pm 20$	$\pm 0.5$ to 1	$\pm 2$	$\pm 1$
Fuel Flow.....	1,000 lb./hr. $\pm 1$ to -6 2,000 lb./hr. $\pm 8$ to -18	$\pm 0.5$ to 1	$\pm 2$	$\pm 2$ to 5
Accelerometer....	$\pm 20$	$\pm 1$	$\pm 2$	$\pm 2$ to 5



## NEW AVIATION PRODUCTS

### Multi-Source Recording Oscillograph

Compact aircraft-test recording mechanism, capable of writing simultaneously peak-and-valley history of impulses from 36 separate data sources, is housed in 65-lb. unit, measuring 11½ x 20 in. at base and 10 in. high. Design-



nated Type 5-115 by maker, Consolidated Engineering Corp., Pasadena 4, Calif., 36 traces are photographed on sensitized paper or black-and-white film. Operation with color film, permits automatic identification of "scrambled" traces. Thirty-six single input plugs to galvanometers are located on panel on side of instrument. Galvanometers, mounted in single magnet block, are but 2.3 in. from paper or film, giving traces not exceeding 0.004 in. in width and 1/5 normal amplitude. Traces are projected on graduated ground-glass screen for observation of amplitude and wave form. Scanning control is provided to synchronize scanning speed and signal frequency. Any eight consecutive traces may be magnified by factor of three, with optical system, for detailed observation.

### Airport Lighting Package

Compact unit, built to CAA specifications, and containing all components for lighting runways of 1,800- to 7,000 ft., is announced by Lighting Div. of

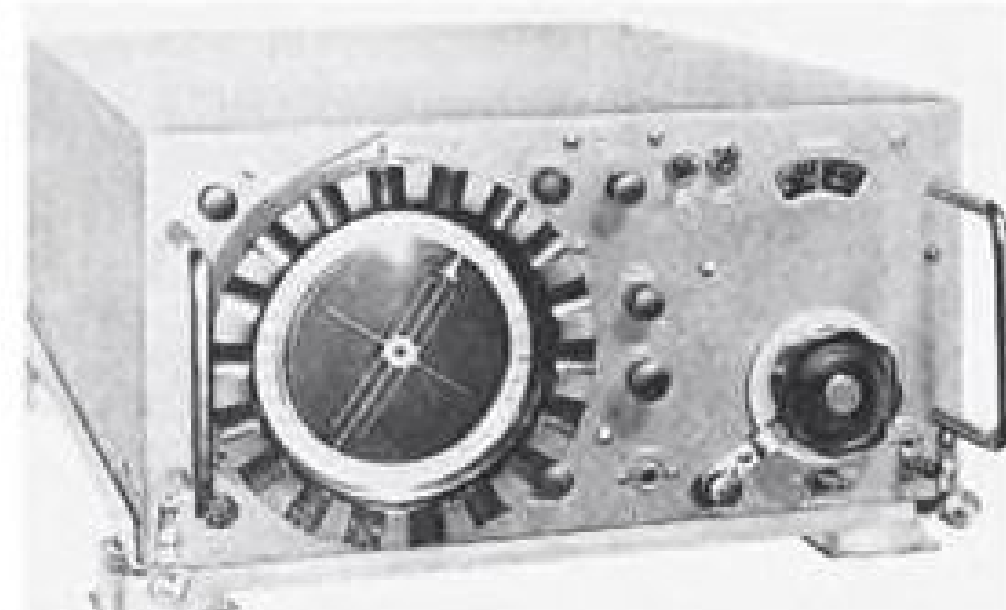


General Electric Co., Schenectady, N. Y. (in conjunction with American Gas Accumulator Co., Elizabeth, N. J.).

Included in kit are Type IL insulating transformers, control cabinet (containing constant-current regulator, runway brightness and selector controls, and protector relays), direct burial-type cables, elevated runway markers, and threshold, taxiway, and obstruction lights. Insulating transformers have coil and core arrangement sealed in compound for direct burial in earth. Primary and secondary leads terminate in moulded waterproof plugs. Transformers isolate fixtures from voltage of distribution system. Lights take 30- to 45w. 6.6 amp. standard runway lamps, housed in prismatic lenses, and main beams provide over 1,000 cp. Control cabinet can be connected directly to power source by three-pronged plug. Receptacles are used to connect runway feeders to secondary side of control regulator. Lights are mounted on lightweight cones secured to ground above insulating transformer by method which features special staking.

### Ground Direction Finding System

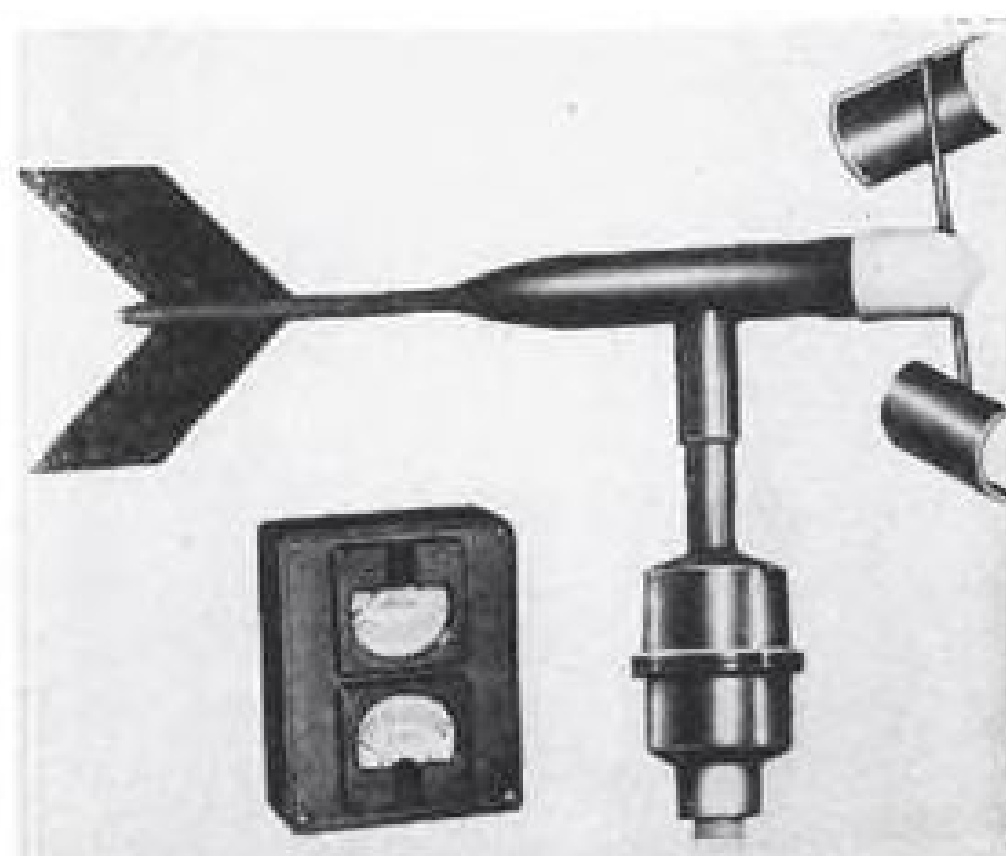
New radio set, type GDF-1, gives exact location of oncoming aircraft by using latter's VHF communication radio signals. Made by Bendix Radio Div. of



Bendix Aviation Corp., Baltimore, Md., and designed for both ship and shore use, device gives instantaneous visual bearings on radio signals transmitted on any frequency between 100 and 156 mc. and provides communication reception in addition to direction finding facilities. Direction-of-arrival indications and unambiguous bearings are presented on 5-in. cathode ray oscilloscope, readable even in daylight. Compact unit is so designed that it may be operated by one person.

### Quick-Reading Anemometer

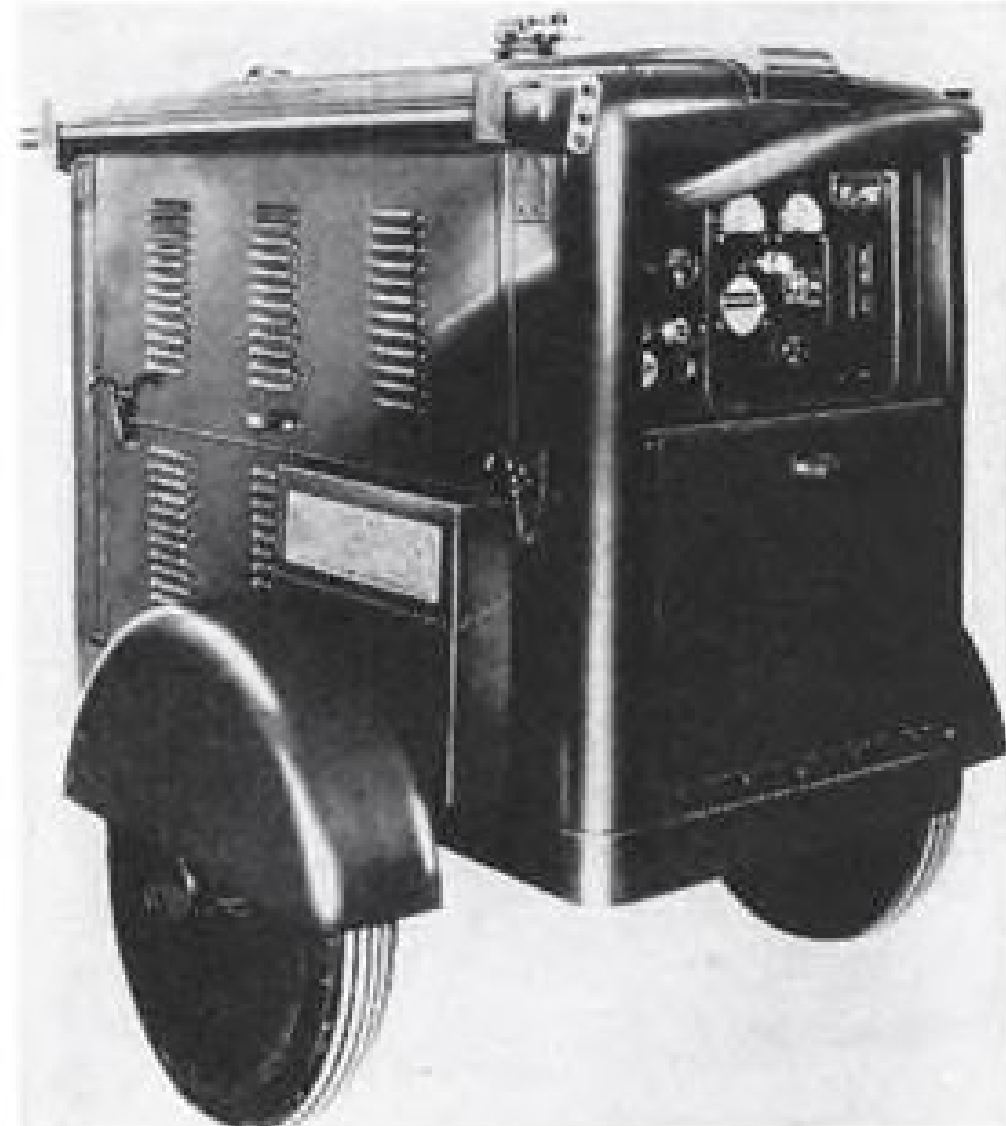
Distributed by Air Associates, Inc., Teterboro, N. J., new inexpensive precision anemometer, suitable for commercial airports, gives quick, accurate, direct readings of wind direction and velocity. Lightweight device is easy to install, and has no gears (to reduce wear). Outside installation consists of



single unit registering both direction and velocity of wind, and fan-type spinner gives maximum readings in gusts. Corrosion-resistant aluminum vane assembly is 20 in. long, 15 in. high, and weighs but 2½ lb. Connection between outside and inside units is by single cable. Inside installation comprises two matching meters, mounted in plastic case for desk or wall, which are available to operate on 110v. a.c. or on batteries. Wind velocities up to 100 mph. can be accurately read on one meter, with scale graduations for every 2 mph., while wind direction is obtained from second meter. In event of power failure, velocity scale remains operative. (Device is made by Hastings Laboratories, Bass River, Mass.).

### Ground Power Source

Specially engineered for aircraft applications, Model 604 power supply unit built by Motor Generator Corp., Troy, Ohio, affords versatile ground service, such as engine starting, checking of craft's electrical systems, and charging of batteries. Provided is protection for both plane and generator, including carbon pile voltage regulator, circuit breaker, reverse current relay, and relay to prevent discharge of batteries when the generator is not operating. Generator gives rated power plus generous over-



load. Unit is for use with craft having 24v. systems. Another model (605) is designed for use with either 24- or 12v. systems.

## AVIATION SALES & SERVICE



### Ryan Brings Out Newly Styled Navion for 1948 Sales Campaign

Added features include high gloss enamel finish; new color scheme; other mechanical improvements.

By ALEXANDER McSURELY

The 1948 version Navion is still the same airplane basically, but Ryan Aeronautical Co., its new maker, has incorporated some styling innovations likely to make the plane much more attractive to the segment of the consumer market which can afford to buy the four-placer at \$8,750 flyaway, San Diego.

Most obvious of the Ryan changes is the new high-gloss enamel finish, applied to the entire airplane surface as standard for all Ryan Navions in a choice of four color schemes: oxford maroon, zircon green and chevron blue as basic colors all with cream striping,

and catalina tan with cadmium red trim.

Ryan cites among other refinements: • Redesigned cabin styling with "emphasis on eye-appeal and comfort" using two-tone all-wool upholstery, chrome fittings and trim, and more generous use of carpeting.

• Cabin soundproofing, using blankets of acoustical material on all cabin panels and firewall and new backing materials for side paneling with a result that noise level has been materially reduced. Passengers can talk in normal voices or listen to radio broadcasts.

• New ventilation system gives greater air circulation and better temperature control with individually controlled air ducts under the rear seat which empty



the air through vents in the wing fillets.

• New reserve electric fuel booster pump auxiliary to the standard engine-driven pump. In event of fuel pressure loss the electric pump can be switched on immediately.

• Minor mechanical improvements including improvement in fuel vent line to insure both fuel tanks are filled; reworking of the hydraulic unit of the Hartzell controllable propeller.

• Optional at extra cost is a 20-gal. auxiliary fuel tank which, installed in the Navion baggage compartment, will increase the plane's range to a 750-mile maximum at normal cruising speed of 150 mph., the company reports.

The price figure announced by Ryan is a \$1,000 boost from the \$7,750 price tag at which the Navion was last sold by North America Aviation, Inc., its former manufacturer. North American built approximately 1,100 of the planes before discontinuing their manufacture last summer, and selling parts, tool fixtures and designs to Ryan.

► New Dealers—Addition of three new Ryan Navion dealers to the five announced in AVIATION WEEK, Oct. 27, includes Page Aviation Service, for Oklahoma-Arkansas; Aviation Consultants, Inc., Pennsylvania and adjacent area, and Aircraft Service Co., for Idaho-Utah area. Ryan has also announced names of eight foreign Navion agencies, including C. Adrianza & Cia, of Caracas, Venezuela; Anco, S. A., of Paris; Chinook Flying Service, Ltd., Calgary, Alberta, Canada; Hindustan Airways Co., Ltd., Calcutta, India; Maquinaria Accesorios y Controles, Mexico City; Miller, Medeiros & Bastos, Montevideo, Uruguay; Pretoria Light Aircraft Co., Pretoria, Transvaal, South Africa, and Tider, S.R.L., Buenos Aires, Argentina.

Retail sales in Southern California and Arizona will be handled by a dealer organization operating under factory supervision. Ryan will not set up a separate company to handle this activity nor will the company compete with its dealers in retail sales.

► Delivery Schedule—With some of the new 1948 Ryan-built Navions already in the hands of dealers, deliveries are being scheduled in limited quantities for the rest of the year with volume production expected to start in January and stepped up each month as necessary to fill the backlog of orders accumulated since Ryan took over the Navion program. North American was tooled to produce 10 of the planes a day, and presumably this is still the maximum



production capacity of Ryan's tooling.

With the parts and spares purchased in the transaction with North American, Ryan has been operating a complete factory service department at the San Diego plant for Navion owners since early fall. The all-metal, low-wing tri-cycle gear Navion is powered with a 185 hp. Continental six-cylinder engine, turning a Hartzell variable pitch propeller. Plane has 33 ft. 4 1/2 in. wingspan, is 27 ft. 4 1/2 in. long. Performance figures: cruising speed 150 mph., top speed 160 mph., landing speed (40 percent flaps) 54 mph.; rate of climb, (sea level), 830 ft./min.; takeoff distance (20 percent flaps) 695 ft.

Navion has been known for its good stall and landing characteristics, stability, excellent visibility, roominess and sturdiness of construction. Wing is designed to give unusually good aileron control at low speeds approaching stall. Root sections of the wing are first to stall, eliminating tendency for plane to roll. Wingtip is inclined three degrees nose down, relative to airfoil at root.

## CAA Sets Standards For Runway Lengths

Maximum length and strength of runways for which Federal money will be supplied have been announced by CAA Administrator T. P. Wright. Ranging from 3,500 ft. for feeder airports to 8,400 ft. for international express airports, the list includes length, width and bearing strength for runways in each category.

Purpose of the order, according to Wright, is to guide CAA employees in approvals and recommendations for runway design; to indicate to sponsors of airport projects under the Federal Airport Act the extent to which Federal funds may be applied; and to indicate to manufacturers and operators of transport type aircraft the runways which will be available.

Definitions of airports cited in the table below:

- **Feeder**—Airports to serve certificated feeder line airlines.
- **Local**—Airports to serve smaller cities on airline trunk routes.
- **Express**—Airports at important cities or junction points on trunk routes.
- **Deluxe**—Airports serving aircraft making long non-stop domestic flights.
- **International**—Airports terminating

long international flights.

- **International Express**—Airports serving the highest type of transoceanic flights.

## New Rules

The Sept. 10 ruling by the Veterans Administration, affecting GIs at colleges who want to take flight training courses as elective subjects along with their other studies, may be explained by using the following hypothetical case of a typical student:

Joe is attending old Siwash College, which has its own airport and gives a few hours credit a semester for its flight training course. Joe wants to elect flight training in his business course because he is going into sales work and feels a private license would be a help in sales trips. Before the Sept. 10 ruling, Joe could take this course and pay for at least part of it out of the current year's allotment for college tuition, not exceeding \$500. If the regular Siwash tuition was \$300 a year, Joe would have \$200 left to apply on his flight course.

But that is all changed. If Joe wants to elect that flight course now, it costs a separate chunk out of his total entitlement. No longer can he apply money above his current college tuition for the flight course. Now he has to take funds from the next year's entitlement, or "accelerate" his allotment in order to cover flight training. This means that he can draw only three years of college tuition plus flight training or the full four years tuition without flight training.

Net result is to cut down sharply on the number of GI college students taking training.

C.E.A. Brown, Ohio aeronautics director, and head of the NASAO aviation education committee, estimates that there are approximately 500 colleges and universities which have aviation courses as electives, while from 50 to 100 of these schools own their airports. Schools not owning their airports generally have flight school contracts.

## New Lighting System

A new high-intensity lighting system, enabling safe landing at ceiling zero both day and night, was introduced recently at Charleston, W. Va.'s \$7,000,000 mountain-top Kanawha County Airport.

The 60 new 44,000 candle-power units can be seen from a distance of 1,050 ft. when daylight visibility of objects is limited to one-eighth of a mile. Light intensity may be varied by the tower from less than 1 percent to 100 percent.

For runway safety, each light is mounted on a frangible coupling which will break off at ground level and fall out of the way if struck by aircraft, according to General Electric Co. lighting specialists who jointly developed the system with the American Gas Accumulator Co.

The units are spaced at 200 ft. intervals along the 5,200 ft. main runway, with 12 threshold lights, 28 yellow runway lights and 20 clear lights. Each weighs less than 12 lb. and stands 18 in. from the ground.

## NAL Strike Parley

National Mediation Board officials last week were meeting with representatives of the Air Line Pilots Association and National Airlines in an effort to prevent a strike against the carrier. Grievance at issue is NAL's refusal to reinstate a pilot whose Lockheed Lodestar was washed out when it skidded off a wet runway into the water at Tampa, Fla., on Sept. 13, 1945.



## NEW TIE-DOWN

Eddie Lyons of Lyons Flying Service developed the link chain tie-down device he is shown attaching to a Piper Cub at his flying school at Zahn's Airport, Lindenhurst, L. I. The chain snaps into an eye on the wing strut, the other end to a concrete block sunk into the ground. A similar chain holds down the other wing and a small length the tail. (Ross-Pix Photo)

## Fixed Base Group Works For Insurance Rate Cut

Establishment of a standing committee of fixed base operators and aviation insurance representatives to work for reduction of aviation insurance rates through greater flying safety was discussed at the 1947 annual meeting of National Aviation Trades Association delegates at Springfield, Ill., last week.

Ground work for such a committee was prepared at a recent New York meeting of aviation insurance representatives from more than a dozen companies and groups, with NATA steering committee members and officers. It was suggested at the close of the New York session that six representatives of insurance companies, and probably seven operators from the seven NATA regions, be named to serve on this standing committee. The NATA participation was up for approval by delegates at the Springfield meeting.

Approval also was sought at Springfield for wide-spread circulation of the code of good airport operating practices written by Jerry Lederer, aviation insurance engineer, and Harold Swank, Pennsylvania Aviation Trades Association president. It has been suggested that the code, already circulated in Pennsylvania, receive nationwide distribution among NATA members.

- Other subjects on the NATA agenda:
- Designation of airports complying with the operating code as NATA airports.
  - Participation along with other industry organizations in a sales promotion program to sell aviation generally to the public.
  - Establishment of standards and business ethics codes in each NATA state for operator members, aimed at correcting unfair charges for repair and maintenance work which have been protested by various consumer aviation groups.
  - Setting of uniform instruction and training practices.

## CATA Gets GI Refunds

California Aviation Trades Assn. claims credit for forcing Veterans Administration to refund \$115,750 to 24 operators of West Coast "G.I." flight training schools.

Money represents deductions made from school payments earlier in year when VA at Los Angeles ruled that student flight check costs were not chargeable.

According to Richard Thurber, CATA manager, persistent pressure by CATA finally brought a ruling from VA in Washington that flight check charges were valid items, and an order to refund all amounts previously deducted.

## BRIEFING FOR DEALERS AND DISTRIBUTORS

**SEGMENTED CIRCLE PROCEDURE**—Ross Airport, St. Louis, has installed a marking for mixed traffic using the CAA-approved segmented circle, which is made in this instance out of 1 1/2 in. white crushed rock. Segments were staked out around the 100 ft. circle, and a truck dropped the crushed rock from the tailgate through a three foot opening as the vehicle moved around the circle. When the circle was completed, the three-foot spaces between the 12-ft. segments were scraped away. L-shaped arms, two indicating right hand traffic on the northern takeoffs and two indicating left-hand traffic on the southern takeoffs, were "poured" similarly. Result is a marker which retains its color in all weather and is approximately 3 to 5 in. thick on the surface of the ground. Total expenditure for the rock was \$25 for 11 tons. The labor was done by linemen at the airport as part of their week's work without extra compensation. Pouring calcium chloride or some other weed killer on the ground where the rock is placed is another improvement contemplated. W. W. Ross, operator of the field, reports that he has compiled figures on the project because of protests from airport operators that the segmented circle markers would cost from \$500 to \$700. The circle has been placed around an L-shaped landing tee and windstock with a moveable arm on the landing tee to show whether the wind requires left-hand or right-hand traffic. Ross Airport has also succeeded in getting a St. Louis company to paint a Skyway No. 1 symbol airmarker on a hangar at the field along with an advertising sign of the company and operator Ross believes that many local business firms will participate similarly in airmarking in other localities if operators ask their assistance.

**STUDENT PILOTS TOTAL DROPS**—CAA's statistical report on pilot certificates approved, shows a drop in student certificates for August as compared to the same month in 1946. Totals are 17,549 student certificates for Aug. 1947, and 20,467 for Aug. 1946. For the same month however private pilot certificates show a gain to a total of 11,737 as compared to only 7,210 for Aug. 1946. Since the large majority of flight training is in GI programs these figures may be interpreted to mean that entrants into the GI flight program are slowing. The drop has been expected.

**GA-2 SERVICE TESTS**—Nine of the GA-2 three-place amphibians built by Goodyear Aircraft Corp., Akron, have now been placed with fixed base operators in the extensive service test program which seeks public and operator reaction to the plane's market potential. Operators listed now include: Atlantic Aviation, Teterboro, N. J. (which has just completed its testing program); Northeast Aviation, Portland, Me.; Fliteways, Inc., Milwaukee; J. D. Reed Co., Houston, Texas; Southern Airways, Atlanta; Hawthorne Flying Service, Charleston, S. C.; Hummel Aviation, Hopewell, Va.; Wooten Aviation Industries, Orlando, Fla., and Miami (Fla.) aviation center.

**SKYWAY ONE CORPORATION**—Plans to incorporate a Skyway 1 association are being formulated by chambers of commerce in cities through which the private flyers' route passes. The association is expected to be patterned after the highway associations which played a material role in developing major trans-continental surface routes. Los Angeles Chamber and Washington (D. C.) Board of Trade at the two ends of the Skyway, are still carrying a major part of the promotional and development load but are recruiting other cities in between to participate.

**NEW STINSON APPOINTMENTS**—Appointment of a new Los Angeles regional sales and service office for Stinson, headed by William Stewart Venn, sales manager, and Kenneth L. Chastain, service manager, has been announced. Territory includes Los Angeles, St. Luis Obispo, Santa Barbara, Ventura, San Bernardino, Orange, Riverside, San Diego and Imperial counties in California, and Lincoln and Clark counties in Nevada.

**MIXED FLIGHT PATTERN**—J. M. W. Chamberlain, owner of the partially-completed Chamberlain Airport at Akron which has been the subject of legal dispute for more than a year, recently informed the Ninth Ohio Court of Appeals that he proposed a mixed flight pattern to prevent airplanes from his field from flying across the nearby community of Fairlawn, home of most of the objectors to his field. Planes would reach an altitude of 500 ft. before leaving the airport proper and would then head north, away from Fairlawn, he said. Chamberlain told the court that he had a letter indicating the mixed pattern was acceptable to the Civil Aeronautics Board, while F. E. Randell, Ohio state aviation department chief engineer, testified that he was ready to approve the airport as now planned.

ALEXANDER MCSURELY



# AIR TRANSPORT

## Pay Demands Eyed as Unions Organize More Airline Personnel

Management sees cards stacked against them in unions' generally successful campaign among mechanics, stewardesses and other employe groups.

Intensive and generally successful union organizational drives among both ground and flight personnel during the past year are being eyed with apprehension by the economy-minded air transport industry.

Prospects are that it will be a number of years before the certificated carriers' ground employes are as completely organized as the pilots—of whom the Air Line Pilots Association now claims to represent 99 percent. But the unions have won victories in an overwhelming majority of elections conducted by the National Mediation Board during 1947. **► Last Holdouts**—Clerical, office and station personnel, together with foremen and supervisors, seem to be the last holdouts, although unions are making progress even among these groups.

Wages currently represent about 49.4 percent of the domestic airlines' total expenditures and around 38.9 percent of U. S. flag carriers' costs. When United Air Lines recently announced plans for a 10 percent passenger fare boost it laid heavy emphasis on the fact that wages and salaries have risen 61.8 percent since 1941. Further wage boosts may force other carriers—now on the fence—to seek higher fares.

**► Wage Drive Started**—Northwest Airlines' mechanics already have asked for another 18 percent wage hike "to catch up with the cost of living."

Airline management feels the cards are stacked in the unions' favor because the National Mediation Board provides no place on a representation ballot for a vote for "no union." This is in sharp contrast to procedure under the Taft-Hartley Act or under the old Wagner Law. Under National Mediation Board interpretation of the Railway Labor Act, the only way to vote for "no union" is either to cast an invalid ballot or not to vote at all.

**► Rapid Organization**—Stewardesses represent an extreme example of rapid unionization. In June of 1946 they were organized only on United Air Lines. Since then ALPA has organized the Air Line Stewards and Steward-

esses Association and has won elections at eleven carriers—Eastern, Northwest, TWA, American, PCA, Chicago & Southern, Braniff, Western, Inland, Northeast and National. The Transport Workers Union of America (CIO) represents stewards and stewardesses on Pan American Airways and American Overseas Airlines.

A CIO union represents radio and teletype operators on seven airlines—American, Braniff, Inland, Mid-Continent, Northwest, PCA and Western—while an ALPA-sponsored organization represents the same group at Chicago & Southern. The Radio Officers Union (AF of L) represents communications employes at Northeast and National, but ROU's failure to organize Eastern represents one of the few union defeats of the year.

**► Maintenance Employes**—The International Association of Machinists (Independent) continues to be the big union among maintenance employes. It represents mechanical workers at Colonial, Eastern, National, Northeast, Northwest, PCA, TWA and United. The United Automobile Workers (CIO) has organized mechanics at Braniff, Chicago & Southern, Continental, Delta, Inland, Mid-Continent and Western. The Transport Workers Union represents mechanics at American, American Overseas and Pan American.

Between the IAM, UAW and TWU, airline mechanical departments are already well organized, with the IAM probably in a position to make the biggest gains in the future. IAM now is attempting to organize the smaller carriers and has won several elections among nonscheduled lines and feeder operators. It also has won an election among U. S.-based mechanics of British Overseas Airways Corp.

**► NMB Ruling**—Meteorologists are just getting into the union picture. On Oct. 27 the National Mediation Board determined after a hearing that meteorologists would thereafter be treated as a separate class or craft under the Railway Labor Act. The Brotherhood of Rail-

way Clerks had unsuccessfully opposed this decision. A new and independent organization, the Society of Airline Meteorologists, now represents these employes on United Air Lines and has just won an election at Braniff. Another independent union represents meteorologists at PAA, while the Brotherhood of Railway Clerks represents them at Mid-Continent.

Several union moves to organize airline foremen, supervisors and professional employes have given management additional worries. The UAW now represents technical engineers, architects and draftsmen at Mid-Continent. In September the IAM won an election to represent mechanical department foremen at PCA, and about the same time the UAW was successful in a ballot at Western. The Transport Workers Union abandoned a similar attempt at American Overseas.

**► Laws Differ**—The Railway Labor Act differs from the Taft-Hartley Law with regard to supervisors. While Taft-Hartley excludes supervisors, the Railway Labor Act covers "employes and subordinate officials."

Aside from stewardesses, ALPA's penetration among employe groups other than pilots has met with little success. The Air Carrier Communication Officers Association—an ALPA-sponsored group—has won representation only at Chicago & Southern.

**► ALPA Activity**—When an ALPA mechanics group lost out to TWU at American Airlines in July, 1946, most of the pep was taken out of the pilots' attempts to control unionization in airline mechanical departments. The American Federation of Labor has taken notice of ALPA's interest in ground workers and has warned the pilots to keep hands off.

Both the AF of L's Brotherhood of Railway Clerks and the CIO's Transport Workers Union reportedly are disappointed with their airline gains. After the National Mediation Board established the new class or craft of clerical, office and station workers early this year, the railway clerks won elections at PCA, Mid-Continent and Western and extended their coverage at Northeast.

**► Loses Fight**—The Brotherhood had previously obtained voluntary recognition at Pan American and represents transportation agents at Northwest. But the Union's fight with the IAM over stockroom personnel has resulted in the machinists representing the entire clerical group at National and Colonial.

On the big airlines, the railway clerks'

organization drive is stymied at the moment. The brotherhood has removed several of its special airline organizing staff.

**► TWU Campaign**—The left-wing Transport Workers Union has failed to make much impression outside of Pan American, American and American Overseas. Elsewhere TWU has only managed to win an election at United covering a few flight navigators.

A paradox is the manner in which TWU has been easy with management in the writing of agreements. Where the union has contracts they are usually as favorable to management as any in the industry. Only at American Overseas has TWU been "tough."

Airlines believe TWU's policy is merely an indication of how eager the union is to get a foothold in the industry. TWU's attitude also evidences strong resistance in negotiations on the part of management.

## New Chicago-Seattle Service Disapproved

Reflecting a continuation of its recent caution in granting new routes, CAB has denied, with two minor exceptions, all applications for additional airline service in Chicago and Seattle area.

Excessive cost, duplication of existing operations, and the small population of many of the new points sought contributed materially to the Board's decision denying the bids of Duluth Airlines, Duluth, Minn.; G. I. Airlines, Milwaukee, Wis.; and Great Northern Airlines, Great Falls, Mont. Western Air Lines' application to operate between Great Falls and Seattle also was turned down.

**► Certificate Amended**—Northwest Airlines' AM 3 certificate was amended to include Great Falls as an intermediate point between Billings and Bozeman, Mont., and to include Kalispell, Mont., as an intermediate point between Missoula, Mont., and Spokane, Wash., subject to the restriction that Great Falls shall not be served on flights stopping at Billings, Bozeman, Butte or Helena, Mont., and that Kalispell shall not be served on flights stopping at Bozeman, Butte, Helena or Missoula.

Duluth Airlines' unsuccessful application proposed local feeder service between Chicago and Fargo, N. D., via numerous intermediate points in Wisconsin, Minnesota and Michigan. G. I. Airlines asked certification for a mail and express pickup service concentrated primarily in Wisconsin and Illinois, with stops in Michigan, Minnesota and Iowa.

**► Low Traffic Potential**—Great Northern sought a 2,051-mile route from Chicago to Seattle via the Twin Cities and running parallel to and just south of

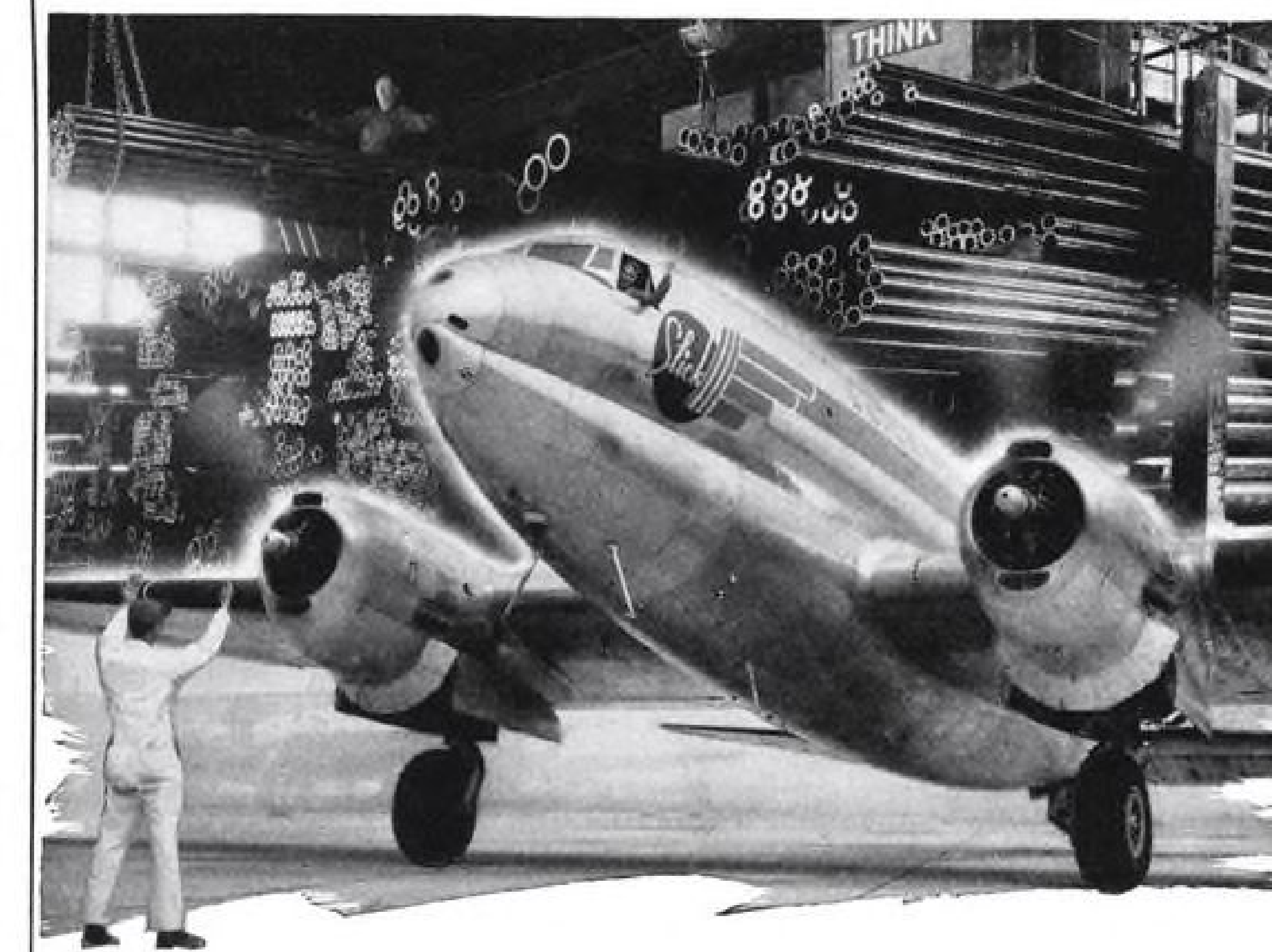
the Canadian border on that portion of the link west of Duluth. CAB noted the small traffic potential over most of the system, adding that additional installations and annual maintenance for airway navigational facilities would cost \$1,142,000 and \$408,000, respectively.

## CAB Restores Rights To 10 More Nonscheds

Eighteen of the 42 uncertificated carriers which lost their letters of registration as nonscheduled operators in October for noncompliance with CAB's

economic regulations have now been authorized to reinstate service.

In addition to eight companies which had their suspensions lifted late last month (AVIATION WEEK, Nov. 10), CAB has restored letters of registration to Standard Air Cargo, Seattle; Aviation Maintenance Corp., Van Nuys, Cal.; Capitol Airways, Nashville, Tenn.; Gulf and Western Airlines, Houston, Texas; Viking Airlines, Burbank, Cal.; Arctic-Pacific, Inc., Seattle; Magnolia Airlines, New Orleans; Arnold Air Service, Anchorage, Alaska; Reg. Robbins, Houston; and Airline Transport Carriers, Inc., Burbank.



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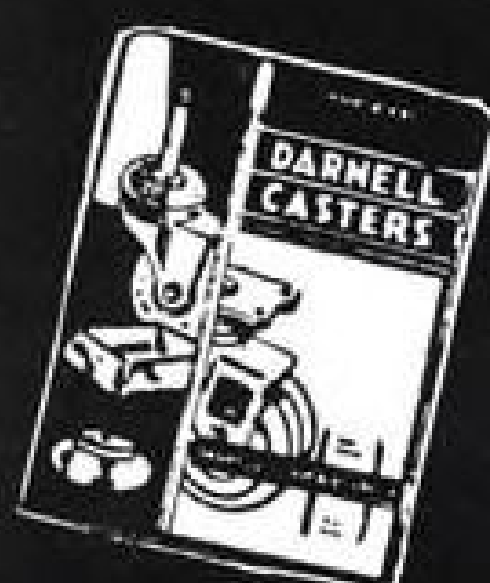
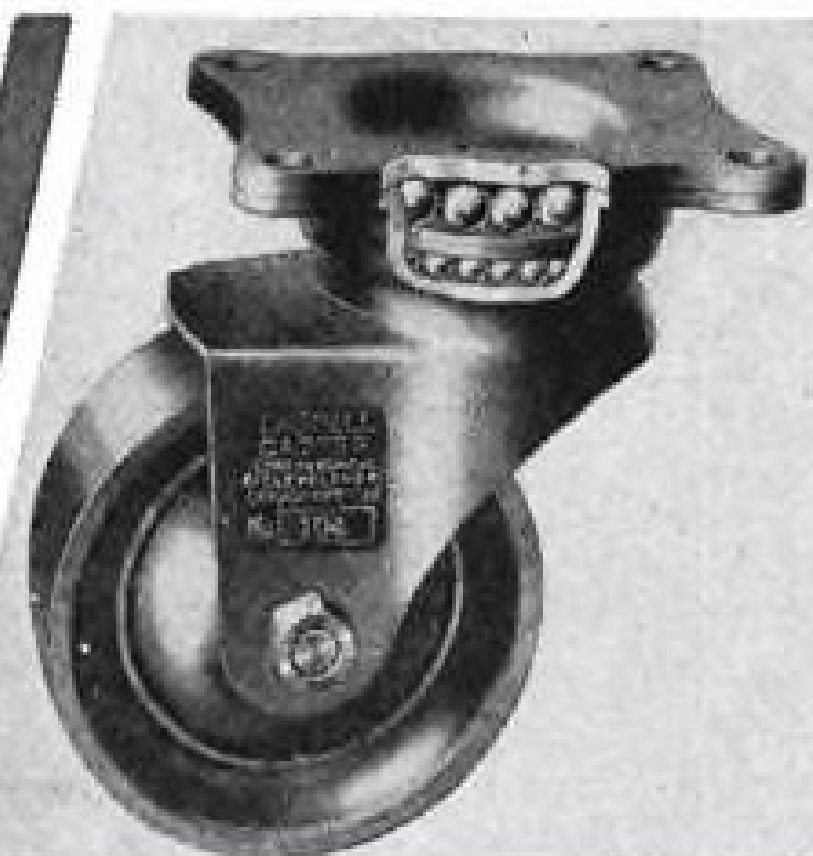


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## UAL Nets \$1,428,587 During Third Quarter

United Air Lines turned in net earnings of \$1,428,587 during third quarter 1947 to cut its nine-months deficit to \$1,771,613. The carrier had a \$2,343,631 profit during the first nine months of 1946 and reported net income of \$1,502,571 in the third quarter of last year.

Compared with third quarter 1946, United's passenger revenue increased 29 percent, mail revenue 5 percent, express revenue 24 percent and freight revenue 85 percent. Total operating revenue for the quarter was \$22,507,577 against \$20,272,534 a year ago. This gain was made despite the fact that third quarter 1946 revenue included \$2,804,195 from Army contract operations no longer in force.

Operating expenses in third quarter 1947 totaled \$20,013,390 against \$17,607,030 in the corresponding period last year. Operating revenues for the first nine months of 1947 were \$52,686,877 compared to \$48,184,660 a year ago and operating expenses were \$54,865,855 against \$43,599,080 in the first nine months of 1946.

Under its economy program, United has made payroll reductions aggregating about \$6,500,000 annually. As of Sept. 30, the company had about 11,000 employees compared to a peak of 13,348.

## AIA Conference Set

A CAB prehearing conference on whether to withdraw permanently American International Airways' letter of registration as a nonscheduled operator is to be held in Washington on Nov. 25. The New York carrier operated the Boeing 314 flying boat which was forced down in mid-Atlantic last Oct. 14.

## CAB SCHEDULE

Nov. 24. Prehearing on Board's investigation of Universal Air Travel Plan agreement. (Docket 3079.)

Nov. 24. Hearing on Caribbean-Atlantic Airlines' mail rate case. (Docket 2210.)

Dec. 1. Oral argument on Railway Express-Northwest Airlines airfreight agreement. (Docket 2340.)

Dec. 8. Hearing on PCA's application for unrestricted service from Chicago to Cleveland, Akron, Youngstown and Pittsburgh. (Dockets 1789 and 1790.)

Dec. 8. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans route. (Docket 1956.)

Dec. 10. Prehearing conference on New York area helicopter case. (Docket 946 et al.)

Jan. 5. Hearing on Board's investigation of Consolidated Airfreight Tariff Agreement. (Docket 2719.)

Jan. 6. Hearing on Taca, S. A., foreign air carrier permit renewal and amendment case. (Dockets 3016 and 3017.)

## New York Helicopter Mail Case Scheduled

Helicopter mail service in the New York area will move an important step toward achievement Dec. 10 when CAB is slated to hold a prehearing conference on route applications filed by six companies.

The Post Office Department, which already has backed helicopter mail service in Los Angeles and Chicago, will favor certification of a New York operation. In tests last January nine helicopters carried mail between LaGuardia Field and New York, New Jersey and Connecticut points.

Regularly-scheduled helicopter mail service in the Los Angeles area began in October, and CAB already has held hearings on applications for Chicago service. The Post Office Department does not plan to back certificated helicopter mail operations in cities other than Los Angeles, Chicago and New York until the value of these three services has been proved.

Applicants for New York area routes are New York Helicopter Corp., Air Commuting, Inc., Island Air Ferries, Inc., Helicopter Air Transport, Inc., Atlantic Central Airlines, Inc., and Asbury Park-New York Transit Co.

## TWA Earns \$884,124 During Third Quarter

After recording a first quarter loss of \$5,723,523 and second quarter earnings of \$201,690, TWA boosted its net profit on overseas domestic operations to \$884,124 in the three months ended Sept. 30.

Highlighting the report was TWA's announcement that net profit on domestic operations alone during September was \$467,148, highest monthly earnings in company history. Earnings from overseas service brought total profit for September to \$630,131.

Continued reductions in overhead expenses, closer consolidation of overseas and domestic operations, and increased passenger miles flown were credited by TWA for the improved third quarter showing. The company predicted overseas traffic will continue at a high level throughout the winter.

Total operating revenue increased from \$7,354,474 in July to \$8,068,299 in September, while operating expenses dropped from \$7,430,716 to \$7,321,355. Revenue passenger miles increased from 98,798,000 in July to 112,977,000 in August and 113,124,000 in September. Systemwide load factor climbed from 63.68 percent in July to 72.32 in August and 75.78 in September.

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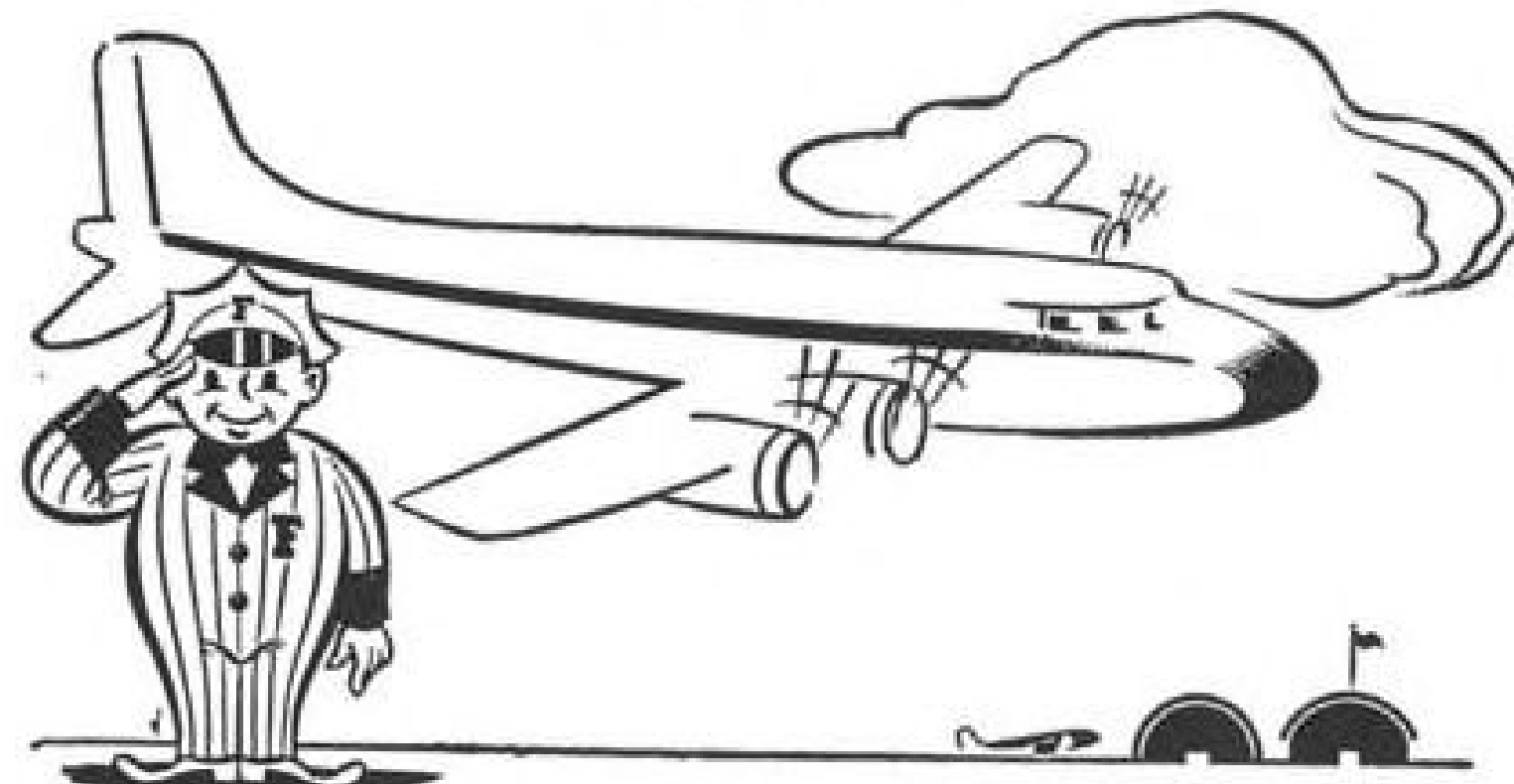


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## SHORTLINES

► **American**—Flew a record 20,208,666 cargo ton miles during the first nine months of 1947. Freight carried on scheduled flights through September totaled 7,462,727 ton miles compared with 6,238,966 ton miles in all of 1946. Company also flew 4,008,254 ton miles of contract freight during the first nine months of this year. Besides freight, American flew 3,523,431 ton miles of express through September compared with last year's nine months total of 3,107,182. Airmail aggregated 5,214,254 ton miles in the first three quarters of 1947, up 214,864 over the same 1946 period. . . . Passenger traffic out of the New York area last month set an all-time October record. Company carried 71,142 passengers from LaGuardia Field and Newark Airport—5,588 more than in October, 1946.

► **Braniff**—Temporary mail rate on the company's Latin American link from Houston, Tex., as far as Lima, Peru, has been set at 95 cents a plane mile on the basis of three schedules weekly. CAB set no rate for services beyond Lima because of existing uncertainties as to operating rights. Braniff had sought a temporary mail rate of \$1.51 a plane mile. Service is slated to begin shortly.

► **Capital**—Plans to inaugurate service to Minneapolis-St. Paul on Dec. 1. Flights to Charlotte, N. C., will commence Dec. 5. . . . Carrier has instituted as combined reservations service with Braniff Airways to provide immediate confirmation of interline space.

► **Chicago & Southern**—During October operated in the black for the third successive month with a net profit of \$4,036. This compares with \$3,917 net in August and \$8,492 in September. October's showing was made despite pay increases of over \$10,000 monthly which went into effect Oct. 1.

► **Delta**—Plans to inaugurate service at Richmond and Kokomo, Ind., on AM 54 about Dec. 1.

► **National**—Intends to offer a reduced roundtrip excursion fare between Miami and Havana beginning Dec. 1. Present one-way fare is \$20, while the roundtrip excursion fare would be \$30.

► **Northwest**—All flights into and out of New York and Chicago are being made with DC-4s and Martin 2-0-2s. New schedules have eliminated DC-3s altogether at these two cities. Every point of NWA's system from Billings, Mont., eastward will be served by the carrier's new fleet of ten 2-0-2s.

► **Pan American**—Flew 502,902,000 passenger miles in third quarter 1947 against 320,078,000 in the corresponding quarter of 1946 and 446,252,000 in the second quarter of 1947.

## Incentive Mail Pay Proposed for CAL

For the first time in its rate-making history, CAB has proposed gearing the mail pay of a trunkline directly to its passenger load factor.

Sliding scale mail rates drawn up by the Board for Continental Air Lines will enable that carrier to increase its profit automatically as it raises passenger volume. The formula, effective retroactively to Dec. 1, 1946, would permit CAL to break even under present passenger tariffs at a load factor of 48 percent, based on the standard DC-3 capacity of 21 seats. Continental would receive maximum mail pay of 28.5 cents a plane mile when its monthly passenger load factor falls below 51 percent.

► **Mail Rate Drops**—For each 1 percent increase in the passenger load factor above 50 percent, the mail rate will be decreased by six-tenths of a cent. Despite the declining mail rate, each 1 percent increase in the passenger load factor will boost Continental's operating revenue by about one-half cent a plane mile.

With a 45 percent load factor in a given month, Continental would receive 28.5 cents a plane mile mail pay but would suffer an operating loss of 3.86 cents a plane mile before taxes. At

## More Fare Boosts

At least eight trunklines and two feeders are expected to institute 10 percent passenger fare increases on part or all of their routes by the middle of next month.

Tariffs filed with CAB indicated that Capital Airlines (PCA), Western, Inland and Southwest will join TWA and United in raising fares on a systemwide basis Dec. 12. At the same time, Chicago & Southern, Challenger, Delta and Mid-Continent are slated to increase tariffs on portions of their routes. Northwest Airlines' 10 percent fare boost went into effect a month ago. American Airlines remains the principal holdout against higher tariffs.

about 48 percent load factor (mail pay 28.5 cents a mile) the carrier would break even. A 50 percent load factor (mail pay still 28.5 cents a mile) the carrier's operating income would be 1.56 cents a mile.

► **Earnings Rise**—A 55 percent load factor (mail pay 25.5 cents a plane mile) would yield the carrier 4 cents a plane mile operating income or a 6.2 percent

return on its investment after taxes. At 60 per cent passenger load factor (mail pay 22.5 cents a mile) Continental would have an operating income of 6.44 cents a plane mile and makes a 9.9 percent return on its investment. At 65 percent load factor (mail pay 19.5 cents a mile) the carrier would have an operating income of 8.88 cents a mile and earn 13.7 percent on its investment.

Any economies which Continental achieves to bring operating costs below CAB's estimate of 83.64 cents a plane mile will result in higher earnings. CAB said the formula has sufficient flexibility to forestall the necessity for frequent revision and would provide maximum incentive.

Under the Board's proposal, Continental will receive \$343,000 additional mail compensation for the seven months ended June 30, 1947, bringing the total to \$698,992.

## Wilson in New Firm

T. B. Wilson, formerly TWA board chairman, and Theon Wright, formerly TWA's public relations director in New York, have opened offices at 500 Fifth Ave., New York, where they will conduct a public relations service and general business representation. Wright is president of the new firm—Wilson, Wright & Associates, Inc.—and Wilson is board chairman.

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(Continued on page 46)

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An advertising inch is measured ¼" vertically on a column—3 columns—30 inches to a page.

## New ZWENG Books

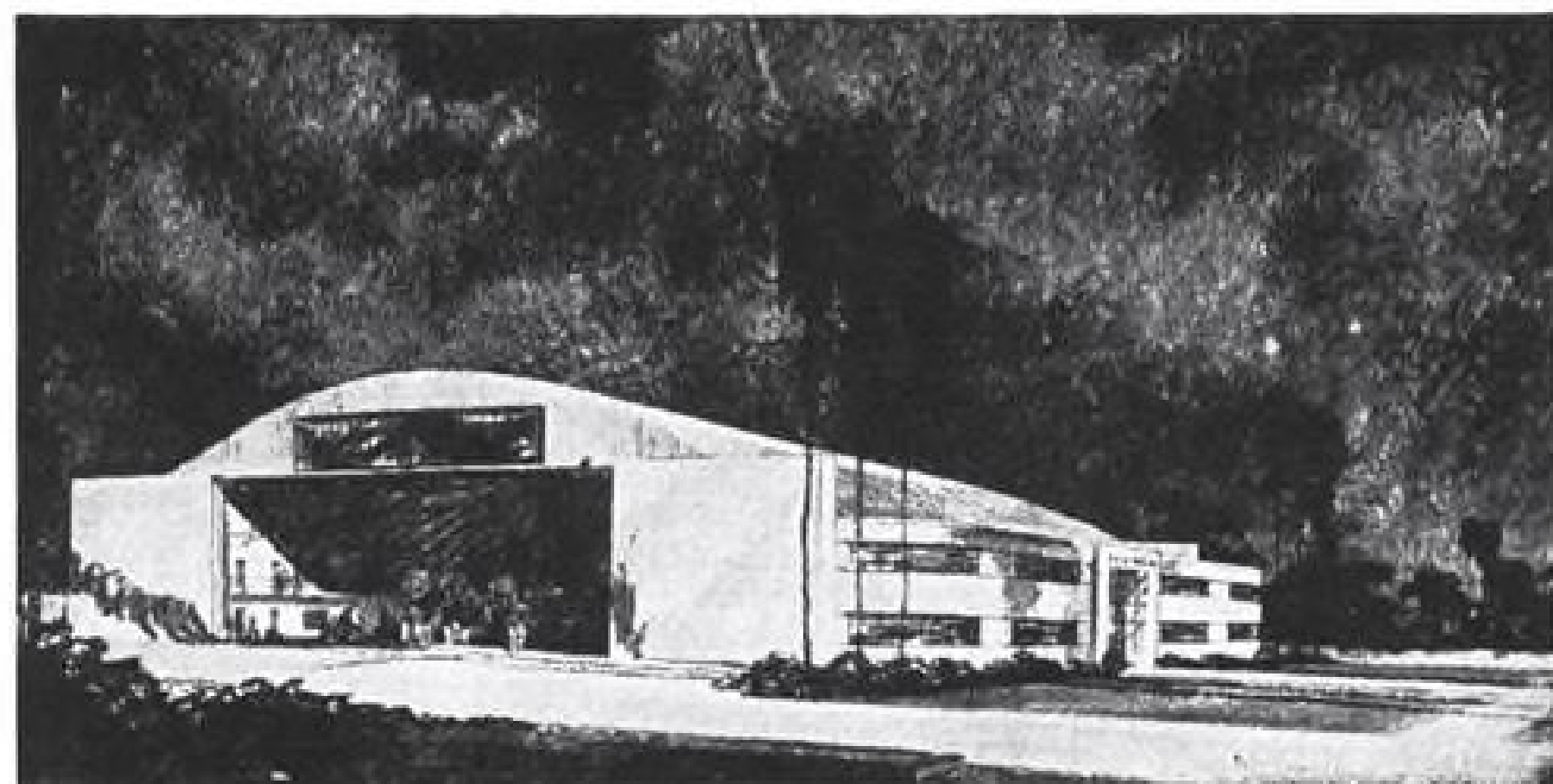
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**FLIGHT ENGINEER MANUAL** by Charles A. Zweng. A basic text for the new CAA Flight Engineer rating. Typical examinations included. \$4.00 postpaid or C.O.D.  
**PRACTICAL MANUAL OF THE E-6B COMPUTER** (by Allan C. Zweng). More than 400 problems explained and illustrated. De Luxe (handsomely bound), \$2.00 postpaid.  
**E-6B computer** with leather case \$10.00.  
**PAN AMERICAN NAVIGATION SERVICE CIV. A-3** 12021 Ventura Blvd., North Hollywood, Calif.



SEE US FOR **SAE INSTRUMENTS** APPROVED REPAIR STATION 188  
NEW — USED — ALL TYPES — SALES — REPAIRS  
**STANDARD AIRCRAFT EQUIPMENT COMPANY**  
Hangar 35, Roosevelt Field, Mineola, L. I., N. Y. Garden City 8753



## HANGAR For Sale



New all-steel prefabricated bolted type building, actual floor dimensions 147' x 162'. Unobstructed span, clearance in center of arch 39'. 22 gauge Butler type galvanized covering for entire building included. Building is packaged for overseas shipment and complete with doors for both ends opening to a width of 120' and 26' high. Approximate total weight 140 ton. Blue prints, assembly manual and erection tools included. We have sold a number of these throughout the country and invite inspection. Average erection cost \$6000. Will deliver rail side or ship side on Pacific Coast.

PRICE \$37,000

**ANDERSON AIRCRAFT CO.**

1700 SAWTELLE BLVD.

LOS ANGELES 25, CAL.

### NO COMPROMISE

"No Compromise with Quality" is the constant guide on all maintenance work performed by Atlantic Aviation. That's why Atlantic services a major share of the executive planes in the New York area. Next time in New York, take advantage of Atlantic's superb facilities.

**Atlantic Aviation**  
TETERBORO AIRPORT  
TETERBORO, N. J.  
PHONE: HASBROUCK HEIGHTS 8-1740

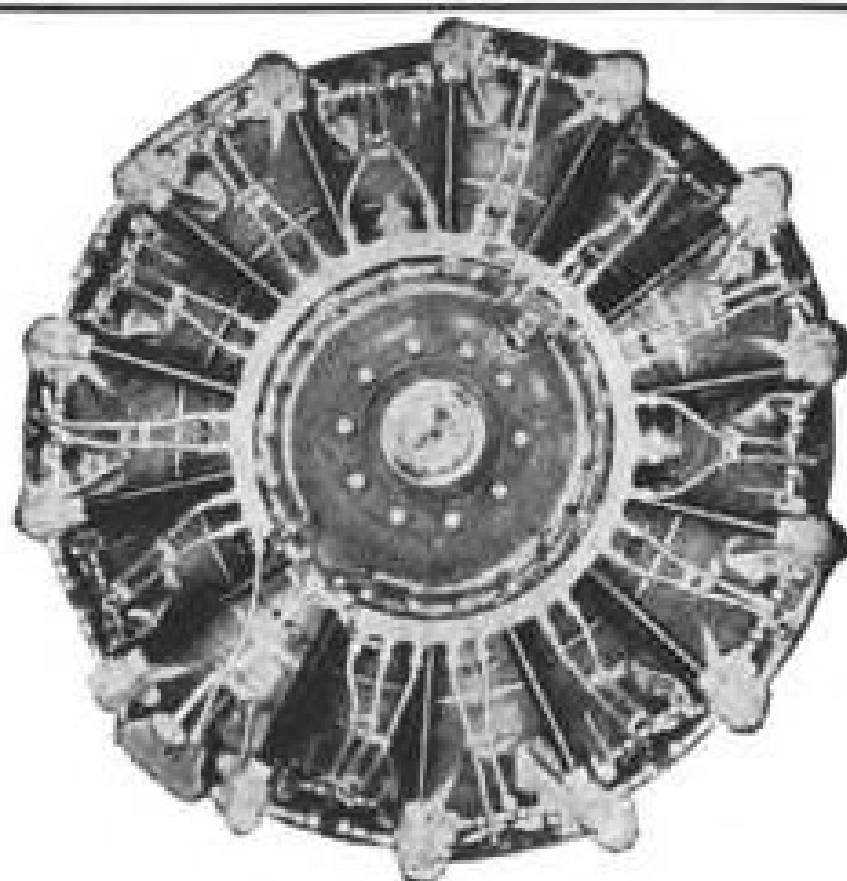
### FOR SALE

- 2 Never Flown 1946 ERCOUPES  
New Guarantee in every respect—\$2850.00
- 1—1946 ERCOUPÉ—400 hours  
Low Time Since Major—\$2250.00
- 2—1946 ERCOUPES—100 hours  
With Radios — \$2450.00

All of above airplanes can be financed.

**THE TRACTOR SALES CORP.**

1409 Santa Fe Ave., Los Angeles 21, Calif.



*This fine engine, newly overhauled, warranted, test-run, prepared for long-time storage and packaged for shipment, is available at \$1795 f.o.b. Los Angeles, to operators all over the world. We are proud to present it—We would feel equally privileged to forward you additional information and discuss with you any procurement you may now be planning.*

ADDRESS INQUIRIES to Steward Davis,  
13501 S. Western, Gardena, Calif.  
CABLE: STEDAV, Los Angeles Phone  
PLymouth 5-5144

**this is the Steward-Davis  
R-1830-92 Conversion**

REPLIES (Box No.): Address to office nearest you  
NEW YORK: 330 W. 42nd St. (18)  
CHICAGO: 520 N. Michigan Ave. (11)  
SAN FRANCISCO: 68 Post St. (4)

(Continued from Page 45)  
**FOR SALE**

DC-3, 21 passenger,  
2 new P&W spare engines. Howard-15P now being converted. AT-6, painted and licensed. Twin Cessna-100 hours since engines and props were new, cost \$26,000. Piper 1947 Cruiser only 33 hours, blind flight group. AT-11 Twin Beech, 7 passenger conversion, less than 100 hours on engines since major. 2-AT-19 Stinsons, like new, low time, new licenses. All ships can be seen at our hangars. Commercial Aircraft, Inc., Willow Run Airport, P.O. Box 450, Ypsilanti, Mich.

1946 Beechcraft D-18S  
complete equipment. Less than 300 hours. Condition like new; UHF, ADF, de luxe pilot chairs, reasonable price. New York Aviation Corp., 5 W. 46 St., New York, N. Y.

Cessna heavy wing just relicensed,  
newly majored engines fabric tested okay, lights and flares, extra tank, beautiful interior and exterior, ADF, marker range receiver, Lear transmitter, Lear 3 hand receiver with loop and speaker. Under 780 hours total. Attractively priced. Trades considered. New York Aviation Corp., 5 W. 46 St., New York, N. Y.

### Kollsman Magnetic Compasses



Type  
B-16  
Price  
\$14.95  
each

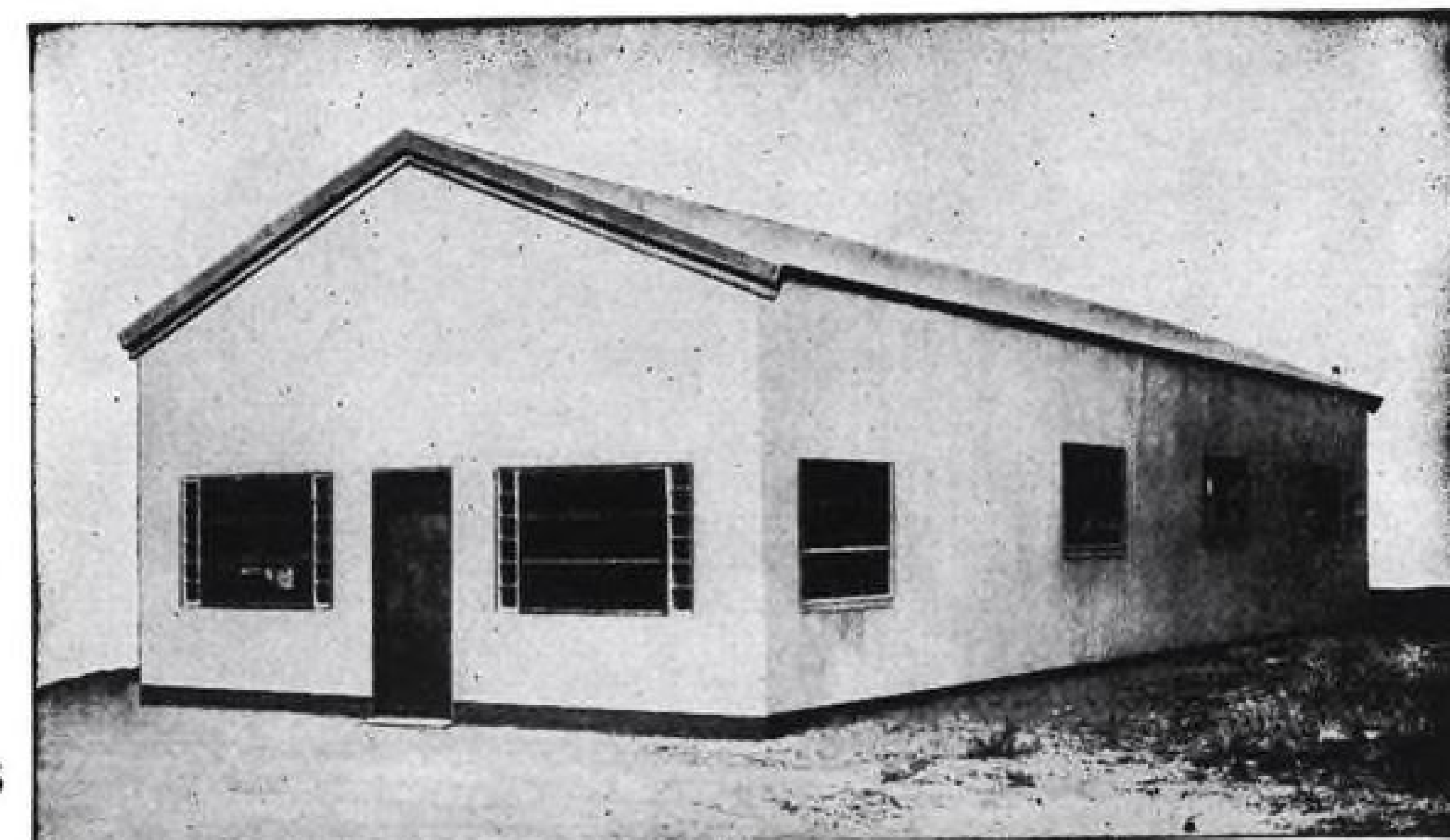
Approach Indicators — L. D. — 24/ARN-3  
Price \$4.95 ea.  
Inverters — Pioneer Bendix type 12123-1-A  
Price \$49.50  
Instrument Lamps — Mazda #323  
Price \$22.00 per C  
All prices f.o.b. Tuckahoe, New York  
**ELECTRONICRAFT, INC.**  
5 Waverly Place, Tuckahoe 7, New York  
Phone — Tuckahoe 3-0044

**EXHAUST  
COLLECTOR RING ASSEMBLIES**  
DOUGLAS PART #5115224 (C-47) NEW  
JOHN N. HOWARD  
P. O. Box 956, Coral Gables, Fla.

# Airplane HANGARS and STEEL BUILDINGS

**Spot  
Delivery**

A PARTIAL LISTING ONLY  
WRITE FOR COMPLETE DETAILS



**B-100, 176' x 300'**—Hangar Building, 176' wide by 300' long. Complete with two wings, lean-to type, 21' wide each by 200' long. Bow string trusses on approximately 25' centers. Building has an eave height of 20'5" and a clear center height of 48'. Building is equipped with full door openings in each end and doors are 13' high, multiple sliding type. Entire structure is covered with corrugated steel sheeting. Lighting and plumbing fixtures are available if required.

**B-101, 130' x 160'**—Combat style Hangar Building, 130' wide by 160' long. Building has an eave height of 8' graduating to a center height of 33' clear. Bow string type trusses, each one 13' wide. Trusses are located on 35' centers. Complete end wall & door assemblies are available. Each building is covered with corrugated steel sheeting. All materials are match marked and erection details are furnished.

**B-102, 110' x 150'**—Brand new "Economy" Hangar Building, 110' wide by 150' long. Bowstring type trusses on 20' centers. Hangar has a clear inside height of 16'. A complete door assembly for one end is furnished. These doors are sliding type and provide an opening 90' wide by 16' high. Continuous steel sash are furnished for both side walls. Entire building is covered with prime quality corrugated aluminum sheeting. Ready for prompt shipment.

**B-103, 110' x 300'**—"Economy" Hangar Building—BRAND NEW—never been erected, 110' wide by 300' long. Bowstring trusses on 20' centers and Hangar has an eave height of 16' and a clear inside height of the same measurement. Complete door assemblies are available for both ends. Continuous or intermittent sash is also available. Anchor bolts, erection bolts and miscellaneous hardware are furnished. Entire building is completely covered with prime quality, bright finish, corrugated aluminum sheeting.

**B-104, 70' x 100'**—Brand New "Economy" Building. Hangar style, 70' wide by 100' long, sidewall height 19'6" to eaves. Rigid arch construction. Gable roof with a slope of 5" in 12". Columns are on 20' centers. Building is equipped with full sliding doors in both ends and 4 steel sash, 2 in each side. Complete corrugated aluminum siding and roofing is furnished.

**B-105, 60' x 120'**—Brand new "Economy Building" Hangar style, 60' wide by 120' long. Sidewall height 16' to eaves. Rigid arch design with columns on 20' centers. Gable roof with a slope of 5" in 12". This building is equipped with a full sliding door unit in one end. Six steel sash measuring approximately 3' x 5' are also furnished. Entire hangar is completely covered with corrugated aluminum roofing and siding.

**B-106, 100' x 160'**—Brand new Wooden Hangar Building, 100' wide by 160' long. Bowstring trusses on 16' centers. Wooden trusses and columns. Sidewall height 17'6" to eaves. Clear span. Outside center height 31'9". Covering consists of galvanized steel sheets. Never been erected.

**B-305, 25' x 45'**—Three complete buildings, 25' wide by 45' long by 12' at the eaves. Approximately 25' high at the center. Aluminum covered. Three bays at 15' each. Equipped with two sliding doors.

**B-308**, One all steel private airplane hangar. Structural steel designed for a combined load of 27½ per foot. A clear door opening of 41'8". Clear vertical opening 9'. Wing section 42" wide x 16" deep x 13" high. Tail section 14" wide x 13'8" deep x 9' high.

**B-309**—One all steel small airplane hangar 40'x100'. Equipped with full sliding doors on one end for an opening of 38'5". Building completely covered with steel sheets.

**B-400, 40' x 100'**—Six complete buildings 40' wide by 100' long by 14' to the eaves, 22' high at the center. Aluminum roofing and siding. Equipped with two 10' x 10' sliding doors and four 3' x 5' windows. Complete building ready for erection.

**B-401, 50' x 100'**—Two complete buildings 50' wide by 100' long by 14' to the eaves, 22' high at the center. Aluminum roofing and siding. Doors and windows included.

**B-42, 60' x 100'**—One complete building, 60' wide by 100' long by 19'6" to the eaves. Center height in proportion. Clear span. Completely covered with aluminum roofing and siding. Doors and windows included.

**B-404, 80' x 100'**—Three complete buildings, 80' wide by 100' long by 14' high to the

eaves. Composed of two bays measuring 40' wide each. Each bay has a center height of 22'. Aluminum roofing and siding included. For 10' x 10' sliding doors and four windows 3' x 5' included.

**B-405, 120' x 200'**—Three buildings 120' wide by 200' long by 16' high to the eaves. Composed of three bays measuring 40' wide each. Center height in proportion. Six sliding doors measuring 10' x 10' and located one at each end of each bay are included. Eight windows measuring 3' x 5' are also included.

**B-107, 150' x 300'**—One complete building 150' wide by 300' long by 26' high at the eaves. Composed of 3 bays measuring 50' wide each. Center height of each bay is in proportion with the eave height. Six sliding doors and 12 windows are included. Corrugated aluminum roofing and siding included.

### OVERHEAD CRANES

A PARTIAL LIST ONLY

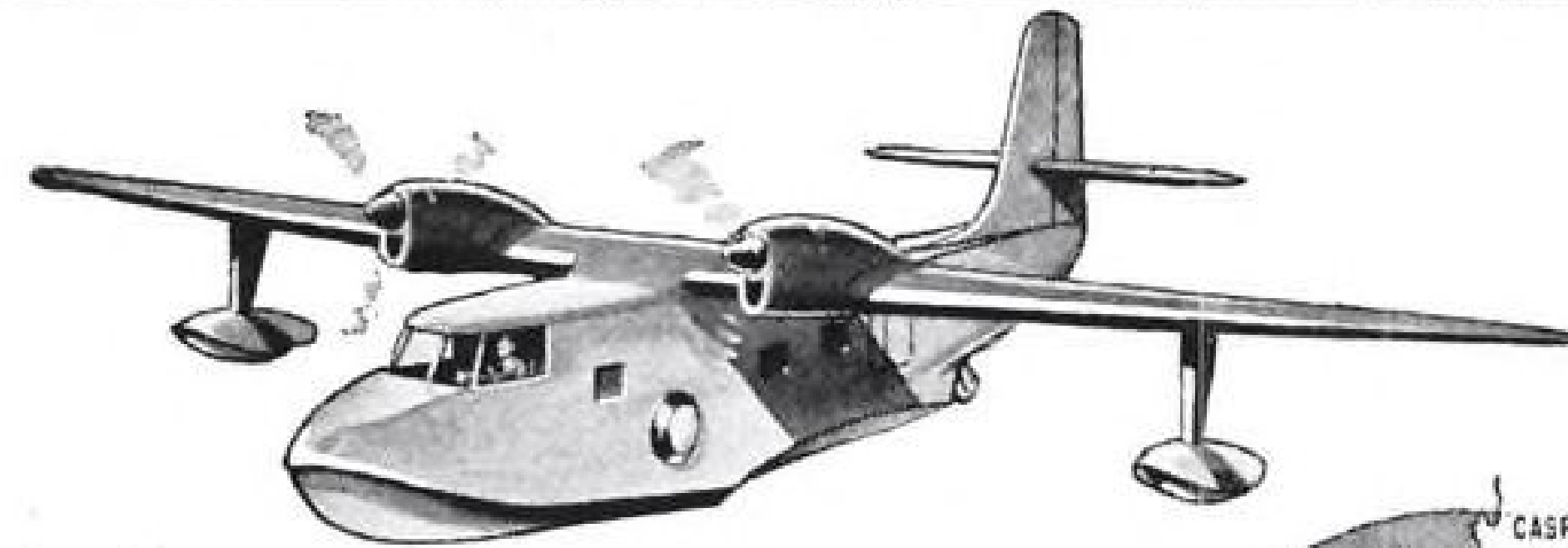
- 2-ton P&H. 31'10½" Span. Hoist motor 6 HP. Bridge motor 6 HP; trolley 2 HP. 230 Volts DC.
- 2½-ton P&H. 33' Span. Two 10 HP on Hoist; two 1 HP motors on trolley; one 10 HP on bridge. Current: AC.
- 3-ton P&H. Span 42'1¼". Three motors—5 HP on bridge; 5 HP on hoist; 1½ HP on trolley. Current: 230 Volts DC.
- 5-ton Detroit. 34' Span. Three motors—7½ HP, 5 HP and 1½ HP. Current: 220 Volts AC.
- 5-ton overhead crane. 37'3" Span. Hoist motor 10 HP; trolley 2 HP; Bridge 7½ HP. Current: 440 Volts, 3 phase, 60 cycle.
- 5-ton Alliance. Span 95' 220 Volts DC. Hoist motor 25 HP; Bridge 50 HP; trolley 15 HP.
- 15-ton Bedford. Span 34'6". 220 Volts AC.
- 20-ton overhead crane. 60' Span. Four General Electric DC motors.
- 25-ton overhead crane. 74'4" Span. Four General Electric motors—40 HP on hoist; 15 HP on auxiliary hoist; 15 HP bridge and 5 HP Trolley.

**ECONOMY COMPANY, INC.**  
45 Vanderbilt Ave., N. Y. C. Tel. MUrray Hill 4-1616



# Suppose you owned a Sealand...

Some Short jottings for airline operators, charter companies, and V.I.P.s

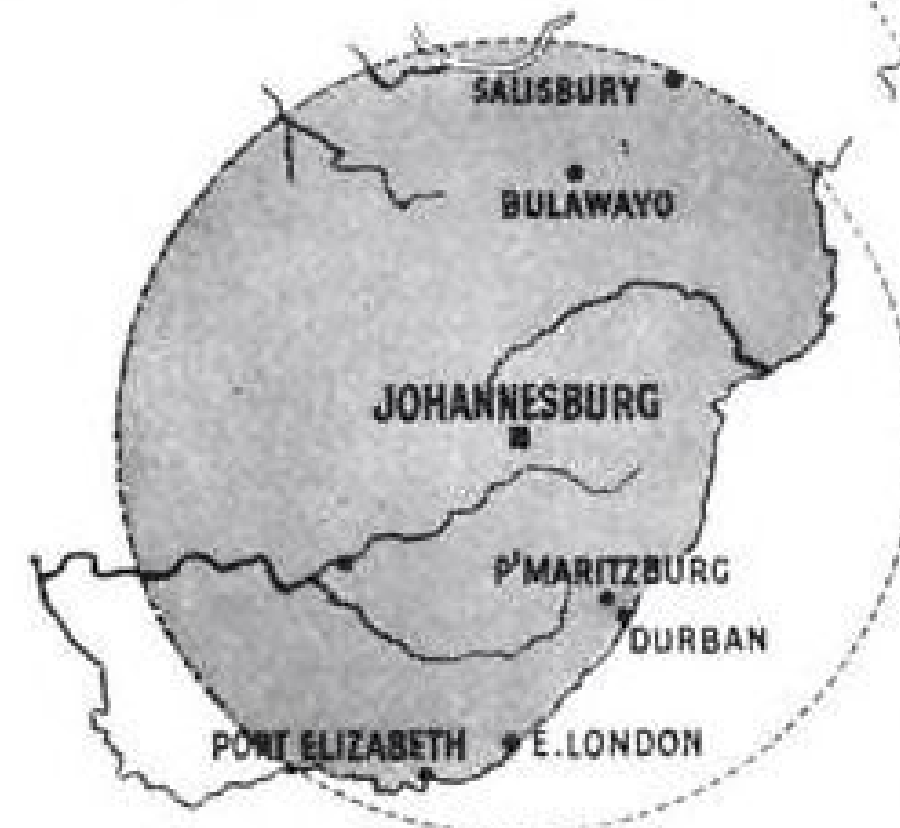


## What is a Sealand?

A Sealand is the name Shorts have given to their new Amphibian—built with the experience that gave us the Sunderland and the Stirling. It is as happy on land as on water. It carries five passengers, with seats for an extra three if need be, or can be converted to a freight carrier, ambulance, mobile workshop, or what you will. It has a normal range of 484 statute miles and a cruising speed of 127 m.p.h. It is powered by two Gipsy 70, 330 h.p. engines, is airworthy on either, up to Air Registration Board safety requirements, and is as technically perfect throughout as you could desire.

## What are 484 statute miles?

484 statute miles are about 778 kilometres. A tidy distance, wherever you



may find yourself. Remember also that with full tanks of 120 gallons, the Sealand has a maximum range of 776 statute miles. Suppose you are working out a distribution system from a main terminal at Poole: a Sealand would enable passengers to transfer direct and be flown non-stop to Belfast, Prestwick, or Dublin in about 2 hours. (Northolt and the Thames Estuary would be a matter of minutes.) If you were in Abadan, then Mosul, Kermanshah, Tehran, and Bahrain would be nicely in range. Again, Durban, Bulawayo, and East London could easily be reached from Johannesburg.

## Where do you operate from?

We will leave further geographical calculations confidently in your hands. Just for fun, try Edmonton, Stockholm, and Cairo, and see where you get to. But remember all the points of advantage that a true amphibian has.



## Are you thinking of the Charter business?

Good luck to you, with a fleet of Sealand. This is a job just made for the job. You can offer a service no land plane can offer, and you'll find that the payload and operating costs make the Sealand highly profitable. The same applies to "feeder" lines almost anywhere in the world.



## Are you a V.I.P.?

If not, you will be one day. Just think what a Sealand could do for you, whether you are in oil, mining, finance or industry! You can turn your Sealand into an office complete with staff, a mobile maintenance or inspection unit, or a hospital outfit. You could even use it to take yourself and your family home on leave.

## What should you do now?

Production deliveries will start soon. But we are booking orders now and a lot are coming in. To enable production to be planned, and to avoid a tedious wait, it is suggested that you write for further details and then place your requirements on record.

**Shorts**

The first manufacturers of aircraft in the world • Established 1908

SHORT BROS. (ROCHESTER & BEDFORD) LTD., ROCHESTER  
SHORT & HARLAND LTD., BELFAST

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## Maximum precision in the making...



Photo Courtesy of Hallcrafters Co.

## with... KESTER CORED SOLDERS

• When soldering operations call for precision, permanence and dependability, Kester Cored Solders fill the bill.

• Kester Cored Solders carry positive acting fluxes right in their cores. They're applied in one, mistake-proof operation. The Kester way of applying flux and solder simultaneously saves you time and reduces the work of soldering to an absolute minimum.

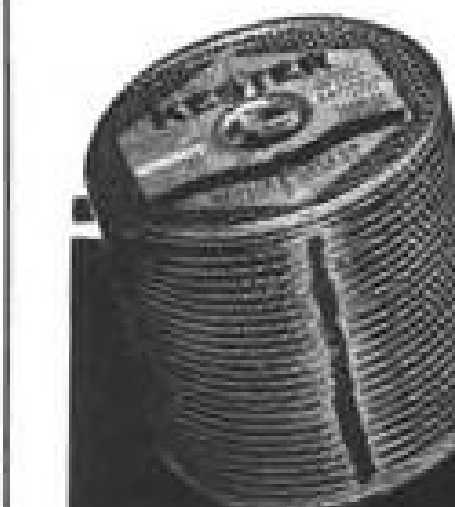
• Kester Acid-Core solder, for general use, forms a connection that remains tight and clean under all operating conditions. Its core will not leak, nor will its flux gather moisture.

• Kester Rosin-Core Solder is manufactured to fill the requirements of any electrical circuit. Its patented plastic rosin flux will not cause corrosion nor injure insulation.

• Kester experience is at your service to determine the best solder formula and practice for your operation. Write fully and be assured of Kester engineering cooperation without obligation.

KESTER SOLDER COMPANY  
4206 Wrightwood Avenue, Chicago 39, Ill.

Eastern Plant: Newark, N. J.  
Canadian Plant: Brantford, Ont.



**KESTER**  
*Cored Solders*  
STANDARD FOR INDUSTRY



# LETTERS

(The editor, on a midwest survey trip, turns over his editorial page today to opinions expressed by his readers)

## 2 Stall Philosophies

To the Editor:

We were much interested in your editorial Nov. 10 titled "Wake Up! Banish Stalls." However, we do have some comment on an earlier AVIATION WEEK report.

This is in reference to the article in your Sept. 15 issue, "Stall-Resistant Craft Seen Through New Design Data." With the stark realization that inadvertent stalls are creating nearly half the fatalities in personal flying, the elimination of the stall can naturally be considered one of the most important goals of aircraft engineers. Two divergent approaches are shaping up to seek the solution of this problem, with two corresponding schools of thought as to the best method of reaching this goal.

The approach which your article highlights is designing an airplane in which it is impossible for the pilot to stall the airplane. Several light two-place aircraft have been placed on the market which, by virtue of restricted rudder and elevator up-travel have achieved a "characteristic incapability of spinning."

The other school of thought functions on the theory that, if a pilot is warned sufficiently of an impending stall, he will very easily be able to take corrective measures in sufficient time to avert disaster. It might on the surface appear that the latter theory still requires the ability of the student to parry a stall and that, even when warned, his succeeding actions might not produce corrective action in sufficient time.

In either case there are problems, compromise and limitations. Your article points out for instance that certain problems connected with restricted up-travel of the elevators still remain to be solved when a 4-place plane is considered, with its resultant CG travel, or when flaps are used, which create a forward pitching moment. The net result to date of any characteristically unspinnable aircraft has been a limitation on elevator travel so great, to meet all conditions of CG, power setting and other factors that an abnormally high gliding speed is necessary.

This same article also points out an advantage claimed for restricted control airplanes which, experience has proved, has resulted in many damaged landing gears. The article says that "restricted control also drastically minimizes the skill required to execute a landing insofar as the stick is pulled all the way back and held there as the airplane glides down to contact the ground. We might add, "and the pilot steps out to order a new landing gear!"

We can see great merit in these efforts to produce a stall-proof, fool-proof airplane, but we wonder if the solution particularly to our immediate safety problems doesn't lie in the form of more adequate stall warning indication which will give the pilot ade-

quate pre-stall warning under any condition, and which does not require any aerodynamic alteration of the plane. This seems logical to assume when it is realized that virtually every stall accident comes out of an unusual condition of steep turn or excessive acceleration under which conditions the warning shudder comes swiftly and immediately before the stall itself occurs.

Stall warning indicators are now being produced. Our instrument, the Safe Flight Stall Warning Indicator, gives warning at speeds of 10% above stalling speed regardless of attitude or condition of wing loading. It is significant that this stall warning indicator, as a matter of fact, is recommended very highly by at least one insurance company for use on certain spin-proof airplanes.

The technique involved in making use of a stall warning device is extremely simple. Since it is impossible to stall or spin an airplane without back pressure on the stick, the pilot need only relax this pressure when the horn goes off, thereby decreasing his turning acceleration and reducing the wing loading sufficiently to return his plane to safe flying conditions for the particular speed at the moment.

The significance of the development of our instrument, which is not only recommended by leading insurance companies but recognized in the tangible form of reduced accident insurance rates, is really evident when it makes possible a statement even more forceful than the lead statement in the AVIATION WEEK article. This statement is now true: "Personal aircraft accidents resulting from the stall now may be virtually eliminated by the simple installation of an 11 ounce instrument."

LEONARD M. GREENE, President  
21 Russell St., White Plains, N. Y.  
Safe Flight Instrument Corp.

## Another Stall Indicator

To the Editor:

We wish to commend you for the editorial concerning stall warning devices Nov. 10. . . . As manufacturers of the new Arnold Stall Warning we were somewhat abashed by your remark that the Safe Flight Indicator is "believed to be the only recognized stall warning device on the market."

The Arnold Stall Warning has two air-flow detectors mounted near the trailing edge where they are not subject to icing and are operated by the initial stages of the stall itself and not by the related change in angle of attack. These detectors are sensitive to airspeed changes within two miles per hour. They are easy to install on either metal or fabric covered wings and each has a base permanently fastened to the wing with rivets or fabric patch respectively.

The detector itself is readily removed from the base by loosening only two small

lock screws for inspection and adjustment. If necessary, a detector can be removed and replaced on the base in about one minute. The detector design has the feature that the electrical switching mechanism is totally enclosed and the entire unit is on the exterior of the wing where fuel vapors cannot accumulate, as they might inside the wing when wing fuel tanks are used, yet the detector is only one inch wide, 14 inches high, 3½ inches long, and weighs only two ounces. Due to its smooth outline and location on the wing it is not subject to damage by fuel hoses and wing covers.

The dual warning reliability provided by the two wing detectors is duplicated by the cockpit indicator which gives both visual and audible warning. This indicator is provided with lugs for panel mounting or a bracket for mounting on the cowl above the instrument panel. It is provided with a test switch to check the proper functioning of the stall warning when in normal flight and also with a switch which can be used to silence the buzzer without affecting the signal light while taxiing.

The Arnold Stall Warning has been service tested under all weather conditions for about two years, was tested and approved by the Cessna engineering department, and is now undergoing testing by the Luscombe engineering department at Dallas and the Educational Research Corp. at Cambridge, Mass. Approval by several insurance companies is imminent.

It was submitted to CAA for approval but we were advised that the CAA no longer tests equipment since they dropped the approved products list last year. They have since set up the Technical Standard Order system per Safety Regulation Release No. 321, and according to our latest information the TSO for stall warning has not yet been established. However, on Jan. 28 we did demonstrate the Arnold Stall Warning on an informal basis to A. L. Morse, acting chief of the Aircraft Development Division at the CAA experimental station in Indianapolis.

GORDON H. ARNOLD  
Gordonay Products Co.  
Flint 3, Michigan

## AOPA Backs Indicators

To the Editor:

We noticed your editorial, "Wake Up! Banish Stalls," and want to compliment you on a splendid thing, as we well know that the stall warning indicator will greatly reduce the number of fatal and serious accidents in private flying.

To date, we have had no record of an AOPA aircraft accident emanating from a stall-spin position where the stall warning indicators have been installed.

J. B. HARTRANFT, Jr., Gen. Mgr.  
Aircraft Owners & Pilots Assn.  
Washington, D. C.

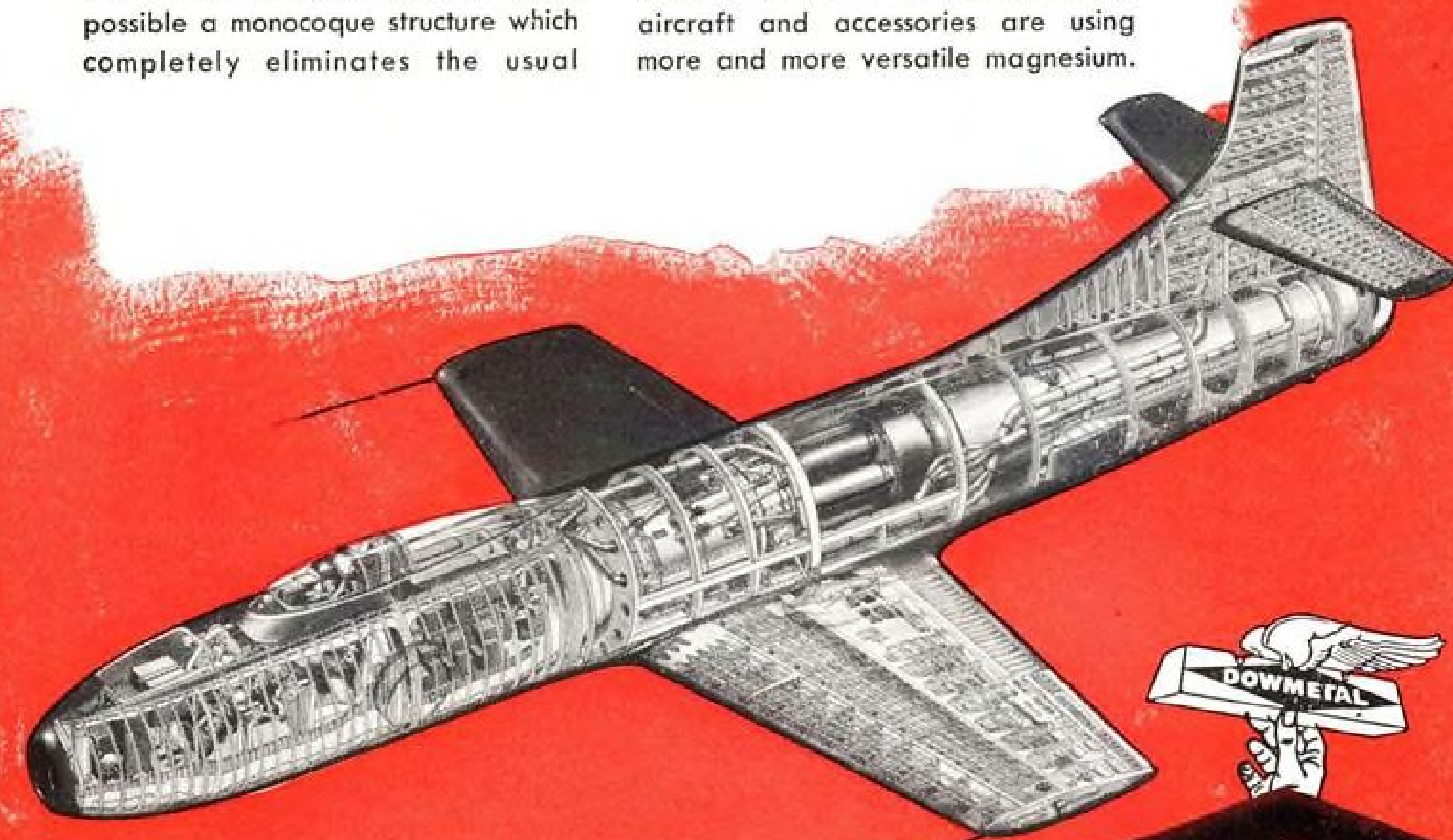
# World's fastest airplane uses New, Simplified MAGNESIUM Design



Magnesium is more than just a weight-saver in the Navy's Douglas Skystreak. Its flexible design properties save space—simplify construction. Strong magnesium sheet is literally "wrapped" around the Skystreak's powerful jet engine to form the entire fuselage skin aft of the pilot seat. It makes possible a monocoque structure which completely eliminates the usual

stringers except for frames carrying concentrated loads. The result—greater internal volume, smoother and more rigid exterior construction.

That's how magnesium helps produce a more efficient fuselage for this high speed aircraft. And that's why more and more manufacturers of aircraft and accessories are using more and more versatile magnesium.



# DOW

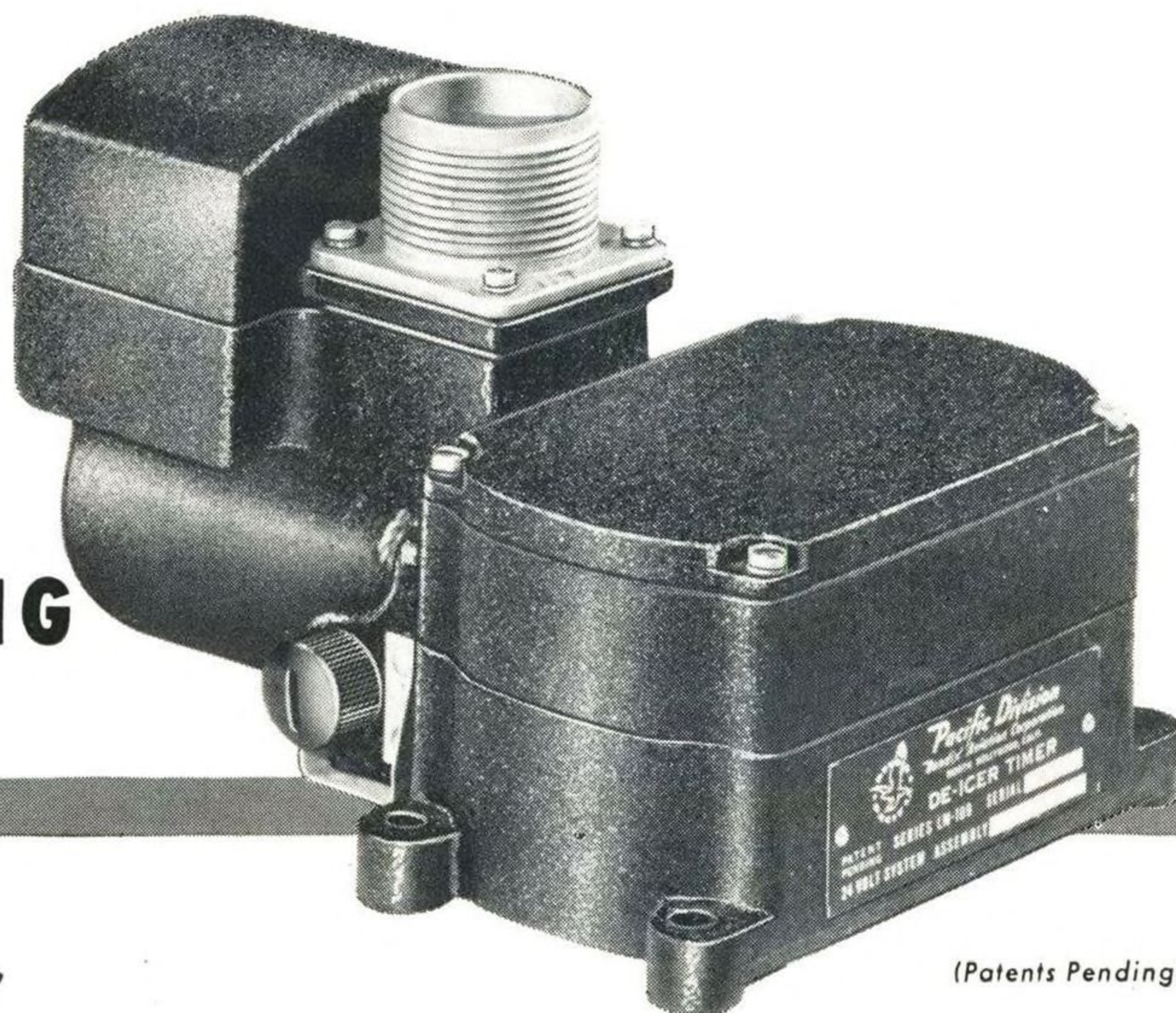
For specific information regarding your plans write to Dow or contact the nearest Dow office.

MAGNESIUM DIVISION • THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN  
New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago  
St. Louis • Houston • San Francisco • Los Angeles • Seattle  
Dow Chemical of Canada, Limited, Toronto, Ontario



*Simplified*

**SEQUENCE TIMING**



(Patents Pending)

*Bendix-Pacific*

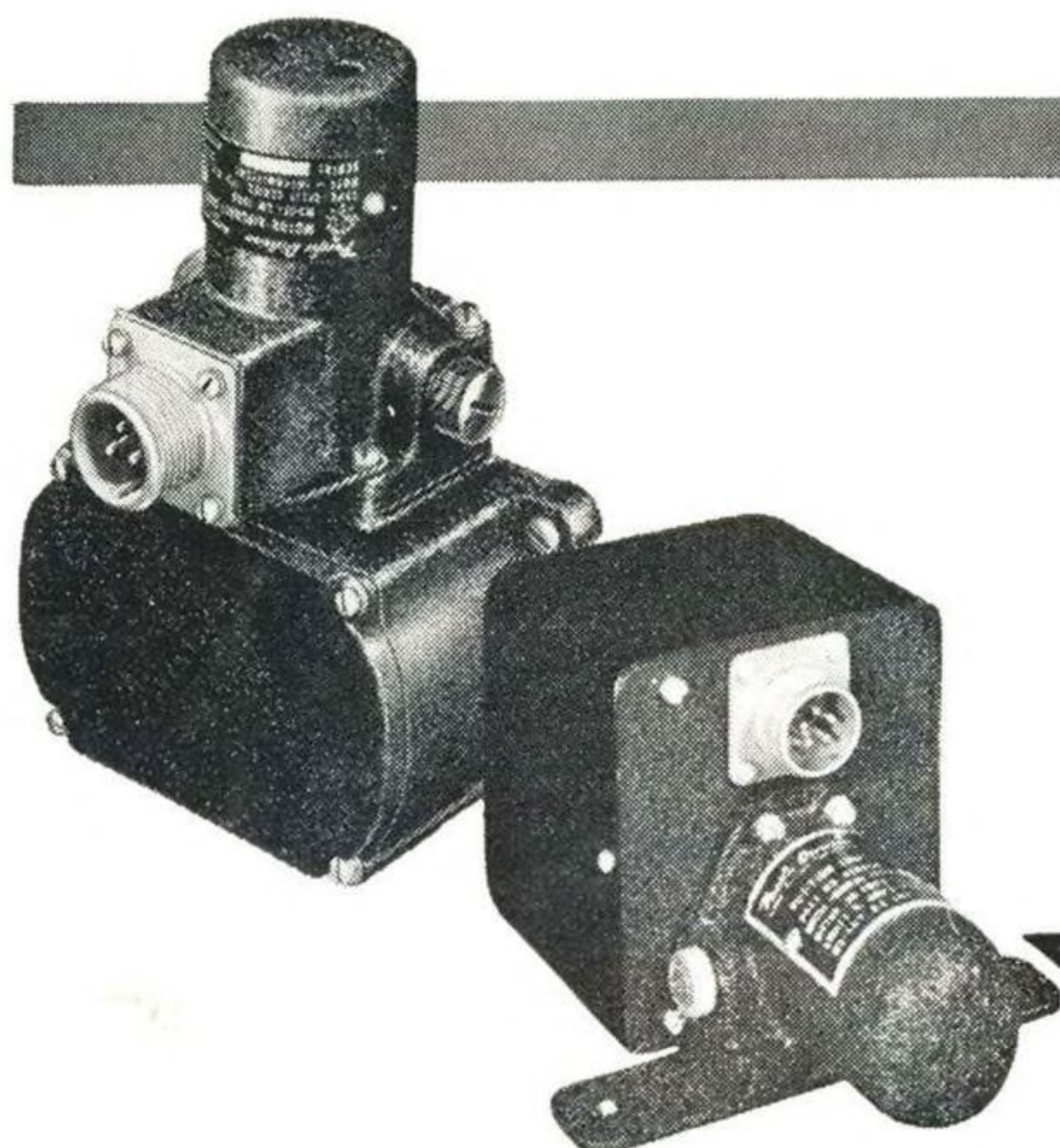
# ELECTRICAL TIMER

Positive, instantaneous switching – eliminating dangerous load fluctuations – is now available in this new type, cam-actuated Electrical Sequence Timer by Bendix-Pacific.

When used as a propeller de-icer timer, this new Timer makes up to 10% more heat available from a given maximum generator load.

The new instantaneous switching action, which actually is accomplished faster than the circuit relays themselves can be closed, is positively controlled by a mechanical cam. There are no adjustments. This simplification results in a weight of only 2 lbs. 3 oz. for the entire Timer.

Two models are currently available. Model 468100 provides eight 15-second periods; Model 454970 provides eight 13 $\frac{1}{8}$ -second periods. Because of its extreme flexibility a wide variety of other combinations can also be supplied. Complete details will be gladly furnished on request.



Companion to the new Bendix-Pacific Timer are these familiar Geneva-loc Electric Actuators . . . and Position Light Flashers which are in use on many commercial and military airplanes. Geneva-loc is the only actuator giving you positive mechanical positioning. The C.A.A. approved Bendix-Pacific Flashers operate on only 6 watts and have demonstrated their complete reliability on major airlines. Write for details.



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