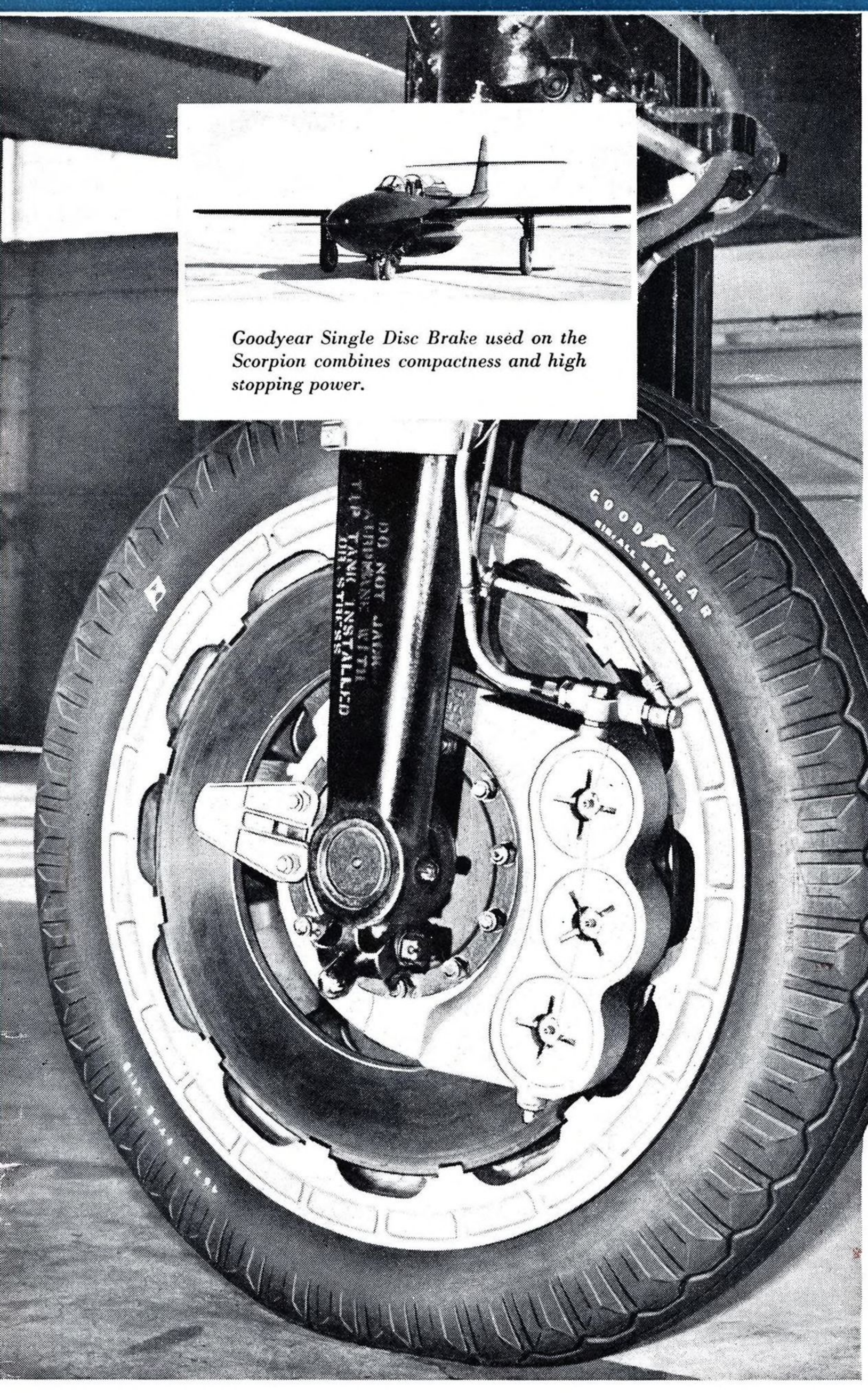
AVIATION WEEK

A McGRAW-HILL PUBLICATION

OCT. 17, 1949



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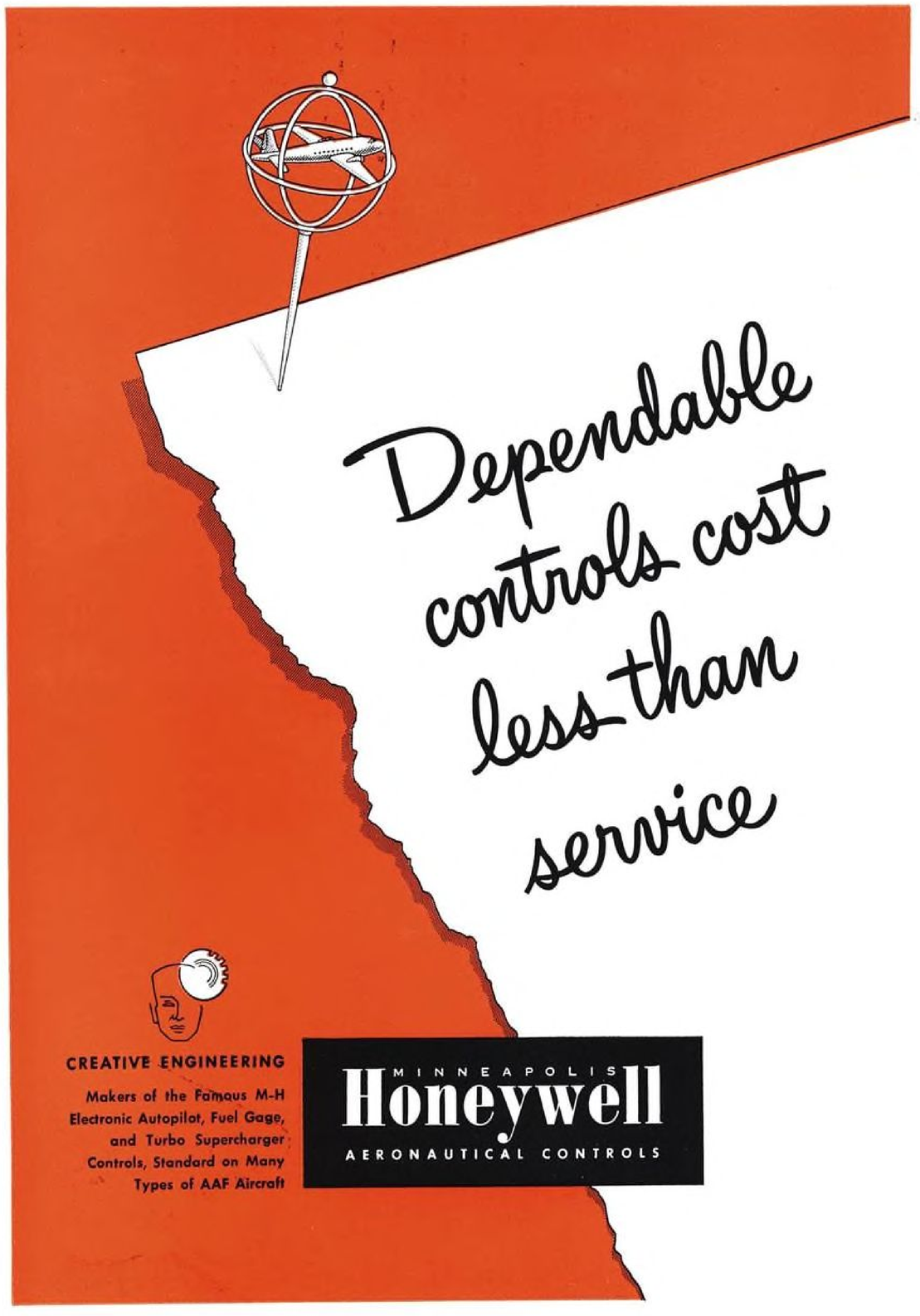

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Aviation Week

Volume 51 October 17, 1949 Number 16

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NEWS SIDELIGHTS

CAA Certification Hit

Long smoldering industry opposition to the fettering action of CAA certification requirements on new airplane development is flaming out into outspoken criticism which CAA Administrator Del Rentzel may not be able to ignore much longer.

Grover Loening, well-known engineer, is the latest to take a hefty wallop at the rules as "a terrible hindrance to be lifted from the back of aircraft development." Not long before, the powerful aviation consumer group, AOPA, lashed out vigorously at the seriously harmful effect of technical red tape on development costs.

Engineers developing any aircraft that doesn't exactly fit the Procrustean bed of CAA conventional aircraft requirements, such as the two-control Ercoupe, the Koppen Helioplane, a roadable plane, a channel wing plane or any such innovation, have an especially bad time. But the CAA stress analysis requirements on even a relatively conventional aircraft and the cross-checking and reports are a very serious factor in the total cost of the airplane's development.

Effect of a new "buyer and builder beware" policy which would eliminate most of the present restrictive requirements, would mean a sizeable reduction in the price of personal aircraft, with the consumers quickly weeding out any unsafe aircraft, the critics of the CAA contend.

Military Transports

American military transport builders still have some progress to make before they can deliver a transport that will fully meet the six desired characteristics set by Military Air Transport Service.

Maj. Gen. Laurence S. Kuter, MATS commander, told the SAE meeting at Los Angeles that MATS has made an evaluation of all existing four engine transports "and those in advanced stages on the drawing board."

"Only one aircraft of this entire group," said Kuter, "achieved a secondary rating of 'very good.' Apparently we are yet a long way from having available a transport which incorporates all the major characteristics essential to an efficient international operation—military or commercial."

Characteristics prescribed include economy of operation, maximum safety, ease of loading and unloading, ease of maintenance, pressurization, and climatic flexibility.

Atkin on Flying Wings

Chief engineer of A. V. Roe Canada, Ltd., manufacturer of the C-102 Jetliner, doesn't see much likelihood that jet transport flying wings will gain industry favor. Avro's E. H. Atkin says the future straight-jet airliner will have a normal circular fuselage of advanced streamline shape, with thin wings and probably a moderate degree of sweep back. He believes the high degree of pressurization required in new jet transports will militate against adoption of any form of flying wing.

Budget Fight

Oklahoma politics figured in the 48-group versus 58-group USAF fight. Sen. Elmer Thomas (D., Okla.), chairman of the Senate Appropriations Subcommittee on Armed Services, engineered the $800 million Senate slash in the 1950 fiscal year USAF budget. Rep. Mike Monroney (D., Okla.), who has served eleven years in the House and is considered a likely candidate to oppose Thomas for the Senate in the next year's Democratic primary, took the lead in the House battle for the funds for ten additional air groups.

In a floor speech Monroney pointed out that the Senate Appropriations Committee has "raised by hundreds of millions of dollars the appropriations passed by the House for the civilian agencies and for bureaucracy. The only major cut made in any departmental appropriation bill (by Senate Appropriations Committee) has been made in our defense funds—and those taken out of the fighting forces, airplane procurement, and strategic materials needed now for our stockpiles in the event of war."

Four Election Contests

The complicated labor pattern at Boeing, Seattle, may be reshuffled as the result of four elections to be conducted for Pacific Coast Boeing employes by the National Labor Relations Board before Nov. 7.

Main contest is for bargaining jurisdiction for almost 20,000 production and maintenance workers between Aeronautical Mechanics Union, Lodge 751, International Assn. of Machinists, and the AFL Teamster-affiliated Aeronautical Workers Local 451. The IAM group in all four elections however is opposing other unions, seeking to take over representation for workers the IAM represented from 1936 until last year. That was when IAM called a five month illegal strike and as a result lost its bargaining rights.

Opposing IAM in other elections are the AFL International Brotherhood of Electrical Workers, the Seattle Professional Engineering Employees Assn., and the Washington State Nurses Assn.

In each election the workers also have the choice of voting for no union.

Involved are workers in Seattle plants 1 and 2, the Renton plant, and Boeing test facilities of Moses Lake AFB.

Basic Airplanese

A list of 1000 words most commonly used in radio conversations between pilots and tower and communications operators may soon become the foundation for a new world language, "Basic Airplanese."

CAA's psychology branch is currently compiling the list using approximately 100 words already rated on a basis of wartime experiments and filling out the list by analysis of recordings made in CAA towers of conversations between pilots and operators. Words most used will be evaluated on a basis of how well they can be understood in radio transmission. Any commonly used words which rate low on intelligibility will be blacklisted with acceptable substitute words suggested.

International Civil Aviation Organization has asked the U. S. to recommend a standard English vocabulary for use by flyers all over the world, and the CAA 1000-word list is expected to be used for this international vocabulary, as well as for standardized two-way aviation radio talking in this country.

Airport Aid Extension

Look for CAA to seek extension of the federal airport aid program from Congress beyond the June 30, 1953, expiration date, to keep it in line with other national development policies for highways, railroads, waterways, etc. CAA's new Airports Advisory Committee has already recommended to Administrator Del Rentzel that he ask for its extension. The program through 1953 will not come close to developing the number of airports generally considered as necessary for adequate overall national coverage (15,000 or more). Currently the airport total in the U. S. is around 7000.

AVIATION CALENDAR

Oct. 17—Fall meeting, New York State Aviation Council, Hotel Syracuse, Syracuse, N. Y.

Oct. 17—National Aircraft Standards steering committee meeting, Van Cleve Hotel, Dayton.

Oct. 17-18—Fall meeting, American Society for Testing Materials' Committee D-4 on adhesives, ASTM headquarters, 1916 Race Street, Philadelphia, Pa. Non-members invited.

Oct. 17-18—New York State Airport Management Conference, Hotel Syracuse, Syracuse, N. Y.

Oct. 17-21—Fall general meeting, American Institute of Electrical Engineers, Netherland Plaza Hotel, Cincinnati.

Oct. 18—ARTC Radome Electrical Testing Subcommittee, AIA offices, Los Angeles.

Oct. 18-19—NAS Council meeting, Wright Field, Dayton.

Oct. 20-21—NASC subcommittee on stainless steel, AIA offices, Los Angeles.

Oct. 23-25—CAA Regional Administrators Conference, Oklahoma City.

Oct. 26-27—CAA Nonscheduled Flying Advisory Committee meeting, Oklahoma City.

Oct. 30—Third annual San Francisco Air Fair, sponsored by Junior Chamber of Commerce, San Francisco Airport.

Oct. 30-Nov. 2—Annual convention, National Assn. of State Aviation Officials, New Orleans.

Nov. 3-4—SAE national fuels and lubricants meeting, Chase Hotel, St. Louis, Mo.

Nov. 9-11—Seventh annual meeting Aviation Distributors and Manufacturers Assn., French Lick Springs Hotel, French Lick, Ind.

Nov. 30-Dec. 2—Annual meeting, Society for Experimental Stress Analysis, Hotel New Yorker, New York.

Nov. 30-Dec. 2—Kansas Airport and Aerial Spray Conference, Manhattan, Kansas.

Jan. 13-5, 1950—All-American Air Maneuvers, Miami.

Jan. 16-19—Plant Maintenance Show, sponsored by American Society of Mechanical Engineers and the Society for the Advancement of Management, Cleveland Auditorium, Cleveland.

Feb. 18-26—National Sportsmen's Show, Grand Central Palace, New York, N. Y.

Mar. 6-9—47th annual meeting, American Road Builders' Assn., Netherlands Plaza Hotel, Cincinnati.

Mar. 28-31—National Plastics Exposition, sponsored by Society of the Plastics Industry, Navy Pier, Chicago.

April 16-20—Annual business meeting, American Assn. of Airport Executives, Neil House Hotel, Columbus, Ohio.

PICTURE CREDITS

12—Wide World; 13—USN; 15—(left and right) Wide World, (center) USAF; 21—A. V. Roe Canada Ltd.; 22—McGraw-Hill World News.

NEWS DIGEST

DOMESTIC

Navy has grounded all Martin Mars flying boats, following loss of an engine during a flight of the Philippine Mars. Propellers and prop mechanisms are being checked on the giant craft, five of which are in Navy service.

Wright Aeronautical Corp. expects to be testing large ramjet engines next month in its new $600,000 laboratory at Wood-Ridge, N. J. Construction of the laboratory, begun early this year, was sponsored by USAF.

Crash cause of an experimental Grumman XTB3F during a propeller check flight at West Islip, L. I., New York, still remains undetermined, according to the manufacturer. Report is that examination of the wreckage, recovered after the flash explosion following impact, revealed no evidence of contributing factors. As a result of injury, the pilot has no recollection of events of the day of the accident or the day previous.

North American Aviation's T-28 USAF trainer made its first flight two weeks ahead of schedule. Craft has a top speed of 288 mph. and ceiling of 29,800 ft. Air Force has 268 on order.

Boeing XB-47 Stratojet made its first flight using six General Electric turbojet engines, each of which develops 5200 lb. of thrust. Previously, the craft was equipped with J-35s, each producing 4000 lb. thrust. Average speed for the flight with the new engines was 607.8 mph.

Harold S. Stuart, 37, of Tulsa, Okla., has been nominated to be assistant secretary of the Air Force. He has been serving as USAF special consultant on reserve affairs and civil aviation.

Capital Airlines has announced an agreement with Lockheed Aircraft Corp. to acquire three Model 049 Constellations. The deal marks the second phase of Capital's pay-as-you-go equipment program. Last month the carrier purchased three Super DC-3s.

Air Force pilot of a Republic Thunderjet F-84D, flying a low-level ground strafing and bombing demonstration at Eglin Field, Fla., was killed when the plane crashed and burned after the tail of the plane apparently was blown off by a parafrag bomb. Plane was one of four making strafing and bombing runs at a Technical Air Command demonstration.

A new world record for sustained endurance flight was set by Bob Woodhouse and Woody Jongeward when they landed at Yuma, Ariz., after staying aloft 1124 hr. 14 min. in a two-place Aeronca. Earlier record of 1008 hr. was set last spring by Bill Barris and Dick Riedel of Fullerton, Calif.

Neptune patrol bomber established what Navy described as the longest flight ever made after launching from a carrier, when the twin-engine craft flew 4863 mi. nonstop from the aircraft carrier Midway in the Atlantic to San Diego, Calif. The Neptune was in the air 25 hr. and 42 min.

Slick Airways C-46 crashed last week in an attempted landing at Cheyenne (Wyo.) Airport. Early reports said four bodies were found in the wreckage.

Virginia L. Sweet, 28-year-old Wasp, was awarded the 1949 Amelia Earhart memorial scholarship by the Ninety-Nines. The scholarship is to be used toward attainment of a higher aeronautical rating.

FINANCIAL

McDonnell Aircraft Corp. reported $32,659,384 in sales for the fiscal year ended June 30. Backlog at the close of fiscal 1949 was $5,260,999. Annual payroll for 6571 employes was $21,875,379. McDonnell has received additional orders for F2H-2 Banshees, in both night fighter and photo-reconnaissance versions.

INTERNATIONAL

France's government crisis has halted work on its vital six-year plan to reorganize the aviation industry until a new minister of national defense, yet unnamed, takes office.

An original Whittle engine, built for the Gloster E. 28/39, world's first successful jet-propelled aircraft, will be presented to the Smithsonian Institution in Washington next month. The engine, one of two built for the aircraft, was first airborne in unofficial flight early in 1941.

Trans-Canada Airlines has been licensed by the Canadian Air Transport Board to operate an international service from Montreal and Toronto to Tampa and St. Petersburg, Fla., Nassau, Bahamas, Jamaica, Trinidad and other points in the Caribbean area.

De Havilland Aircraft Co. of Canada Ltd. is completing orders for 28 Chipmunk dual trainers for the Egyptian government and 29 for the Siamese government. Peruvian government has purchased a number of six-place Beaver bush airfreighters. De Havilland is understood to be arranging for a licensing agreement with the Siamese government for building of Chipmunks in that country. Three Siamese representatives are studying production methods at the Toronto plant.

WHO'S WHERE

Changes

Glenn L. Martin Co. has put **William B. Bergen** in complete charge of the company's engineering activities. He was formerly in charge of special weapons department.

Air Transport Assn. added **Charles J. Roggi** to its research department . . . Aircraft Industries Assn. named **R. W. Markley, Jr.**, as assistant to **George Hannuam**, director of the industry planning service. Markley formerly was assistant to the director of contract requirements and flight test for Douglas Aircraft Co.

Russell L. Wageneck has been appointed manager of maintenance for Capital Air Lines. He was formerly director of maintenance and overhaul activities at Slick Airways.

Philip M. Willcox, former vice president of United Air Lines, has been appointed base manager of Willis-Rose Corp., Lockheed Aircraft Service's recently acquired maintenance installation at New York International Airport.

Sales Shuffles

Standard Pressed Steel Co. has made these sales staff changes: **George A. Gade**, formerly Detroit district manager, now Mid-West regional sales manager; **Francis J. Kinsella** becomes Detroit manager; **David J. Hurford**, formerly Cincinnati district manager, now West Coast special representative; **William C. Harper**, formerly New England representative, now in Cincinnati; **A. Clayton Graham**, now New England representative.

Western Air Lines named **Robert K. Vernon** sales representative for the tri-county area to be served when the carrier begins operations from Ontario (Calif.) International Airport. **Kendall J. Mau**, formerly assistant to the advertising director of WAL, is now assistant to the promotion manager of the Los Angeles Daily News.

Elections and Honors

Austin "Cap" Lathrop has been elected to the board of directors of Pacific Northern Airlines, Inc. . . . **Col. A. D. Tuttle**, UAL medical director, was elected president of the Aero Medical Assn. at a recent convention . . . **Willis G. Lipscomb**, PAA vice president, will serve as chairman of the aviation division of the 1949 fund drive of the Travelers Aid Society of New York.

C. J. Breitwieser, Convair electronics and engineering lab chief in San Diego, received an honorary doctor of science degree from the University of North Dakota.

Maj. Gen. Patrick W. Timberlake, USAF, has been appointed by **Defense Secretary Louis Johnson** as director of the staff of the Munitions Board . . . **Dr. Karl T. Compton**, chairman of the Research and Development Board at the Defense Dept., named **Philip B. Taylor** and **William Littlewood** as chairman and member respectively of the board's Committee on Aeronautics. Also on the committee: **Dr. C. C. Furnas, Dr. H. L. Dryden.**

INDUSTRY OBSERVER

► **U. S. Air Force now plans to make a new evaluation of primary trainers after placing small service test orders for the Fairchild T-31, Beech T-34, Douglas T-30 and TEMCO T-35. This will be the third evaluation of these models for one of the most hotly contested contracts in USAF postwar history. Fairchild was once given the nod for an order of 100 T-31s out of fiscal 1950 funds but that decision has now been rescinded in favor of the new competition.**

► Half a dozen aircraft manufacturers are now working on a USAF proposal for portable field maintenance structures to shelter mechanics working on military aircraft of all sizes. USAF wants these structures to replace costly and hard-to-build hangars at advanced bases. Lockheed, Republic, Boeing, Convair and Curtiss-Wright are preparing design proposals.

► **Curtiss-Wright airplane division at Columbus has a contract with USAF to study the capabilities of military airframes in withstanding the stresses imposed by turbojet engines. Curtiss-Wright will use a Lockheed F-80, Republic F-84, North American B-45 and Boeing B-50 in its structural tests.**

► Fairey Aircraft Ltd.'s new anti-submarine plane (Type 17) is the first plane to use the double turboprop for this specialized naval function. The Armstrong Siddeley Motors Ltd. Double Mamba develops 2800 equivalent shaft hp. out of its two units. The individual Mambas have independent fuel and propeller controls and each drives one of two contra-rotating propellers. Both Mambas are used for take-off from a carrier deck with normal cruise maintained on a single unit for fuel economy. Both units can be used when top speed is required to close with a target. Similar principle is used in the Allison T-40 turboprops now being installed in the Convair P5Y-1 Navy flying boat patrol bomber.

► **Convair's delta wing XF-92A research plane may give Capt. Charles E. Yeager another supersonic ride. Yeager, who was the first pilot to hit supersonic speed in the Bell X-1, is now putting the Convair delta wing through its paces for the USAF since it reached a maximum of Mach 0.9 during company tests. Use of the afterburner on the Allison J-33 turbojet engines may provide sufficient power to push the XF-92A to supersonic speed.**

► American Metals Corp. of Yonkers, N. Y. has developed a new metallic compound specially resistant to the high temperatures of turbojet and rocket engines. The compound uses boron and zirconium and was developed under contract for the Office of Naval Research.

► **De Havilland is now in process of completing U. S. certification for its eight-passenger, twin-engine Dove transport. Biggest problem was oil temperatures during single engine takeoff requirements. New radiators have been installed on the Gipsy Queen engines. De Havilland is aiming at the executive transport and feederliner market in the U. S. Nearly 300 commercial versions of the Dove have been sold to date.**

► CAA is completing plans to make tests covering the effects of humidity as well as temperature accountability, on transport aircraft performance during all segments of the takeoff and climb. The tests probably will be conducted with a DC-4. Air Line Pilots Assn. strongly favors the experiments.

► **CAB and CAA are weighing the advisability of requiring brake mean effective pressure gauges in transport category airliners to facilitate engine checks and provide a more accurate means of measuring engine power output. The International Civil Aviation Organization's airworthiness division has emphasized the need for BMEP gauges or similar devices. CAA and CAB aren't rushing plans for a new regulation because they feel present BMEP gauges do not have the reliability that would be essential for the dependence that would be placed in the devices.**

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AVIATION WEEK

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Navy Berates USAF Concept of Air Power

Inter-service row at white heat as admirals, backed by Marines, have "day in court."

By Robert Hotz

The Navy leveled its biggest guns on the Air Force last week in a heavy barrage of prepared statements before the House Armed Services Committee aimed at the following targets:

• **The Convair B-36 Intercontinental Bomber**—Navy spokesman claimed that the B-36 is a "1941 vintage" airplane that cannot fly 10,000 miles; hit a military target from 40,000 ft.; and is a "billion dollar blunder."

• **Strategic Airpower**—Navy admirals branded strategic air war as a reprehensible mass slaughter of civilians that "is militarily unsound, morally wrong and harmful to the stability of the postwar world."

• **USAF Tactical Airpower**—A Marine general charged that USAF tactical airpower is too weak and inefficient to provide air support of ground troops equal to that offered by Marine and Naval aviation.

• **The Defense Department**—Navy admirals testified that their views were not being given adequate weight by the newly reorganized Defense Department and that decisions for the Navy were being made by people who did not understand Naval affairs.

Navy drumfire against the Air Force started with a tremendous blast by Admiral Arthur W. Radford, Pacific Fleet Commander and longtime crusader for Naval aviation. Radford disagreed violently with the manner in which USAF high command was running the Air Force.

▶ **Radford Charges**—Specifically Radford charged that the USAF made a "billion dollar blunder" in picking the B-36 for intercontinental atom bombing.

He claimed that the 10,000-mi. range of the B-36 was not required for air attacks on Russian targets. He urged the Air Force to be content with its original order for 100 B-36s and war surplus B-29s to take care of any emergency while "they might break their backs to develop the range and other performance" of the Boeing B-47 and Northrop B-49 jet Flying Wing.

Radford said that the B-47 was generally conceded to be the most advanced bomber design flying in the world today. He said it was more important to develop a satisfactory airplane regardless of its range than to develop an airplane that had long range at the expense of other performance characteristics.

▶ **Kilday on B-47**—Rep. Paul Kilday (D., Tex.) pointed out that the B-47 had just emerged from prototype into the production stage and that while the Air Force was planning large-scale B-47 production a Strategic Air Command general had informed him that the B-47 would be fine if we had air bases in Poland.

Radford also urged that the Air Force devote more of its production program to high performance fighters. He said the "main weakness of the German Air Force was its failure to develop superior fighters."

▶ **Symington's Mistake?**—After earlier charging that the Air Force sought to sell the doctrine of a "cheap and easy victory" through atomic bombing, Radford said he agreed with Air Secretary Symington's views on the role of atomic bombing in U. S. defense plans but felt Symington had made a mistake in evaluating the B-36's ability to deliver the bomb. Radford said he felt that USAF did not have adequate equipment to make a proper evaluation of the B-36.

"I felt they should have come to the Navy and asked us to help them make the evaluation," he told the committee. Radford said he saw copies of most USAF aircraft flight tests but that all of the engineering analyses made by Naval aeronautical engineers for the committee were based on information published in aviation trade journals.

▶ **Navy B-36 Chart**—Abraham Hyatt, civilian head of the Aviation Design Research branch of the Navy Bureau of Aeronautics presented a chart purporting to show that the maximum still-air range of the B-36D to dry tanks and without a bomb load was 10,500 mi. Symington testified some weeks earlier that a B-36B had flown more than 10,000 mi. (actually 10,500 mi.) and dropped a 10,000 lb. bombload at the half-way point.

RADFORD: "Billion dollar blunder."

TRAPNELL: No match for three Banshees.

The USAF did not furnish the Navy with all the latest information on the B-36, Radford claimed. Symington had earlier testified that he obtained permission from the then Defense Secretary James Forrestal to withhold such information because it was being leaked to the press in distorted form. Radford said that action indicated a lack of mutual trust on the part of the Air Force. He said the Navy might want to use the B-36 for reconnaissance or other purposes so it has a right to know what the B-36 can do and how it fits into Navy plans.

▶ **Brooks' Question**—Rep. Overton Brooks (D., La.) asked Radford, in light of his attack on strategic bombing, if he condemned the mass bombing of the last war.

"I condemn it on the basis of what I have learned since the war," Radford replied. "I did not feel that way during the last war. I condemn it on the basis of studies I have made and material that has been available since the war. My own appreciation has come from the study of the problems this nation faces in Germany and Japan since the war."

▶ **Honest Effort**—Radford admitted under questioning that the Navy had ample opportunity to present its needs for the fiscal 1950 budget (the first under the Unification Law) and the decisions made on that budget in the Defense Department were better than Radford expected. He said the budget group's decision showed it made a very honest effort to arrive at a satisfactory solution.

Radford said, however, they were "not in a position to evaluate Naval problems."

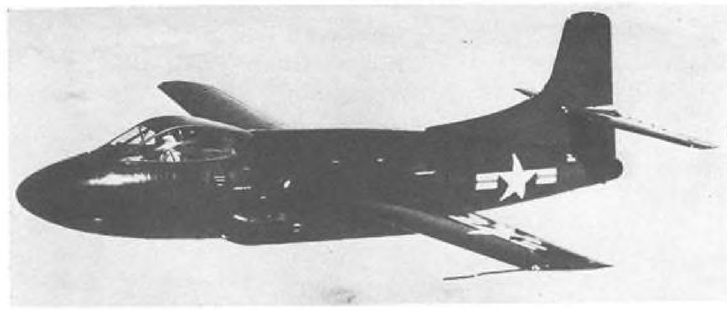
The root of the Navy's troubles, Radford opined, is that "the Navy has been unable to create an atmosphere of understanding in the time we have had to discuss these problems with our own sister services and some of the civilian secretaries."

▶ **Minority Problem**—"Our differences stem from the fact that we are a minority who have a very difficult job and can only succeed when we deal with people who have a better understanding than they have of what we are talking about," Radford said.

Rear Admiral Ralph A. Oftsie, Naval member of the Strategic Bombing Survey, charged that strategic bombing in World War II did not have a decisive effect on the outcome of the war. He charged that even under the most ideal conditions in the air attacks on Japan where only shallow penetrations were required against a weak defending force, "the long-range unescorted bomber (B-29) was faced with a mission beyond its capabilities."

▶ **Initial Shock**—Oftsie charged that the Strategic Air Force, which has top priority within USAF, "cannot be a useful part of the fighting team that must stand ready to meet the potentially disastrous shock of an enemy's initial attack."

"The present concept of strategic bombing is in most urgent need of review at this time," Oftsie state, "not alone because of the recent information from abroad but also in its relation to the European military aid program."



NAVY'S SKYKNIGHT: Successful night interceptions above critical 40,000 ft.

▶ **Douhet Theory**—"Must we maintain as a major element of our military power a force which insists on fighting the war in its own way and contributes virtually nothing to the vital minimum security of ourselves and our allies? Must the Italian Douhet continue as our prophet because certain zealots grasped his false doctrines many years ago and refuse to relinquish this discredited theory in the face of vastly costly experience? Must we translate the historical mistake of World War II into a permanent concept merely to avoid clouding the prestige of those who led us down the wrong road in the past?"

Oftsie says the Navy is not attempting to encroach on strategic bombing functions because it believes "strategic bombing as practiced in the past is both militarily unsound and morally wrong."

▶ **Frustration Record**—Brigadier General Vernon Megee, Assistant Director of Marine Aviation, told the committee that tactical airpower not strategic airpower was the decisive factor in both the European and Pacific wars. He charged that the record of Air Force-Army cooperation during the early part of the war was "largely one of frustration and disappointment for the ground forces."

"Then as now, the primary concern of the Air Force high command was with the theory of independent air operations," Megee claimed. "Tactical air support for the Army was given lip service as a third priority mission but very little real effort was devoted to combined training. As a direct result of this, the North African campaign was definitely retarded by the inability of the Army and Air Force to work effectively together."

▶ **Russian System**—Megee also said the Air Force still lacks an effective air-ground control system. Megee said the Russians use a system of close air support similar to that used by the Navy in the Pacific and pointed out that 17 of the 18 Russian air armies represent tactical airpower and that even the remaining air army of medium bombers is designed mainly to extend the range of tactical airpower.

The Marine general asserted that USAF planning for tactical airpower falls far short of the initial D-day requirements of the Army and urged that the Air Force be asked to produce its order of battle in executive session so that the congressmen could see the inadequate role allotted tactical airpower.

Megee also said Air Force tactical units are not being properly trained for their assigned missions.

▶ **Aviators Parade**—A steady stream of junior Naval aviators paraded to the witness stand to support Admiral Radford's claims against the B-36. They included:

• Capt. Frederick M. Trapnell, veteran Naval test pilot and fighter expert and now chief test pilot at the Naval Air Experimental Station at Patuxent, Md. Trapnell claimed that two McDonnell F2H-2 twin jet Banshee fighters were a match for a B-36 and three Banshees would certainly destroy the bomber. He urged the Air Force to use B-29s instead of the B-36, because larger numbers of B-29s available would enable saturation of enemy defenses.

"If you were to ride as an observer in a B-36 at 40,000 ft.," Trapnell testified, "you would see Banshees diving and zooming all around you and making repeated gunnery attacks with a speed advantage of over 100 mph. You might notice the maneuvers of the fighters were more deliberate than at lower altitudes, that their turns are not so sharp and that they do not attack

More AF Contracts

As a sequel to the list of Air Force negotiated contracts of over $100,000 printed in this publication Oct. 3, AVIATION WEEK in this issue presents those from $1000 to $100,000 for the month of August, latest made available by the USAF. They start on page 41.

from broadside or directly overhead. But they do have the ability to make co-ordinated attacks from all other bearings including those most favorable to the fighters.

"They have in fact the same superiority over the bombers that fighters had over the bombers in World War II. When these bombers were unescorted this fighter superiority was decisive."

• **Cmdr. William Leonard,** commander of Fighter Squadron 171 equipped with Banshees testified that the altitude above 40,000 ft. is the most economical operating area for the Banshee and that it is now operating routinely at that level. He said his Banshee squadron had made numerous interceptions and gunnery runs on targets above 40,000 ft. simulated by another Banshee which is both smaller and faster than a B-36. Leonard said vapor trails are a tremendous help in identifying aircraft above 40,000 ft. Vapor trails have enabled the spotting of planes as far as 100 mi. away at 40,000 ft., he asserted. Leonard said Navy developments of high altitude jet fighters was paralleled in Great Britain and Russia and the B-36 has a negligible chance of survival against Banshees, Vampires and Russian jets.

• **Cmdr. William Martin,** of the Pacific Fleet all-weather training unit in Hawaii testified that the Douglas Skyknight (XF3D) has been making successful night interceptions above 40,000 ft. over Patuxent. The F3D is now in production as a Naval carrier-based night fighter. USAF considered procuring the F3D for its night fighter squadrons but rejected the plane because it was alleged to have a service ceiling of 35,000 ft. Navy claims for the Skyknight make it the most advanced night fighter in the air today. It has an airborne radar with a range of nearly 20 mi. in comparison to the less than five-mi. range of the airborne radar carried in the USAF F-94 night fighter.

Martin said the night fighter version of the Banshee (F2H-2N) will soon be delivered to the Navy and plans are under consideration for a night fighter version of the Chance Vought twin-jet Cutlass (F7U-1). He admitted that the B-36 interception problem at night caused a few difficulties but asserted these have now been solved, making the B-36 unacceptably vulnerable to night fighter attacks. USAF Gens. George Kenney and Curtis LeMay previously testified there was no night fighter in existence capable of intercepting and attacking the B-36 at night.

Martin also pointed out that at 40,000 ft. the moon shines for 15 days out of each month and that the hours of darkness over most of Northern Europe are extremely short during the spring.

• **Cmdr. William Metsger** of Radford's Pacific Fleet staff, quoted a statement from Willy Messerschmitt, famed German designer of the ME-163 rocket fighter and ME-262, twin-jet fighter, that the B-36 could be shot down by planes that were known to be in existence in Germany. Messerschmitt claimed that his ME-262 had bagged stripped-down high-altitude British Mosquito photo planes both in daylight and at night at a distance of several hundred kilometers from the fighter's fields. Metsger also testified that the British Vampire and Meteor are capable of making successful interceptions of the B-36.

He said the Russians have an excellent fighter defense system partly because it is independent of the Russian Air Force and is responsible solely for the air defense of the country. Metsger said that only bomber forces escorted by fighters had a chance to complete their mission and survive with acceptable losses.

Scant Hope for 58-Group AF

Prospects for a 58-group Air Force program this year, despite majority support in the Congress, faded last week. The Truman Administration, which has doggedly insisted on a maximum program of 48 groups, apparently was to win its case.

At stake in the fight was $799,822,000 ($222,067,000 cash and $577,755,000 contract authorization) for USAF for the 1950 fiscal year. The House originally approved a $6,215,709,000 ($4,222,954,000 cash and $1,922,755,000 contract authorization) budget to support a 58-group USAF. The Senate passed a $5,415,887,000 ($4,000,887,000 cash and $1,415,000,000 contract authorization) budget.

This supports the Administration's 48-group program, although it was an arbitrary cut of $50,000,000 ($33,000,000 cash and $17,000,000 contract authorization), to be applied by the Air Force secretary.

▶ **Budget Deadlock**—After conferees stubbornly deadlocked on the USAF budget issue, there were these developments:

The House voted 305 to 1 to instruct its conferees to stand pat. The action followed two hours of lusty speechmaking by congressional military leaders heralding air power as the nation's first line of defense, as well as offense. Rep. George Mahon (D., Tex.), chairman of the House Appropriations Subcommittee on the Armed Services, and Rep. Carl Vinson (D., Ga.), chairman of the Armed Services Committee, led in marshalling support for the 58-group program. Rep. Henry Jackson (D., Wash.) pointed to great apprehension in the Pacific Northwest because of inadequate defensive airpower to protect the area. No one spoke out against the program. The only dissenting vote was by Rep. Fred Marshall (D., Minn.), a farmer serving his first term.

▶ **Impound Funds**—But then, Senate Appropriations Committee decided to send a subcommittee to confer with the President to ascertain whether he would agree to impound funds for the ten additional air groups, if the Senate concurred in the House budget. This strategy was maneuvered by Sen. Elmer Thomas (D., Okla.), adamantly opposed to allowing funds for the larger program.

The subcommittee consisted of Sen. Kenneth McKellar (D., Tenn.), Sen. Scott Lucas (D., Ill.), Sen. Kenneth Wherry (R., Nebr.), Sen. Chan Gurney (R., S. Dak.), in addition to Thomas, who heads the Subcommittee on Armed Services. With the exception of Wherry, the group has vigorously opposed the 58-group program.

▶ **Budget Message** — Presidential agreement to impound the funds was a virtual certainty. The President had recommended the 48-group program in his budget message to Congress last January.

Whether the Congress enacted the House-proposed or the Senate-proposed USAF budget seemed almost irrelevant. The situation seemed to boil down to this: If, as likely, the 58-group program is enacted, it will be trimmed down to a 48-group program by the withholding of funds by the President.

▶ **Only Hope**—The only hope for the bigger Air Force lay in the Vinson proposal to amend the Unification Act to require the Administration to obtain the approval of Congress before impounding military appropriations. Chances for enactment of this proposal in the final rush hours of Congress, however, were scant. In addition, it would face an almost sure presidential veto.

JOHNSON proposed wholesale cuts that . . .

McNARNEY'S committee allocated, said . . .

McNEIL in House committee testimony.

Battle Due On Secret Budget Cuts

Vinson assails proposal by Defense Secretary Johnson to pare military procurement funds instead of overhead.

A pitched battle between the House Armed Services Committee and Defense Secretary Louis Johnson was brewing last week over Johnson's secret proposal to cut some $453 million in aircraft procurement funds out of the fiscal 1950 budget.

Johnson's proposed slashes would be from the minimum budget proposed by President Truman and would cut the Air Force below the 48 groups requested by the President. Naval aviation procurement would take a 30 per cent cut. USAF is scheduled to lose $150 million in procurement funds with the Naval aviation due to drop $203 million.

▶ **Johnson's Promise**—These cuts are the result of Johnson's recent promise to save $800 million out of the fiscal 1950 defense budget if Congress approved amendments to the Unification Act increasing the authority of the defense secretary. Since the military services are now in the second quarter of the fiscal 1950 year, budget officers claim procurement funds are the only place the cuts can be made without wholesale disruptions of personnel and operational programs.

News of the defense cuts was unearthed by Rep. Carl Vinson (D., Ga.) shrewd chairman of the House Armed Services Committee. Vinson interrupted committee hearings on the B-36 to bring in Rear Admiral Herbert G. Hopwood, Navy budget officer and Wilfred McNeil, comptroller of the National Defense Department, to confirm the authenticity of the Johnson order. Vinson, visibly angry over what he considered Johnson's attempt to fob off straight reductions in the combat strengths of the three services as "savings," announced he would press for an amendment to the Unification Act prohibiting anyone in the executive branch of the government from withholding money appropriated for national defense without requesting specific approval from Congress to do so.

▶ **Total $800 Million**—Vinson angrily told the committee that anybody can make reductions whereas Johnson had promised Congress that he would save $800 million through reduced overhead and more efficient operations made possible by the new Unification Act.

The overall cuts ordered by Johnson total $800 million broken down as follows:

• **Navy $353 million** of which $203 million will come out of aircraft procurement.

• **Air Force $150 million** of which the bulk will come from aircraft procurement.

• **Army $300 million.** How this cut will be applied has not yet been determined by the Army.

McNeil testified that the $800 million reduction had been ordered by the management committee of the Defense Department headed by Gen. Joseph T. McNarney, former chief of USAF Air Materiel Command at Wright Field. Other committee members are: Dan Kimball, undersecretary of the Navy; Eugene Zuckert, assistant secretary of the Air Force; and Gordon Gray, secretary of the Army. According to McNeil this group determined how much of the cut each service should absorb. The assignments worked out to a 9 percent cut for the Navy as a whole, 3.5 percent for the Air Force and 8 percent for the Army.

▶ **Navy Hits Air**—Each service is to determine how its cut will be absorbed, but according to McNeil, at this late date in the fiscal year, procurement funds are the only thing left to cut substantially. Admiral Hopwood testified that the Navy had determined to make Naval aviation absorb roughly two-thirds of the total Navy cut.

Air Force has not yet finalized details on how it will absorb the cut but USAF officials indicated that except for a cut in flying time for administrative officers, the bulk of the $150 million reduction would have to come out of aircraft procurement funds.

▶ **Manufacturers Informed** — Aircraft manufacturers have been notified by Air Materiel Command to prepare new figures for their proposed fiscal 1950 contracts indicating that some may be slashed as much as 25 percent. Among the tentative reductions being considered are:

• **Cutback in the Lockheed F-94** night fighter contract.

• **Reduction of B-36 purchases** scheduled for fiscal 1950 from 51 to 40.

• **Cutback of Convair T-29** trainer orders by 60 percent.

• **Elimination** of all small transport contracts.

• **A sizeable reduction** in Fairchild C-119B production.

• **A 10 percent slash** in Republic F-84 production plans.

Naval aircraft procurement will be reduced from 843 planes for fiscal 1950 to 570 planes under the Navy's plan to absorb the Johnson-directed cut. All three services will be given a chance to present their cases against the cuts to Johnson and the management commit-

tee before the cuts are finalized. However Vinson indicated that he had no intention of allowing Johnson to impose these cuts and planned to call the defense secretary back to explain to the House group why he was making reductions instead of the promised "savings."

► **Fiscal 1951 Figures**—Vinson also said he had learned from an authentic source that McNarney had already cut $100 million from Naval aviation's proposed fiscal 1951 procurement budget and added it to the $1.1 billion scheduled for USAF procurement. This would leave Naval air with $600 million for aircraft procurement in fiscal 1951 against $1.2 billion for USAF aircraft procurement.

Vinson claimed that the discussions now under way in the Pentagon were aimed at reducing Naval and Marine aviation by 50 percent and giving the Air Force an expanded role with big bombers as the country's first line of defense.

He said the Navy was being relegated to the role of protecting convoys, moving troops and operating submarines. The USAF took the position in these discussions, according to Vinson, that the Navy should not operate any large carriers or attack air groups.

The fiscal 1951 budget now in preparation would make the following reductions in Naval air strength according to Vinson:

- **Large carriers**—from 8 to 6.
- **Small carriers**—from 10 to 8.
- **Carrier air groups**—from 14 to 6.
- **Marine air squadrons**—from 23 to 12.
- **Patrol squadrons**—from 30 to 20.
- **Anti-submarine squadrons** – reduced from 8 to 7.

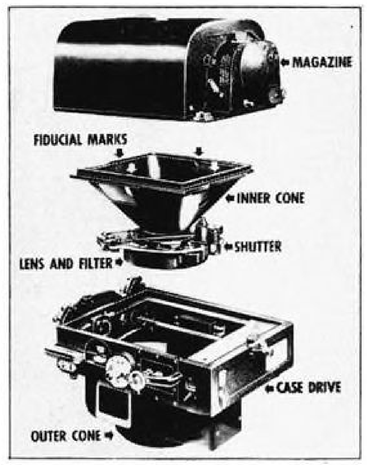
New Camera

Success of high-altitude work produces order for photo Banshee.

Navy plans to procure eight photo versions of the McDonnell F2H Banshee to carry the CA-8 cartographic camera which took the much publicized 48,846-ft. picture of Washington and neighboring areas.

While the Banshee used in the original photo mission last month had the high precision aerial mapping camera mounted aft of the jet burners, new version will provide space forward of the cockpit for a bank of three cameras, each angled for wide coverage.

Navy claims the camera will accurately perform even at speeds in excess of 700 mph., although the 48,846 ft. picture was taken at 515 mph., with temperature at –66 deg. C.



The CA-8 camera is a new development, although research was started during the last part of World War II. It was built to Bureau of Aeronautics specifications by Fairchild Camera and Instrument Corp.

Basically the camera consists of three parts:

- **An outer cone,** which includes the electric motor drive mechanism of the instrument;
- **An inner cone,** which houses the lens and shutter mechanism and defines the focal plane in a rigid assembly;
- **The film magazine,** which holds a strip of film 9½ in. wide and 200 ft. long.

Production order for 40 of these cameras indicates a new tack in Navy thinking. Previously, reconnaissance cameras have been used for aerial mapping to produce accurate charts and maps.

Now, although it will not replace existing reconnaissance cameras, Navy plans to use the CA-8 for all high altitude precision photography.

New camera has already been used in long range photo missions by the Navy's Liberator-equipped Patrol Squadrons 61 and 62, and in aerial mapping surveys in North and Latin American countries.

Jet Flight Plan

The turbojet transport used as an example in Edgar H. Atkin's paper on jet operations (AVIATION WEEK, Oct. 10) would cruise at 30,000 ft. at 400 mph. for 56 minutes on a 500-mile flight, and climb to that altitude in only 22 minutes. The illustrations as used with Atkin's story were open to some misinterpretation as the flight plan sketches inadvertently were reversed. The turboprop flight plan chart appeared on page 14; the jet flight plan on page 15.

CAA Crosswind Gear Support Affects Funds

A revolutionary new CAA airport construction policy that will affect all future federal fund allocations for runways has put full official CAA backing on the crosswind landing gear by denying the existence of further need for additional construction of multiple direction runways.

Hereafter, according to the new policy, federal funds will be allocated on projects as follows:

- **For Class I airports,** only one runway or landing strip will be eligible for federal fund allocation.
- **For all other airports,** financing of additional runways will be approved only for additional volume of traffic, and provided they are non-intersecting, and parallel or diverging. Requests for exceptions must be approved by Washington CAA office, after recommendation by regional administrator, and must justify the exception on some other basis than wind coverage.

The policy was seen as a long-sought victory for John H. Geisse, CAA development consultant who had charge of CAA contracts for developing the swivelling landing gear which makes possible crosswind landings regardless of wind direction.

Principal effects of the new policy are expected to be:

- **A sizeable boost** for the crosswind landing gear as a more necessary part of airplane equipment. (Currently there are approximately 600 sets of cross-wind gear out in the field, and Goodyear Aircraft Corp. is the only company which is manufacturing approved gear for planes ranging from 65 hp. Cubs, to the twin-engine Douglas DC-3.)
- **Wider diversion** of available airport funds, to make possible a greater number of landing facilities than heretofore when multiple runways were financed, but at fewer locations.
- **Construction of new airports** at more convenient locations, closer to urban areas, since real estate requirements for single strip airports are far less exacting than for multiple runway fields.
- **Construction of long single runway airports,** of perhaps 10,000 ft. may make possible landing and takeoff without turnaround, greatly reducing time on ground for scheduled transport planes.

CAA records show currently that applications have been made for federal airport aid for 412 single strip airports and that grant offers have been made on 163 of these while 123 have been withdrawn for lack of local matching funds.

Progress Report

	Year Ended June 30, '48	Year Ended June 30, '49
Income		
Donations—The Friendship Fund	$11,780.	$21,500.
Other	1,000.	21,019.53
Fees—Service Projects, Subscriptions	———	5,372.64
Other Service Projects	———	1,501.95
Research Projects	———	15,300.
Other Income	———	46.25
Total Income	$12,780.	$64,740.37
Total Expenses	$12,286.69	$63,597.78

Contributors to the Flight Safety Foundation during fiscal year ending June 30, 1949

Alexander and Alexander, Inc., American Airlines, Inc., American Overseas Airlines, Inc., Beech Aircraft Corp., Boeing Airplane Co., Braniff Airways, Inc., William A. M. Burden, Godfrey L. Cabot, Capital Airlines, Inc., Colonial Airlines, Inc., Connecticut General Life Ins. Co., Continental Air Lines, Inc., Curtiss-Wright Corp., Delta Air Lines, Inc., Esso Export Corp., Esso Standard Oil Co., Sherman Fairchild, Mrs. L. Carteret Feno, The Friendship Fund, Inc., Grumman Aircraft Engineering Corp., Los Angeles Airways, Inc., National Aviation Corp., Edward J. Noble Foundation, Northwest Airlines, Inc., The Ohio Oil Co., Pan American Grace Airways, Inc., Laurance Rockefeller, Winthrop Rockefeller, Seaboard & Western Airlines, Inc., Sportsman Pilots Assn., Standard Oil Co. of Calif., The Texas Co., Trans Canada Airlines, Transcontinental & Western Air, Inc., United Airlines, Inc.

FSF Reports Research Gains

Rise in operating cost of non-profit organization shows increase in activities over previous year.

Flight Safety Foundation progress during its first full year of broadened safety research activity is reflected in the rising cost of its operation—nearly five times the amount spent during the previous fiscal year.

Establishment of the Woods Hole, Mass. research center opened the way for FSF's staff to:

- **Sponsor** dissemination of information on accident prevention.
- **Conduct** a forum for exchange of information on safety policies for aircraft operators and manufacturers.
- **Initiate** a civilian aircraft accident investigation training course and bulletins.
- **Carry out** research projects which evaluated flight crew requirements; studied problems of cockpit design for private airplanes.

Expenses for the fiscal year 1949 amounted to $63,597.78, compared with $12,286.69 for the previous year. Part of the rise in expenses was caused by an increase in staff, which now totals seven. In the previous fiscal year, salaries accounted for $9,874.31, but this year salary figure was $39,850.66.

The non-profit organization is continuing research on such problems as collection of accident prevention data, methods to maintain safety skills and attitudes among operating personnel, cockpit simplification, studies to reduce accident potentials, development of search and rescue techniques, and indoctrination of safety attitudes in schools where aviation is taught.

Foundation income, which is almost wholly dependent on contributions from the industry, was $64,740.37 for fiscal 1949, compared with $12,780 for the previous year.

SEC Reveals Air Share Sales

Sale of 1000 shares of Grumman Aircraft Engineering Corp. common stock by L. A. Swirbul, president and director, reducing his total holdings to 11,300 shares, is reported in the latest Security and Exchange Commission survey of major transactions.

Other aviation transactions reported in the SEC survey for the mid-July to mid-September period:

- **Air Associates Inc.:** Sale of 100 common shares by Gilbert Colgate, director and principal stockholder, reducing his holdings to 13,548 shares.
- **Alaska Airlines:** Purchase of 300 common shares by Henry Bierds, vice president, making a total holding of 305 shares.
- **Braniff Airways:** Purchase of 500 common shares by John B. Walker, officer, making a total holding of 1000 shares.
- **Consolidated Vultee Aircraft Corp.:** V. C. Schorlemmer, Officer, 45 common shares.
- **Douglas Aircraft Corp.:** L. E. Tollefson, officer, 10 capital shares.
- **Eastern Air Lines:** Sale of 765 common shares by George Blaine Howell, director, reducing holdings to 2000 shares.
- **Northeast Airlines:** Sale of 1000 common shares by Paul F. Collins, chairman of the board, reducing holdings to 2000 shares.
- **Northrop Aircraft:** Sale of 400 common shares by Richard W. Millar, director, reducing holdings to 700 shares; sale of 1900 common shares by John K. Northrop, president and director, reducing holdings to 10,700 shares.
- **Northwest Airlines:** Purchase of 1100 preferred shares by Alonzo Pettys, director, making a total holding of 1700 preferred, plus 1000 common. shares.
- **Pan American Airways Corp.:** Sale of 55 capital shares by Robert Ferguson, assistant treasurer, reducing holdings to 468 shares; sale of 4000 capital shares by Franklin Gledhill, vice president and director, leaving a holding of 556 shares.
- **Reynolds Metals Co.:** Purchase of 900 common shares by U. S. Foil Co., Richmond, Va., principal stockholder, making a total holding of 677,180 shares, plus an indirect interest through Reynolds Corp., holding 35,890 shares.
- **Rohm and Haas Co.:** Purchase of 200 common shares by Lloyd Covert, director, making a total holding of 2300 shares.
- **Solar Aircraft Co.:** Purchase of 1000 common shares, total holding, by Richard Rollins, director.
- **United Air Lines:** Purchase of 1600 common shares by Justin W. Dart, director, making a total holding of 15,406 shares, plus 700 preferred shares.
- **United Aircraft Corp.:** Purchase of 500 common shares by H. Mansfield Horner, president and director, making a total holding of 1500 shares.
- **Warner Aircraft Co.:** Purchase of 400 common shares by R. E. Cecil, director, making a total holding of 1400 shares.

Equity holding of officers, directors and principal stockholders were reported to SEC as follows:

- **Wright Aeronautical Corp.:** Curtiss-Wright Corp., principal stockholder, 583,785 common shares.
- **Chicago and Southern Air Lines:** William T. Arthur, officer, 500 common shares.
- **Curtiss-Wright Corp.:** E. M. Powers, officer, no holdings.
- **Fairchild Engine and Airplane Corp.:** Earnshaw Cook, director, no holdings; Luther M. W. Bolton, director, 5300 common shares; Paul S. Cleaveland, officer, 10 common shares; Charles H. Colvin, director, 200 common shares; Edgar A. Eyre, director, 1700 common shares; S. M. Fairchild, director and principal stockholder, 74,570 common shares, plus an indirect interest through Mills Land Corp. holding 21,100 common shares; Arthur F. Flood, director, 200 common shares; Frank R. Nichols, director, 1000 common shares; Grover Loening, director, 5000 common shares.
- **Glenn L. Martin Co.:** Maple T. Harl, director, no holdings; C. C. Pearson, director, no holdings; W. L. Lucas, officer, 84 common shares; Earl R. Uhlig, officer, 64 common shares.
- **Northeast Airlines:** Hamilton Heard, officer, no holdings.
- **Pan American Airways Corp.:** George C. Marshall, director, no holdings; David S. Ingalls, director, 1344 capital shares.
- **Republic Aviation Corp.:** Martin F. Scanlon, officer, 100 common shares.
- **Consolidated Vultee Aircraft Corp.:** V. C. Schorlemmer, officer, 45 common shares.
- **Douglas Aircraft Corp.:** L. E. Tollefson, officer, 10 capital shares.
- **Piper Aircraft:** John H. Fite, officer, no holdings.

FINANCIAL

CAB Studies Route Duplication

Streamlining heavily serviced route segments to permit more profitable operations poses many-sided problems.

A recognized basic malady in the present airline network is the over-duplication of competitive route segments. Even though excessive services may be pinpointed for adjustment, taking corrective action promises to be a vexatious and endless problem.

The Civil Aeronautics Board is now engaged in conducting extensive studies examining the possible over-competitive conditions surrounding three major route segments: (1) Chicago-Washington, (2) New York-Detroit and, (3) Washington-Detroit-Twin Cities. In the first two instances, four carriers now provide service. It is probable that existing traffic levels can consistently support on a profitable basis two and at the most three carriers.

Nevertheless, all carriers operating over those segments enjoy inherent property rights by virtue of the CAB-granted certificates of public convenience and necessity. The Board can hardly revert to the role of an Indian-giver and revoke any of these permanent certificates without proper cause.

▶ **Self-Help**—Considerable improvement in the airline network by removal of excessive services is possible, however, through voluntary action by the carriers. Recently, a belated effort in this direction has developed.

Late last year, American Airlines filed to suspend service to Abilene and Big Spring in Texas. Support for this application was found in the frequency of service now being provided by Pioneer Air Lines. American's traffic generated at these points hardly justifies the schedules and appears completely uneconomic to the carrier. On the other hand, Pioneer might benefit by American's removal from these points.

The long range effect would be highly constructive to both carriers and the economic solvency of the industry as a whole. Pioneer would stand to increase its passenger revenues and thus lower its dependency upon mail subsidy payments. And by giving up an uneconomic operation, American would take another step to avoid slipping into the category of a subsidized carrier.

▶ **Little Business**—Studies by a number of trunk airlines show that operations to most smaller cities are hardly supported by the passenger revenues generated from such points. Yet, under their certificates, regularity of service to all these centers must be maintained.

These smaller centers of population were not always scorned by the trunklines. Early in commercial aviation it became of strategic importance for a carrier to add as many points to its system as possible. This was an era where operations found healthy encouragement through heavily-subsidized mail payments. Then, too, the relatively limited range of existing aircraft types made it advantageous, if not necessary, to have frequent stops.

With the development of high capacity aircraft with long range, purely economic operations could no longer be fitted into the traffic patterns of old.

Moreover, when service was first brought to many of these smaller cities, the present feeder system was unknown. In most instances, withdrawal now of a trunkline from many points would not leave them without air service.

▶ **CAB Says No**—The Board has recently refused to sanction American's plea to suspend service at Abilene because available airport facilities are inadequate to handle Convair-Liners. CAB has declared that Convair equipment may be safely operated into Abilene. A similar application pertaining to Jackson, Mich., filed by American was also denied by the Board on the same grounds.

Seeking suspension of service to a city because of inadequate or dangerous airport facilities has, in the past, been a favorite stratagem employed by carriers to pull out of uneconomic territory.

Nevertheless, a real risk is present to both the carrier and CAB by maintaining service to airports declared suspect for Convair equipment. It is recognized, however, that the Board has implied that DC-3s should be used if Convairs are unsuitable.

This would present additional economic problems as American has disposed of all of its DC-3s. Moreover, operation of this aircraft would nullify many of the economies flowing from the carrier's postwar transport fleet.

In any event, the application to suspend service at Abilene and Big Spring on economic considerations is proceeding before the Board for a final determination.

Minor modifications of the airline routes are in evidence elsewhere.

In proposing the five year extension for the temporary feeder certificate of West Coast Airlines, the Board has suggested removal of a number of points from this operation. Of greater importance in this proceeding is the show cause order issued to determine the advisability of removing Salem, Ore. and Bellingham, Wash. from United Air Lines' operation and adding them to the West Coast Airlines system.

It is likely that modifications of a similar nature may be proposed as feeder certificates may be renewed. In the absence of supporting traffic to the trunkline involved, such corrections are most constructive. The possibility of decreasing the extent of subsidy payments is encouraged, and an uneconomic operation is removed.

It must be recognized that where trunklines bow out in favor of feeder carriers, there is always the possibility that the temporary certificates of the feeders may be allowed to expire and these areas at such future time be left without any air service.

Regardless of existing air services, however, most communities are reluctant to permit an air carrier to withdraw. Wherever threatened by the removal of an airline from its city, the community's chamber of commerce and echelons of elected officials lose little time in protesting to the CAB.

AVIATION WEEK's *financial observer, Selig Altschul, who is also an independent aviation consultant, will speak to the New York Institute of Finance (successor to the N. Y. Stock Exchange Institute) Oct. 19 on "The Aircraft Industry" and Oct. 26 on "The Airlines".*

▶ **CAB Courage**—For this reason, it took real courage by the Board to resist the pressures attempted by the many communities in the Florida Airways feeder system when that carrier's certificate was not renewed and allowed to expire earlier this year.

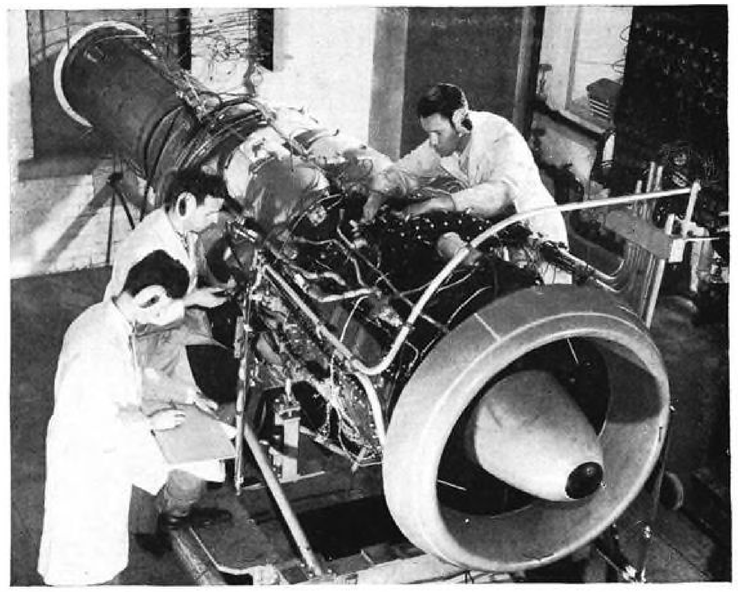
Abandonment of service has assiduously been sought by many railroads, particularly where heavy losses were incurred in certain passenger operations. Receipt of taxes, along with civic pride and service to a very few were all combined to bring pressure on the Interstate Commerce Commission through established political channels. For this reason, railroads have not fared very well in removing the shackles of heavy-deficit branch lines. Yet, it is the existence of many of these segments which has undermined the economic stability of the railroad industry.

The lesson to the airlines is all to clear to be ignored. —Selig Altschul

First Details of Avro's Orenda Turbojet

New Canadian engine shows high combustion efficiency, clean design.

By Irving Stone



MALTON, ONTARIO – The Orenda, A. V. Roe Canada Ltd.'s new jet engine, gives ample indication that it will more than justify its name—that of the spirit believed by the Iroquois to endow things with power.

For, while no data have been made available, observation of this turbojet on the test bed—its size and general external characteristics—leads to the conclusion that it will be in the over-7000-lb.-thrust category. And it may well be that it will emerge as the world's most powerful jet engine.

Designed and built at the company's Gas Turbine division, the Orenda is slated, ultimately, to power Avro Canada's jet fighter, the XC-100. While it's likely that this craft will take to the air before the year's end, it would not be powered initially by Orendas, since both craft and engine would be experimental.

▶ **Compressor, Accessories**—The Orenda's makeup is unusually clean. Its length, from nose to end of exhaust cone, is approximately 11 ft.

The compressor is a straight-through, axial-flow unit, its inlet guide vanes appearing about 6½ in. high.

Design philosophy is, apparently, that the aircraft accessories should have their own gearbox within the airframe, with just a drive from the engine. This would simplify "breaking" during engine change.

Compressor casing slopes down to the rear and thus allows the engine accessories mounted on it to be contained within the largest diameter of the engine—about 3¾ ft., at the cluster of the 6 combustion chambers.

Length of the compressor section indicates that it contains a minimum of 13 stages.

▶ **Chambers, Nozzle Box**—Approximating about 14 in. in diameter, the combustion units seem to be the largest yet installed in any turbojet. Length-to-diameter ratio is usually small.

Forward (cool) portion of the combustion chamber is aluminum alloy; aft portion, steel.

After extensive test bed running, the expansion joints between chambers and the nozzle box were exceptionally clean, indicating no gas leakage.

Soon after engine shutdown, it was possible to hold the hand on the forward portion of the nozzle box. Apparently this section is air cooled. Aft portion of the box, somewhat hotter, is probably insulated.

▶ **Suspension** – Engine supports are located at diametrically opposed points on the sides of the nozzle box forward section, probably because this part is sufficiently cool to allow its use as a structural member.

Suspension at the compressor is accommodated via an ingenious toggle linkage from a pad on either side to the casing bottom.

This arrangement would probably allow all four points to take the loads regardless of aircraft distortion.

▶ **Clear Exhaust**—An impressive feature of the Orenda is the remarkable clarity of its exhaust—an indication of high combustion efficiency.

From outside the test house, an engine start was observed through the muffler attaching to the tailpipe. There was merely an instantaneous puff of flame back at the engine—indication that turbine blade life will be high. No smoke was visible.

This impressive jet points up the high degree of self-sufficiency and design and production perfection attained through all-Canadian efforts. Considering that it is but their second major venture in the turbojet field, Canadian engineers have given emphatic indication in the Orenda that their talent will be a potent factor in jet progress.

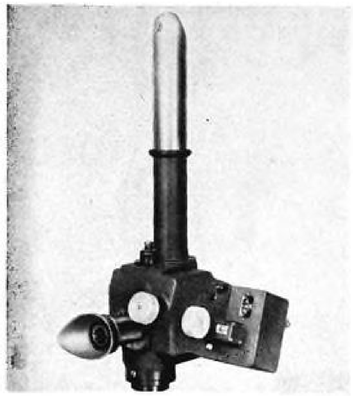
Pilot Warning Device

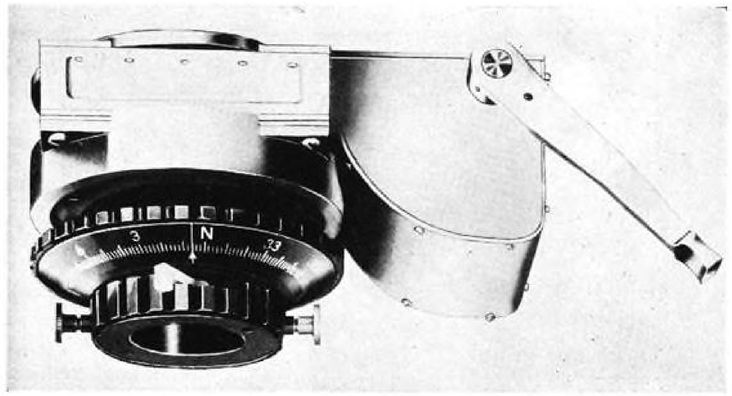
A control stick "shaker" designed to give pre-stall warning to pilots flying high-speed military aircraft has been developed by the Safe Flight Instrument Corp., White Plains, N. Y.

Weighing only 20 oz. and mounted coaxially around the control stick, the new device imparts an unmistakable shaking motion whenever a stall is approaching. It is said to be more efficient than a horn or red light normally used, because of the possible confusion with landing gear horns and various other warning signals in the cockpit.

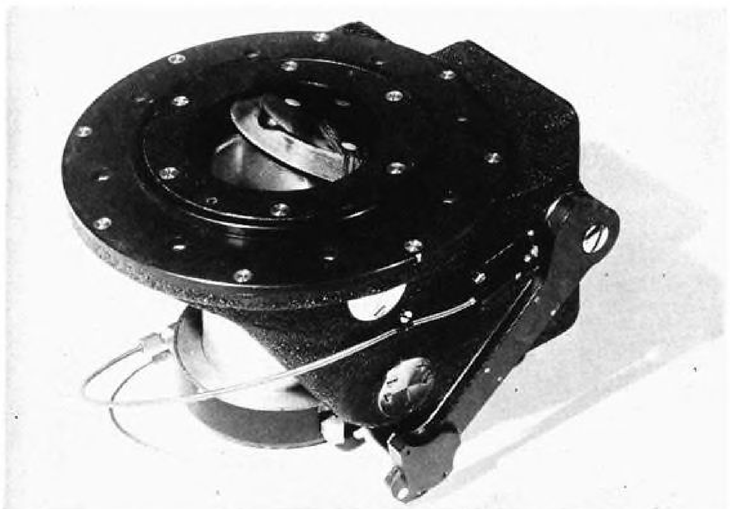
Operation of the stick shaker is controlled by SFI's pre-stall sensing vane which is mounted on the leading edge of the wing. The sensing vane is designed to detect the approach of a stall under any conditions of load, acceleration or speed.

Signals from the sensing vane actuate a motor in the shaker to drive a gear around the stick column. This gear carries an eccentric weight which produces the shaking motion.





AMERICAN: Kollsman periscopic sextant (left) uses horizontal reference appearing as red line of adjustable intensity. Tube is inserted into mount (right) affixed to cabin roof and normally sealed by shutter. Tube projects 1¼ in. above craft.



BRITISH: Hughes sextant (left) uses bubble horizon with different lighting for day and night operation. Tube similarly fits mount (right), projects about 3 in. above skin of aircraft. Cabin pressure sealing plate is seen in mid-position.

Periscopic Sextant: U. S., British Versions

Fundamental differences of new navigational devices analyzed. Units standard on latest transport types.

Britain and the United States simultaneously have come up with different versions of an aeronautical navigation instrument—the periscopic sextant—specified as standard equipment on the two latest transport types to go into operation in the two countries.

The American unit, produced by the Kollsman Instrument Division of the Square D Co., 80-08 45th Ave., Elmhurst, N. Y., is being installed in Boeing Stratocruisers. The British instrument, specified for the Canadair "Four," is made by Henry Hughes & Son, Ltd., whose agent is Smith Aircraft Instruments, Ltd., Cricklewood Works, London, N.W. 2.

The Kollsman sextant has also been installed in Lockheed Constellations by airline operators—Pan American Airways, American Overseas Airlines, KLM Royal Dutch Airlines. KLM also uses the device on a DC-4 cargo craft.

▶ **Development Spurred**—Conception of the periscopic sextant, whose development was hastened by a navigator meeting his death when blown through an exploded astro-hatch, is a logical corollary to the advent of high-speed, pressurized aircraft.

It eliminates the appreciable parasite drag set up by the astrodome (no longer required), saves weight, does away with unpredictable optical abberations and allows the navigator complete security while he is making his observations.

Furthermore, the installation of this sextant is considerably lighter and simpler structurally, than providing for an astrodome.

▶ **How Mounted**—Both the American and English instruments consist of two separate units—mounting and the sextant. The mount is built into the upper portion of the fuselage as a permanent fixture; it need not be on the center-line of the aircraft.

The Kollsman support consists of a gimbal-mounted ring which allows the sextant to swing in an arc of 15 deg. to

compensate for variations in the attitude of the aircraft and to facilitate location of stars.

The Hughes unit has a ball-socket arrangement for a swing of 8 deg.

Both instruments may be rotated 360 deg. in azimuth.

Each mount is provided with a shutter flush with the fuselage skin, sealing the orifice when the sextant is not in place. The shutter is controlled by a lever attached to the mount and when the sextant is placed in position, no appreciable loss of pressure is evident.

Portion of the Kollsman periscope extending into the airstream measures $1\frac{3}{8}$ in. in diameter, $1\frac{1}{2}$ in. in length, while same dimensions for the Hughes unit are $2\frac{1}{4}$ and 3 in. respectively.

► **Indices, Magnification**—Both instruments are equipped with an azimuth scale. The American unit has an independently rotatable compass rose marked off in increments of two degrees. There are two indices—one fixed, denoting the plane's heading, the other movable with the sextant, indicating the direction of the observed body. Mounting of the sextant thus permits determination of both the relative or true bearing and also the altitude of a celestial body. The English instrument operates in essentially the same manner.

The Kollsman sextant has a two-power magnification with a true field of 15 deg., while the Hughes device has a magnifying power of four and a $7\frac{1}{2}$ deg. field. It has been suggested that a flat viewing port be incorporated in the fuselage adjacent to the sextant, thereby providing a means for scanning the heavens to select stars to be used as references.

► **Observation**—With the American sextant, observations may be made at any angle between −10 and +92 deg. in elevation, while coarse and fine adjustments (15 and 3 deg. per revolution, respectively) are provided for rotation of the prism.

The original counter, showing the altitude in degrees and minutes, at first gave trouble, but this has been remedied by substituting a mechanism of Kollsman manufacture.

The eyepiece is adjustable from −2 to +2 diopters and eight filtering glasses of varying values are provided to reduce the sun's brilliance, as required.

The British instrument differs in that the angle is controlled by a 10-deg. adjustment and a fine altitude control extending over about 14 deg. adjusted in either direction at two speeds via a servo motor operated by a rocker bar.

Thus the navigator can "chase" his bubble merely by alternating the pressure on the rocker bar with his first and second fingers, and great accuracy of setting coincidence between object and bubble is achieved.

(Continued on page 26)

Shades are also provided to reduce the brilliance of a bright sighting object.

►**Horizontal Reference**—An interesting feature of the Kollsman sextant is the incorporation of a small (¼-in.) stainless steel mirror which, by reflecting light directed to its surface through a narrow, red-colored slit to a beam-splitting pellicle and thence to the eye piece, establishes the horizontal reference line instead of the conventional bubble.

The mirror, balanced on a concave jewel, circumferentially mounts a conical skirt whose pendulous action maintains it in a horizontal plane. Entire unit is in a housing containing silicone oil for damping purposes.

The horizontal reference appears on the field as a red line of variable intensity subtending about 7 deg. long and 1 min. in width. The straight horizontal line greatly facilitates accurate collimation and obviates the need for an astigmatizer. Also, no parallax exists between the reference and the observed objective.

By contrast, the Hughes unit is equipped with a bubble horizon which gave such excellent service in the Mark 9 sextant. It is illuminated by two types of lighting. One, for use by day, shows a black bubble on a bright field; the other, for night use, shows two red spots in a straight line. When using the latter type, the star is sighted in the imaginary straight line joining the two red spots.

►**Integrating Mechanism**—A Dicmal-Black integrator is incorporated in the body of the American sextant. This mechanism effects a continuous, moving average over any observation period up to two minutes, after which it shuts off the horizon lighting circuit.

One advantage of this integrator is simplicity of operation—a single lever sets and winds the unit; and since it is continuously integrating altitude against elapsed time, it may be stopped at any time short of the two-minute cycle and the average altitude for that period is obtained directly from the counter.

A dial graduated in seconds indicates the half time of the observation, which indication may be added directly to the time of start to give the mean time of the average altitude. The integrator will indicate the elapsed time of observation to an accuracy of one second or better.

The British integrating mechanism functions in very much the same manner in that it is also operated by a single lever (which must be reset four times to complete a full operating cycle) and gives average altitudes for periods up to two minutes. It is powered, however, by a constant speed electric motor.

►**Moisture Control**—Tube of the Kollsman sextant is filled with dry air and hermetically sealed to prevent condensation when the tip is extended into the atmosphere. As a further precaution, a small amount of silica gel within the tube is visible through the prism window to indicate moisture.

The optical system within the tube is supported independently, thus protecting it from shock and mitigating the effects of changing ambient temperatures.

To guard against condensation and misting in the Hughes unit, a heating coil is fitted inside the top of the periscope tube. Temperature is controlled by a thermostat.

Although reaction of navigators to the Hughes sextant is not known at this moment, those who have used the Kollsman instrument are enthusiastic over its ease of operation, half an hour being considered adequate to become thoroughly checked out in its use.

Undoubtedly a great asset to the men who use it is that need for an astro compass is eliminated. This will not only facilitate the navigator's job, but will also permit him to perform his work more rapidly—of increasing importance as speed of aircraft points towards the supersonic.—G.C.

British Starter For Turbine Engines

A high-power output starter—Type T.S.C. 50—for cranking a turbine engine to starting speed in a reasonably short period has been developed by Plessey Co. Ltd., Ilford, Essex, England. Weight of the unit is 50 lb.

Designed to give approximately ten times the output of the company's L-type unit for piston engines, the turbine starter burns 15 times the cordite content of the latter's cartridge charge over a working period of two seconds, affording a maximum energy output of 50,000 ft.-lb.

The starter carries six cartridge barrels in a circular cluster. Two cartridges are fired simultaneously through nozzles at opposite points. The high-temperature, high-velocity gases are directed to a turbine wheel system having two contra-rotating wheels with no stator blades between them.

A reduction gearbox combines the motion of the contra-rotating shafts and brings peak speed of the output shaft to 10,000 rpm., against a corresponding rotor speed of 40,000 rpm.

A multi-plate clutch in the final drive shaft absorbs peak loads during engagement. To render the starter safe in event of failure of any part of the drive, an overspeed device limits rotor speed.

Lubrication of bearing and gear train is via a built-in pump. At each start, the pump meters the required quantity of oil from the main turbine engine.

Avionics

Flying Lab Tests Airline Radar

Suitability of devices for in-flight definition of weather and as navigation aid being proved by airline and Navy.

Important new uses for airborne radar, aimed at improving air-to-ground reference for bad weather navigation and permitting pilots to "see" ahead and avoid treacherous storms, have been developed by American Airlines in conjunction with the Navy.

The latest radar applications were demonstrated recently for the first time aboard AA's Convair-Liner flying laboratory, "Gamma," during a moderately stormy trip along the Eastern Seaboard. The research craft was equipped with a modified APS-10 airborne search radar set and other special devices.

An AVIATION WEEK reporter watched Robert W. Ayer, American's assistant director for operational development, guide the plane through soft spots in the storm utilizing a radar scope in the passenger cabin.

▶ **Enables Identification**—Ayer was able to identify the type of weather ahead and its most turbulent areas by means of "weather images" which appeared in the scope in varying forms and intensity. He pointed out that the images are distinct enough for an experienced operator to identify line squalls, heavy and light rain, hail and icing conditions.

▶ **Navigation Aid**—Besides revealing the type of storm ahead, the radar set can be switched to pick up ground contours through the thickest weather. Ground images were clear enough to guide the "Gamma" along the coastline between New York and Boston when visibility hardly extended beyond the wingtips.

At times, the engineer actually flew the plane from the cabin using the scope, a duplicate set of flight instruments and an auto-pilot controller. However, the pilot in the cockpit, also equipped with a scope, was able to override this "back-seat driving" at any time.

AA engineers have found the versatile radar set also can be used to:

- **Determine true ground speed** quickly and accurately.
- **Guide aircraft around** hills and mountains when pilots are forced to operate below level of surrounding terrain obstacles.
- **Estimate altitude** within plus or minus 10 percent accuracy.
- **Navigate any track** with reference to a single ground beacon or approach a runway with beacons at each end.
- **Indicate whether plane** is right side up during blind flight; gyroscope is only other instrument which can perform this function.

Ayer believes the 3½ years of experimentation carried out by his group with the Navy has proved three important points:

- Airborne radar should have an antenna which is stabilized against roll of the airplane to maintain a horizontal aspect in relation to the ground.
- Pilots can effectively make use of radar in addition to their other duties while flying two- or four-engine aircraft—eliminating need for a special operator.
- Radar has developed sufficiently to be used in commercial craft—its adoption by airlines would increase further the safety factor in flight operations.

▶ **Weight Factor**—The carrier distributed to manufacturers over two years ago complete specifications for radar it believed would be satisfactory for airline operations. It asserts, however, that until recently, industry opinion had not "jelled sufficiently to result in a production radar." As installed experimentally in the "Gamma", the present equipment weighs about 300 lb. But Ayer thinks this weight eventually will be sliced in half with development of production models.

The APS-10 search radar was developed several years ago by General Electric Co., Syracuse, N. Y., for the Air Force and Navy. It is a 3.2 centimeter wave length, 9375 million cps. set having a scanning antenna located in the radome on the nose of the plane. The antenna has a 360-degree azimuth sweep, effective for 240 degrees (forward-looking) on the Gamma, and a tilt of 1 degree up and 10 degrees down.

"Avionics"

"Avionics" is a new word, coined by AVIATION WEEK as a simple and much needed term to describe generically all the applications of electricity to the field of aeronautics.

You will see the word frequently as AVIATION WEEK brings its readers more and more news of highly important developments in the field of ground and airborne electrical equipment.

The set includes a transmitter-receiver, power supply unit and synchronizer installed just aft of the pilot. Two scopes (plan position indicators) and a single control panel are provided for the pilot and co-pilot. For experimental purposes, a third scope, a duplicate set of controls, signal power measuring equipment and other provisions for taking data are installed in the cabin.

Recommendations based on experiments with the APS-10 set have resulted in development of an improved installation, currently being tested by the Navy.

This set, designated APS-42, is a product of Houston Corp., Los Angeles. It features higher power, an antenna which is stabilized against roll of the plane and an improved antenna radiation pattern. Other companies besides GE and Houston engaged in developing better airborne radar are Sperry Gyroscope Co., Great Neck, L. I., N. Y. and De Morney-Budd, Inc., New York City.

▶ **Capture Weather Samples**—Another interesting feature on the "Gamma" was a pressure lock permitting hail catchers and ice gages to be extended outside the plane without loss of cabin pressure.

When hail had accumulated in the catcher, the device was pulled back into the cabin and the hail stones stored in an icebox for eventual examination. AA engineers have measured the stones to determine how large they must be to damage airplanes. Investigation indicates anything above ¾ in. can be dangerous. Ayer believes radar could be set up to tell whether hail precipitation ahead of an aircraft should be avoided.

The "Gamma" also was equipped for research in carburetor icing and specialized instrumentation, and has been used to test a new cabin pressurization supercharger. Tests with this equipment were carried out simultaneously with radar experiments.

The Convair-Liner flying laboratory was used for aerial research work for almost a year. It has been flown over much of the U. S. and Canada, seeking out the worst types of weather encountered in scheduled carrier operations. The demonstration flight was its last in this capacity since it now is being overhauled for regular airline service.

North American Plans Guided Missile Study

Construction of a new research laboratory for solving some specialized problems encountered in guided missile flight has been announced by North American Aviation, Inc., Los Angeles.

Costing $50,000, the lab is being erected within the main building at the company's Downey, Calif, plant. It will be equipped for investigation of problems involving extreme high altitude, "G" loads and vibration, extremes of heat, cold and humidity, and gyro mechanisms.

An important feature will be an "equatorial mount" for gyro development. Attached to a concrete pier in the earth and insulated against vibrations in the factory, the mount will be aligned with the axis of the earth by sighting on stars through an opening in the factory roof. A super-accurate clock mechanism, built by the company's aerophysics laboratory, will subtract the 15-deg.-per-hour movement of the earth to give a stable platform for watching gyro "drift." North American engineers presently are working to reduce gyro drift to not more than ¼ revolution per year.

To simulate the environment of a missile in flight, the new laboratory will have a test chamber with a temperature range of −76 to 180 F. Engineers will be able to evacuate the chamber to simulate atmospheric pressures encountered by missiles at 100,000 ft.

A centrifuge which can whirl componets up to 50 lb. to create a load 25 times the force of gravity also will be included in the test set-up.

And the laboratory will be equipped with a horizontal and vertical vibration machine which will vibrate loads up to 100 lb. to ten times the force of gravity.

How Navy Solves Its Jet Problems

Engineering refinements to aircraft and carriers help lick difficulties of operating planes from shipboard.

By Robert McLarren

In the short space of just three years since the Navy's first jet fighter made its initial takeoff from a carrier deck, its fleet of these planes has grown to more than 150 aircraft of a variety of types. And the operating problems have grown apace.

It was clear, in May, 1948, that the basic problem of operating jet fighters from a carrier could be solved by proper design. Early doubt about the jet's inability to take off in the short distance of a carrier deck or take a landing "wave off" was dispelled quickly by experience with the McDonnell FH and F2H and the North American FJ jet fighters. All have been operated successfully from carrier decks.

▶ **Conditions Differ**—The Air Force is, of course, operating more than 2000 jet fighters but problems of handling a jet fighter from a 6000-ft. runway and from a carrier deck often as short as 610 ft. differ considerably. The difference is so great as to demand special design requirements for the aircraft.

The Naval jet must have a lower stalling speed (lower landing and take-off speed) than its Air Force counterpart. This is obtained by using greater wing area and, therefore, lower wing loadings in Naval craft. (Naval jet fighters, to date, exhibit wing loadings in the 35-45 lb. sq. ft. bracket, whereas USAF jet fighters extend from 55-75 and higher.)

▶ **Lower Top Speed**—This lower wing loading, at first glance a penalty paid for carrier deck limitations, actually gives the Naval jet fighter important performance advantages. First, for example, this lower wing loading provides a superior rate-of-climb. Second, it produces a higher service ceiling and, third, it produces greater maneuverability at high altitudes.

Thus, in all the important combat characteristics save one—speed—the Naval jet fighter has an important advantage over its land-based counterpart.

But lower wing loading means lower top speed, and in this one consideration the Naval fighter may always be expected to be slightly inferior.

▶ **Penalty Small**—Proper design, however, can minimize this penalty, as well as others inherent in the carrier fighter.

For example, the necessity for a stronger landing gear and supporting structure (to absorb landing impact aboard ship), carrier deck arresting gear hook, catapult fittings, etc., can be accommodated in a fighter design without involving significant penalty.

In other words, if such equipment were added to an existing Air Force fighter it might involve a weight increase of 5-10 percent, whereas, by providing these installations in the original design no weight penalty per se can be said to have been paid.

▶ **Range Can Be Less**—One of the basic Naval jet fighter features contributing directly to its reduced wing loading is a comparatively reduced fuel load. The Naval jet can afford a lesser "built in" range than the Air Force fighter because the great portion of its range is intrinsic in the carrier itself.

This by no means indicates a lack of Navy interest in aircraft range, since every effort is made to provide the maximum practicable in each new design.

However, the tactical problem is entirely different in the two types. The Naval fighter can execute an interception 1, 2, 3000 mi. from shore by using

the carrier to cover all but the last 3-600 mi., whereas Air Force fighter interception is limited to 1000 mi. or less.

While remarkable progress has been made in the past five years in aircraft design and propulsion, carrier facilities and equipment for handling this progress have not kept pace, for obvious reasons.

The 65,000-ton carrier United States was to have incorporated most of the lessons learned in jet fighter operation over the past few years, but its cancellation has forced the Navy to concentrate attention on bringing its existing carriers up-to-date to the extent possible with available funds and the characteristics of the individual ship.

The airplane itself must be modified to accommodate some of the problems inherent in its gas turbine powerplant and in its operation from the aircraft carrier deck.

► **Power Indication Problem**—One of the hardest-pressed sections of the Navy Bureau of Aeronautics is the Instruments group. Not only does the gas turbine powerplant demand special instrumentation but the greatly increased speed of the jet aircraft has posed new instrument problems.

One of the basic problems at the moment is the development of a power indicator for jet thrust. Reciprocating engine aircraft have a variety of instruments for informing the pilot of operational conditions. For example, the combination of a tachometer and a manifold pressure gage give him a good indication of engine power. On later aircraft a bmep. gage was available to indicate power, and on more recent types a torquemeter is available to give a direct indication of the power being developed by the engine.

► **BuAer Approach**—However, the problem of indicating thrust of a turbojet in flight is complex. Existing jet fighters have compressor rpm. and tailpipe temperature gages, both of which give an indication of engine output. However, a relatively minor change in engine speed can produce a major change in engine thrust. Also, thrust is affected by conditions of temperature, altitude and pressure.

Static thrust is easily determined on the ground by mounting the aircraft on a stand and using its thrust to operate a scale (AVIATION WEEK, Aug. 22, 1949), but this procedure is of little value to the pilot.

Pilots of current jet types use the airspeed indicator and rate-of-climb meter as the best practical indication of thrust. But BuAer has developed an instrument which automatically computes thrust from engine pressures and, after service tests, this new device probably will become standard jet fighter equipment.

► **Horizon, Turn-and-Bank**—Low drag and high wing loading of jet fighters have widened their turning radius so that several miles are required for a shallow turn. When required, fighter pilots tighten up these turns by increasing their angle of bank and these steep banks cause current attitude gyros to tumble. A new type of non-tumbling artificial horizon is now being installed on all new Naval jet fighters.

Another tactical problem with current instrumentation is its operation from the aircraft electrical system, which, upon malfunctioning or interruption by gunfire, leaves the pilot without instruments. BuAer has developed a compressed air bleed from the engine compressor to operate the turn-and-bank indicator.

Future jet fighter instrumentation will utilize this air-operated unit in conjunction with electrically operated compasses and gyro horizons, so that in the event of failure of the latter two the pilot will still have an indication of the plane's attitude.

► **Angle, Fuel Indication**—An angle-of-attack indicator also is being installed on all new Naval jets. An important difference between the jet and conventional fighter is the former's greater percentage of gross weight devoted to fuel. This large fuel load and its rapid consumption make a considerable difference in stalling speed between full and near-empty tanks.

Since carrier landings are made on the basis of approach angle rather than approach speed, the aircraft angle of attack on final approach must be held the same, regardless of airspeed. Lighter craft will land more slowly, heavier planes faster, but both will maintain the same angle of attack. Hence, an angle of attack indicator in a carrier based aircraft is a vital instrument.

High fuel consumption is rendering an accurate and compact fuel flowmeter a necessity aboard Navy fighter planes and this will soon be standard equipment. Most promising design now being tested is integral with the fuel quantity gage so that the same instrument shows the rate-of-consumption and the amount of fuel remaining. A special modification of this instrument gives a reading in minutes of flight remaining.

► **Radar, Armament**—Electronic equipment is a fast-moving field of activity in BuAer. A new radar gear is now being installed in the noses of its new jets. Designed for both interception and navigational use, this equipment is superior to current APS-19 units. Another device demanded by pilots is VHF homing equipment, to simplify the navigation problem in fast-flying jet craft, and this is now standard for all new jet models.

The standard .50-cal. machine gun has proved impractical aboard jet craft

because of greatly increased rate-of-closure and reduced firing time. The jet pilot can no sooner get his target lined up than he must break off to avoil collision. Therefore, 20mm. cannons, because of their greater range, are now standard equipment on all new jet fighters.

▶ **Starters**—Greatly increased starting loads of the gas turbine engine has created a demand for larger and larger starter capacities. While a piston engine starter has an output of 2-4 hp., jets require from 10 to 250 hp. just for turning them up to required speed for firing.

BuAer has investigated a wide variety of starting systems but presently is concentrating on development of the AiResearch gas turbine-compressed air system (AVIATION WEEK, Dec. 27, 1948), affording 66 hp. for starting, weighing only 88 lb.

Although the present unit is too heavy and bulky for jet fighter installation, refinements for weight reduction are being studied.

▶ **Carrier Facilities**—Improvements in the carrier and its equipment are being made to accommodate the special problems of jet fighters. The increased fuel capacity and consumption of jet fighters has multiplied carrier fuel handling difficulties. To cope with this situation, the Essex-class carrier conversions include a pumping rate three times that formerly available.

Degassing facilities are being improved, additional fuel capacity is being provided. And many additional pumping stations are being installed.

All Naval jet fighters are catapulted when loaded to maximum military gross weight and higher capacity catapults are being installed. BuAer has conducted studies of methods for automatic catapult "spotting" in which the fighter is taxied into position over the catapult fittings.

Power outlets for starting are being provided adjacent to the catapults. Servicing power outlets are being added along the edges of the flight and hangar decks.

The comparatively short turbojet overhaul time has greatly increased the frequency of engine removal. Accordingly, additional engine stowage is being provided, and additional engine hoists installed.

▶ **Deck Cart**—Until the new engine starting equipment is installed in fighters, auxiliary power from deck carts will be used.

The current system consists of a conventional Jeep with eight batteries. It is driven about the flight deck to individual aircraft during the starting phase of operations. As maneuverable as this classic vehicle may seem to some, it is not satisfactory for the tight work demanded among closely packed fighters.

A new truck is being developed by O. E. Szekely & Associates, Phila. This unit is a three-wheel design with the front pair of wheels fixed and the rear wheel maneuverable via a vertical steering wheel. The unit can turn in its own radius. It mounts a gasoline-driven generator affording 24v. d.c., weighs 2200 lb.

▶ **Oxygen**—The problem of oxygen supply is being explored but it is complex and requires highly specialized equipment. The Navy has tested the liquid oxygen converter unit, built by Eclipse Pioneer division of Bendix Aviation Corp. and based on a National Bureau of Standards design (AVIATION WEEK, June 13, 1949), but the size and weight of this equipment, while suitable for multi-engine aircraft, makes it impractical for jet fighter use.

However, NBS has developed a unit with a 2.5-liter capacity that weighs only 16 lb., compared to 22.4 lb. for the standard pilot's oxygen cylinder.

Problem of protecting this unit from gunfire is important. The current oxygen tank will withstand shrapnel or anything but a direct hit by a .50-cal. bullet, whereas the liquid oxygen tank will not. Hence, armor plate must be installed around this unit and its weight-saving feature is lost.

New Metal-Forming Process Developed

A new process, called Marform, which promises to reduce greatly the cost of producing formed sheet-metal parts, has been developed by tool research engineers at the Glenn L. Martin Co., Baltimore, Md.

The method is claimed to permit faster production of many formed parts and, at the same time, cut down the need for expensive tooling and labor. According to Martin president, C. C. Pearson, the new process may save hundreds of thousands dollars annually for the aircraft industry.

Principle feature of the method is the precision control of the pressure curve for the forming cycle of the part. This permits pieces to be formed free of wrinkles and reduces spring-back to a minimum. It enables an operator to make complex parts, involving drawing, shrinking and stretching, at the rate of 50-120 per hr., yet hold tolerances to ±.002.

Stainless steel exhaust stacks, for example, reportedly can be produced ten times faster than with conventional methods—50 units per hr. compared to a drop-hammer rate of 3-5 units per hr. —with variations in material thickness rarely exceeding 5 percent.

The process can be utilized to form and trim flanged pieces such as aircraft nose ribs. The finished part is said to be entirely free of wrinkles and to have negligible spring-back. No flutes are needed to absorb excess metal, because it is shrunk into itself to give a smooth, constant-gage flange.

According to the company, preliminary tests indicate the process can be used to:

- Form sheet-metal to compound curvatures with deep-drawn flanges, without wrinkling.
- Make deeper draws in hard metal than is possible with conventional techniques.
- Eliminate finishing of parts by hand as now is required on those pieces formed on rubber in hydro-presses and on some die-formed parts.
- Shear, as well as form parts, in the same operation.
- Form several different parts having complicated contours, but similar pressure curves, at the same time.

Other advantages claimed for the method are that it will maintain practically uniform wall thicknesses from the blank to finished part, will not affect surface finishes of the metal and coatings, and will leave parts relatively free of internal strain concentrations. It is said the Marform process also can be easily adapted to hot forming procedures.

NEW AVIATION PRODUCTS

Blower for Aircraft

For cockpit cooling and frost dissipation, lightweight, axial-flow blowers, offered by **Rhodes Lewis Co.**, 4008 W. Jefferson Blvd., Los Angeles 16, Calif., are represented to produce exceptionally high air output for size of units.

Made of aluminum alloy with airfoil-section blades, blowers are designed for operation with a.c. or d.c. motors. Capacity of 3-in. model (shown) is 70 cfm. of air with no static head. Weighing 1 lb. 9 oz. complete with motor, this unit is provided with single locking knob and double swivel for universal mounting.

Larger, 5-in. blower has 250 cfm. output with static pressure of 2 in. of water at outlet. Device weighs 2.5 lb. with 400c., a.c. motor.

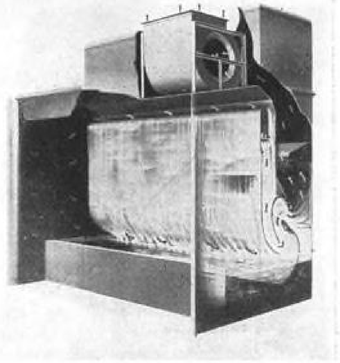
Small VHF Radio

"Instrument type" VHF receiver and transmitter, developed by **Lear, Inc.**, 110 Ionia Ave., Grand Rapids, Mich., is compactly designed set specially suitable for installation on panels where space is limited.

Weighing only 4 lb. 4 oz., model LR-5BN receiver has continuous tuning for all VHF tower, radio range and VOR reception facilities. With dimensions of $3\frac{7}{16} \times 6\frac{7}{8} \times 7\frac{1}{8}$ in., unit takes no more mounting area than two standard aircraft instruments.

Model RT-10CH transmitter is 2 watt, 6 frequency unit weighing only 13 oz.

Measuring $3\frac{1}{4} \times 3\frac{1}{4} \times 7$ in., it fits into single, average-size instrument mounting hole.

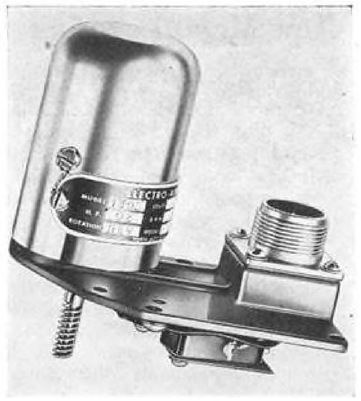


Paint Spray Booth

Roto-Wash paint spray booth, providing suction of paint laden air at both top and bottom of water curtain is offered by **Newcomb-Detroit Co.**, 5741 Russell, Detroit 11, Mich.

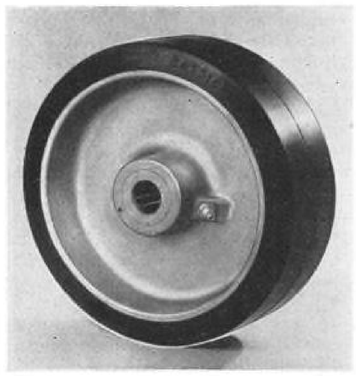
This pre-assembled machine is represented to afford cleaner, healthier working conditions by creating more even flow of air across face of booth, trapping maximum amount of paint overspray, and by pre-washing air before it enters the regular washing section of the booth.

Entire washing action is created by suction from exhaust fan. Air entering through top is pre-washed as it passes down rear of water curtain, while air passing underneath is washed as it goes through water cascading from curtain into tank. Both streams of air and water join at bottom of curtain and are carried in scrubbing torrent where airstream direction is reversed twice as it impinges against metal baffles. As air leaves wash, velocity drops sharply, separating it from water. Remaining droplets of water are removed as air passes through moisture separator before entering exhaust fan. Paint-laden water settles in tank as sludge.



Small DC Motor

A 1/100-hp. dc motor stated to be useful for any application requiring linear or rotary motion, such as operation of wing flaps, pumps, lifts, and fuel, oil, or air valves is offered by **Electro-Aire, Inc.**, 11439 Vanowen Street, North Hollywood, Calif. Running torque is listed at 1 oz.-in. at 10,000 rpm. at 28 v., but motor is said to be adaptable to many other torque and speed requirements, and to specific plans and housings. Having a compact brush and brush holder, weight of device is given as 15 oz. Size (excluding worm gear) is 2.857 in. x 1.75 in. dia. Mounting plate is 2.7 in. x 3.4 in.

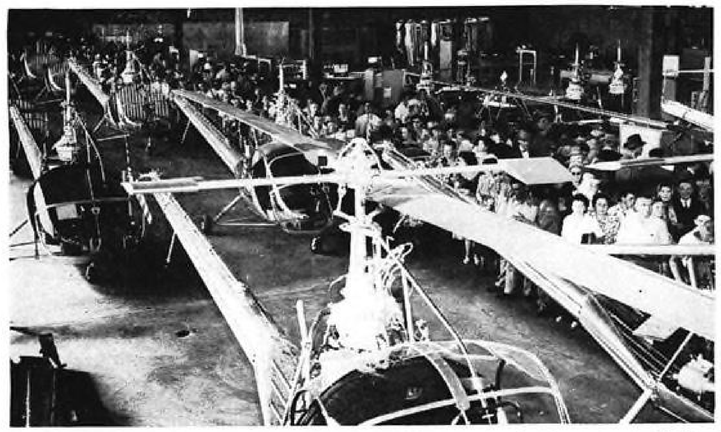


Industrial Wheels

"Alcore" line of aluminum core rubber tread industrial wheels in 6, 8, and 12-in. sizes is announced by **The Bassick Co.**, Bridgeport, Conn. Units use caged-type roller bearngs and are represented to have new, highly resilient, power-saving, rubber-compound tread.

According to company, wheels are 50 percent lighter, just as strong and cost less than wheels with iron or steel cores. Special sizes and tread compounds are available.

PRODUCTION



HILLER 360 LINE, assembling three 'copters weekly, was recently shown to stockholders.

Hiller 360 Output Nears 100 Mark

Five basic models of two-place rotary wing craft are in production. Company has obtained $1.5 million credit.

More than 4000 United Helicopter, Inc., stockholders attending the annual Palo Alto, Calif. factory open house heard President Stanley Hiller, Jr., announce a new order for five 'copters and describe the firm as "the world's largest manufacturer of commercial rotary wing aircraft."

Hiller said that production is now up to three planes per week. The basic craft itself is now being produced in five different configurations, and stockholders were treated to demonstrations of crop dusting, spraying, power line inspection, rescue operations and normal flying.

▶ **Sales Specialization**—Twelve full-time distributors are selling the 360, Hiller said, and each concentrates most heavily on a form of sales associated with the predominant activity in his area. As examples, he cited Rotary Wings, Inc., of Sacramento, Northern California distributor which specializes on the agricultural market; and Pacific Helicopter Co., Southern California distributor, which has been developing personal transportation and other markets associated with that part of the country.

▶ **Loans Permit Quantity Buying**—Meanwhile, United Helicopters has obtained a $500,000 line of credit from a combination of financial interests, including the Reconstruction Finance Corp., the Bank of America, and "private sources." The credit will be used to reduce the cost of purchased parts and subassemblies by allowing placement of larger orders with subcontractors. With production of number 100 Hiller 360 in sight, the company has already started placing orders for the second 100 craft.

Canadair Readying F-86 Production

While Canadair, Ltd., is preparing to produce the F-86 jet fighter, the possibility is seen that the Orenda jet engine, designed and built in Canada by A. V. Roe, will be tested in a North-American-built F-86 to determine its suitability for use in Canadair's version.

The Canadian defense department recently signed a $30 million contract with Canadair to build 100 F-86s for the Royal Canadian Air Force.

Actual contract price—$30,211,190—breaks down this way: Airframes, $19,-029,000; airframe spare parts, $1,902,-990; production and machine tools, $8,178,000; royalties, $625,000; publications and ground handling equipment, $475,300. Engines, radios, armament and other special equipment will be provided from other sources.

The Montreal company, wholly-owned subsidiary of the Electric Boat Co., probably will begin delivery in August, 1950. The F-86 is to become standard fighter equipment for the RCAF, replacing the British-built de Havilland Vampire.

As a direct result of this new contract, Canadair will finance a $2 million extension to Plant 1 at Cartierville near Montreal, providing over 200,000 sq. ft. of additional covered space. Of steel construction, the new building is to be 315 by about 700 ft., and will be used for fabrication of aircraft parts and fabrication and assembly of tools, dies, jigs and fixtures. F-86 assembly will be done in Plant 2, also at Cartierville.

PRODUCTION BRIEFING

▶ **Grumman Aircraft Engineering Corp.** has placed a $1.5 million subcontract with Twin-Coach Co.'s Buffalo division raising to $7 million total subcontracts from Grumman to the company. Original contract was for center panels, outer panels and control surfaces for Grumman. Latest contract is for spares.

▶ **Babb Co., Inc.**, has sold five AT-6s to the Danish Air Force for use as trainers. Aircraft will be overhauled by Skandinavisk Aero Industri, which then will be able to go into production for the first time since the war.

▶ **TEMCO** (Texas Engineering & Manufacturing Co.) has received three new contracts from Consolidated Vultee for stretch forming of extrusions and rolled sections, fabrication of door handles, and design and fabrication of dies and other production tools for the B-36. Company has placed four new plants into full-scale operation, equipped for testing and overhaul of propellers, radio and radar equipment, instrument and hydraulic assemblies for military and transport aircraft.

▶ **Curtiss-Wright Corp.** is offering a service and technical assistance plan to commercial operators of C-46 aircraft by making field representatives available to aircraft operators who are using the covered military aircraft. C-W will also furnish supplementary publications and handbooks on all engineering changes and modifications as they are approved.

▶ **Glenn L. Martin Co.** has been judged as having the best 1948 annual report of the aircraft makers by an independent board of judges for Financial World's Annual Report Survey. United Aircraft Corp. and Douglas Aircraft Co. were runners-up in the industry.

▶ **Budds Aero Castings, Inc.**, Canaan, Conn., has announced a new metal casting process which casts, molds, forges and coins a product to its finished state, eliminating 60-70 percent of machining operations. Harold Budds, company president, says the process is applicable to forming of all metals, including aluminum, steel, brass, bronze and copper.

Air Force Negotiated Contracts

Air Materiel Command headquarters at Wright-Patterson AFB, and Watson Laboratories, Red Bank, N. J., in August negotiated contracts worth more than $60 million, it is revealed in a list of negotiated contracts of more than $1000 each made available to AVIATION WEEK by the Air Force.

AMC negotiated 390 contracts valued at $60,606,170, and Watson Lab negotiated 67 contracts worth $17,261. AMC also entered into 114 contracts worth $3,872,785, after formal advertising, and Watson Lab's advertised contracts numbered three, worth $10,604.

Small business firms (employing less than 500 persons) won 348 contracts valued at $7,605,666 from AMC.

In the following list, some of the contracts total more than $100,000, as a supplement to the list in AVIATION WEEK Oct. 3. Some contracts were deleted due to security. Estimated completion date is shown by month and last digit of year: June 0, for example, means June, 1950.

Adel Precision Products Corp., Burbank, Calif., valve actuators, June 0, $5000.

Aero Supply Mfg. Co., Inc., Corry, Pa., bolts, Dec. 9, $7368.

Aerojet Engineering Corp., Azusa, Calif., additional facilities for rocket engine testing facility, June 1, $245,661.

Aeromotive Equip. Corp., Kansas City, Mo., mountings, April 0, $36,813.

Aeroproducts division General Motors Corp., Dayton, Ohio, emergency procurement of assemblies, sub-assemblies and detail component parts, June 0, $2500.

Air Associates, Inc., Teterboro, N. J., bolts, nuts, Oct. 9, $7246; motor assembly cowl flap, Nov. 9, $15,759.

Aircraft Engr. Maint. Co., Oakland, Calif., cycle reconditioning on C-54 aircraft, Sept. 9, $994,000; to cover cycle reconditioning on aircraft being returned for Project Vittles, Sept. 9, $1,246,000.

Aircraft Fittings Co., Cleveland, O., bolts, nuts, Sept. 9, $1389.

Aircraft Service Corp., New York, N. Y., aircraft engine tank, Dec. 9, $8140.

AiResearch Mfg. Co. division of Garrett Corp., Los Angeles, Calif., cabin coolers, June 0, $10,000.

Akeley Camera, Inc., New York, N. Y., tester engineering data and maintenance data, Sept. 9, $4845.

Alar Products, Inc., Cleveland, O., rework of 5745 regulators from AN 6004-1 to type A-14 pressure breathing, Dec. 9, $68,653.

Alford, Andrew, Boston, Mass., continuation of engineering services on antenna designs for very high speed aircraft, June 0, $35,000.

All American Aviation, Inc., Wilmington, Del., tie-down device, June 0, $3000.

All Steel Equipment, Inc., Aurora, Ill., storage cabinets, Sept. 9, $6291.

Allis, Louis Co., Milwaukee, Wis., No. EO motor 50 hp. Adjusto-speed, Oct. 9, $2592.

Allison division General Motors Corp., Indianapolis, Ind., turbojet engine spare parts tools data, $6,538,200; facilities for production of J-33 and J-35 engines, Sept. 9, $600,000; six J-35-A-17 turbojet aircraft engines, $230,400; J-33-A-23 turbojet engine spare parts tools data, $3,158,684.

American Auto Typewriter Co., Chicago, Ill., trainers, demonstrator, Sept. 9, $10,943.

American Blower Corp., Dayton, O., blowers, centrifugal, Nov. 9, $9754.

American Brass Co., Waterbury, Conn., conduit, Oct. 9, $6384.

American Chain division American Chain-Cable Co., Detroit, Mich., bolts, nuts, Sept. 9, $2639.

American Monorail Co., Cleveland, O., switches and trolleys, Dec. 9, $6799.

Ansco division of General Analine Film Corp., Binghamton, N. Y., photomechanical film, Oct. 9, $3970.

Arel, Inc., St. Louis, Mo., still camera lenses, Aug. 9, $1246.

Baltinger Electric Co., New York, N. Y., cable, Nov. 9, $10,190.

Baldwin Locomotive Works, Eddystone, Pa., one special 200,000 lb. capacity Southwark-Tate-Emery universal testing machine and accessories, Aug. 9, $14,720.

Battelle Memorial Inst., Columbus, O., research on resistors, April 0, $25,000.

Bausch and Lomb Optical Co., Rochester, N. Y., photographic carrying case, Oct. 9, $3500.

Bell Aircraft Corp., Niagara Falls, N. Y., increase in spare parts, special tools and ground handling equipment, June 0, $274,000.

Bendix Aviation Corp., Pacific division, N. Hollywood, Calif., switch and valve, Nov. 9, $19,402.

Bendix Products division Bendix Aviation Corp., South Bend, Ind., misc. spare parts, assemblies and subassemblies, June 0, $75,000.

Bendix Radio division Bendix Aviation Corp., Towson, Md., radio set, $731,855.

Biederman Motors Co., Cincinnati, O., spare parts for F-1 truck, January 0, $86,652.

Bird Electronic Corp., Cleveland, O., redevelopment and fabrication of antenna, $58,933.

Boeing Airplane Co., Seattle, Wash., maintenance during flight test program, Oct. 9, $73,640; spare parts for B-29 aircraft, January 0, $197,021.

Boots Aircraft Nut Corp., Stamford, Conn., bolts, nuts, Sept. 9, $1225.

Brown-Brockmeyer Co., Dayton, O., grinder, bench type A-2 wheel, Aug. 9, $3728; grinder, Oct. 9, $1446.

Bulova Watch Co., Woodside, N. Y., spare parts for watches, Aug. 9, $2299.

Burg Tool Mfg. Co., Los Angeles, Calif., level assembly, Nov. 9, $4425.

Cannon Elec. Develop., Los Angeles, Calif., asemblies, subassemblies, spare parts, June 0, $2000.

Cardox Corp., Chicago, Ill., truck data handbooks, February 0, $39,800.

Chase Aircraft Co., Inc., W. Trenton, N. J., repair YC-122 aircraft, serial No. 47-641, Sept. 9, $60,519; assault transport aircraft with spares, special tools, ground handling equipment and data, September 0, $4,045,678.

Chicago Metal Hose Corp., Maywood, Ill., conduit, Oct. 9, $3503.

Chicago Pneumatic Tool Co., Detroit, Mich., compressor, air, stationary, Oct. 9, $9854.

Chrysler Corp., Detroit, Mich., engine and accessory parts for Chrysler M-7 marine, February 0, $2419.

Cincinnati Electrical Tool, division R. K. Le Blond Machine Tool Co., Cincinnati, O., grinder, bench type, Sept. 9, $3779.

Commonwealth Engineering Co. of Ohio, Dayton, O., rate of descent indicators and data, Oct. 9, $8194.

Consolidated Vultee Aircart Corp., San Diego, Calif., modernization of 154-L-13 aircraft, July 9, $219,868; miscellaneous spare parts for L-13 aircraft, June 0, $3000.

Cook Electric Co., Chicago, Ill., antenna adapter, April 0, $6616.

Cornelius Co., Minneapolis, Minn., air compressors, Dec. 9, $8500.

Corps of Engineers, Granite City, Ill., freon gas, July 9, $2154; freon gas, July 9, $12,546; freon gas, July 9, $3362; freon gas, July 9, $4942.

Curtiss-Wright Corp., Columbus, O., design of an oscillation table, oscillation table and main data, October 0, $88,785.

Curtiss-Wright propeller, division, Caldwell, N. J., emergency procurement of assemblies, subassemblies and detail component parts, June 0, $5000; trainer, May 0, $3767.

Dalite Screen Co., Inc., Chicago, Ill., photographic screen, Aug. 9, $20,640.

Dake Engine Co., Grand Haven, Mich., press, arbor, bench type, Nov. 9, $1392.

Dayton Aircraft Prodcts, Inc., Dayton, O., Assembly dolly, Dec. 9, $64,850.

De Mornay-Budd, Inc., New York, N. Y., modification of radar set AN-APS-42 XA-3 and XA-4, January 0, $3600.

DeJur-Amsco Corp., Long Island, N. Y., indicator assembly, Sept. 9, $8771.

Denison Engineering Co., Columbus, O., test stand engineering data, Oct. 9, $37,480.

Design Fabricators, Inc., Dayton, O., trainer, demonstrator, Oct. 9, $1798.

Detroit Testing Machine Co., Detroit, Mich., shear strength and maintenance data, Aug. 9, $3895.

Diamond Instrument Co., Wakefield, Mass., antenna coupler, April 0, $12,145.

Dorne and Margolin, Long Island, N. Y., services on communication and navigation antenna development, July 0, $19,057.

Dzus Fastener Co., Babylon, N. Y., bolts, Sept. 9, $3887.

Eastman Kodak Co., Rochester, N. Y., viewfinders, lenses and camera shutters, Sept. 9, $8608; sound recording film, Sept. 9, $1776.

Eclipse-Pioneer division Bendix Aviation Corp., Teterboro, N. J., fuel pressure indicators, October 0, $35,465.

Elcor, Inc., Chicago, Ill., inverters, April 0, $70,387.

Eisemann Magneto division Jack-Heintz Precision Industries, Cleveland, O., magneto spare parts used on 0-190 and 0-470 engines installed in L-16 and L-17 aircraft, Dec. 9, $3818.

Electric Indus. Equip-Sup, Baltimore, Md., cable, Oct. 9, $2577.

Electronic Brazing Co., Montclair, N. J., detector, Oct. 9, $51,262.

Elliott Carleton Co., Dayton, O., trainers, demonstrator, Dec. 9, $5235.

Emerson Electric Mfg. Co., St. Louis, Mo., mobilization data on fire control systems, Sept. 9, $13,124.

Engelhard, Charles, Inc., East Newark, N. J., tester assembly and data, Nov. 9, $5171.

Euclid Road Mach. Co., Cleveland, O., tractor towing tools, January 0, $85,000.

Fairbanks Morse and Co., St. Louis, Mo., pumps and spare parts, Sept. 9, $5966.

Fairchild Aircraft division, Fairchild Engine and Airplane Corp., Hagerstown, Md., spin-up drop test rig for testing track-type landing gear, January 0, $86,262.

Fairchild Camera-Instrument, Jamaica, N. Y., indicator, May 0, $68,012.

Fed Co. Products Co., Cleveland, O., sealing compound, Nov. 9, $6321.

Federal Mfg. and Engr. Corp., Brooklyn, N. Y., photographic enlargers and lenses, Aug. 9, $12,480.

Federal Supply-Bureau of, Cleveland, O., filing cabinets, Sept. 9, $1892.

Flader, Frederic, Inc., N. Tonawanda, N. Y., indicator, airspeed-machmeter-temperature, $56,870.

Forest Products Lab., Div. of Dept. of Agriculture, Madison, Wis., research and development services on aircraft structural plastic laminates, October 0, $30,000; testing and designing containers and methods of packaging, July 0, $50,000.

Garwood Industries, Wayne, Mich., spare parts for C-2 truck-tractors, Nov. 9, $23,241.

General Cable Corp., Cincinnati, O., cable, Oct. 9, $10,140.

General Development Corp., Elkton, Md., experimental panels for sealing airplane cabins, July 0, $21,990.

General Electric Co., Schenectady, N. Y., modification of sighting station, February 0, $8305; gears, spur, April 0, $5520.

Giesecke, Hans, W-P AF Base, Ohio,scientific consultation services of foreign nationals, June 0, $6600.

Gilfillan Bros., Inc., Los Angeles, Calif., technician services, June 9, $1500.

Glas Fibers, Inc., Waterville, O., services to include study and experimental investigation directed toward development of a low dielectric constant glass fiber warp for fabrication of laminated radomex, July 0, $53,515.

Goodrich, B. F., Co., Akron, O., fire hose, Nov. 9, $36,750.

Goodyear Tire and Rubber Co., Inc., Akron, experimental panels for sealing airplane cabins, July 0, $9798.

Greer Hydraulics, Inc., Brooklyn, N. Y., assembly stand engineering data and main-

tenance data, Oct. 9, $5320.

Haller, Raymond Brown, Inc. State Col., Pa., addltional work on radar investigation, August 0, $66,400.

Hamilton Standard Propellers division United Aircraft Corp., E. Hartford, Conn., modification of 94 propeller assemblies for T-29A airplane, June 0, $21,911.

Hartford Steam Boiler Inp-Ins., Hartford, Conn., inspection of high pressure boilers, June 0, $10,000.

Hartman Elec. Mfg., Mansfield, O., switch, generator control relay, spare parts maintenance data, January 0, $24,498.

Heller, Robert, Associates, Cleveland, O., reports covering services required in specifications Air Force material system, February 0, $117,000.

Holley Carburetor Co., Detroit, Mich., carburetor spare parts assemblies and subasemblies, June 0, $30,000.

Holmes Projector Co., Chicago, Ill., spare parts for projectors, Oct. 9, $19,583.

Houghton, E. F., and Co., Philadelphia, Pa., spares for 5-ton jacks, Nov. 9, $9075.

Houston Oxygen Co., Houston, Tex., breathing oxygen and dehydrat. services, June 0, $3834.

Hydropress, Inc., New York, N. Y., plant layout and recommendations for manufacturers methods, pilot plant, Adrian, Mich., April 0, $98,500.

Industrial Research Prod., Franklin Park, Ill., development of electric motor hermetically sealed, June 0, $25,500.

Inland Equipment Co., Nashville, Tenn., tester and engineering data, Dec. 9, $20,250.

International Postal Supply Co., Brooklyn, N. Y., technician services, June 0, $4994.

Interstate Brake Test Mach., Los Angeles, Calif., grinder, brake shoe, pedestal type, Sept. 9, $38,325.

Interstate Engineering Corp., El Segundo, Calif., instrumentation for parachute test projectile, August 0, $34,028.

Jack Heintz Precision Inds., Cleveland, O., asemblies, subassemblies, spare parts, June 0, $5000.

Jacobs Aircraft Engine Co., Pottstown, Pa., spare parts for overhaul of the R-755-11 engine installed in the LC-126 airplane, June 0, $10,000.

Jumbo Steel Products Co., Azusa, Calif., portable engine hoists, Aug. 9, $11,404; shop, field maintenance, Dec. 9, $77,000.

Kaiser-Fraser Corp., Willow Run, Mich., storage services in Bohn Aluminum Plant, Adrian, Mich., Dec. 9, $54,282.

Kinsey, E. A., Co., Cincinnati, O., lathe, engine, geared head, and maintenance data, Dec. 9, $53,882.

Kollsman Instrument Division, Square D Co., Elmhurst, N. Y., airspeed indicators, Oct. 9, $5914.

Lear, Inc., Elyria, O., open contract for pump assemblies and spare parts, June 0, $5000.

Liquidometer Corp., L. I. City, N. Y., tester and maintenance data, Dec. 9, $7248.

Litton Industries, San Carlos, Calif., sets of magnetrons, reports and data, May 0, $30,000.

Lockheed Aircraft Corp., Burbank, Calif., landing gear revision, installation of combination radio jack, June 0, $4769; oil revision of bombing electrical systems, June 0, $9644; funnel, eng. and hyd. reservoir, Aug. 9, $3205.

Lockheed Aircraft Service, Inc., Burbank, Calif., cycle reconditioning of C-54 aircraft, Sept. 9, $540,000.

Lycoming Division AVCO Mfg. Corp., Williamsport, Pa., maintenance spare parts for V-1650 engines installed in F-51 aircraft assigned to Air National Guard, July 0, $131,521.

Mallory, P. R., Co., Indianapolis, Ind., jack Nov. 9, $1318.

Marquette Metal Prods. Co., Cleveland, O., windshield wipers, June 0, $5000.

Maurer, J. A., Inc., L. I. City, N. Y., 16mm. Maurer camera, Sept. 9, $8894.

McCulloch Motors Corp., Los Angeles, Calif., maintenance data, Sept. 9, $2696.

Meriam Instrument Co., Cleveland, O., control panel for engine test cell, Nov. 9, $24,347.

Metal Trims, Inc., Youngstown, O., clip, photographic film, Aug. 9, $5490.

Meyer, Charles, and Co., New York, N. Y., summarization and translation of non-technical documentary material written in Slavic, Romanic and Teutonic languages, June 0, $49,200; June 0, $50,000.

Micro-Switch Division, First Industrial Corp., Freeport, Ill., assemblies, subassemblies, spare parts, June 0, $2000.

Mines, Bureau of, Washington, D. C., investigation and development of malleable chromium and its alloys, Aug. 1, $55,000; investigation and development of methods for electroplating of titanium and zirconium, June 1, $50,000; determine future availability of crude oil and refining facilities for production, July 0, $14,100.

Mines Equipment Co., St. Louis, Mo., cable assembly, Nov. 9, $23,052.

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., spare parts, bombsight, May 0, $35,766.

Morse Instrument Corp., Hudson, O., photographic printers, Oct. 9, $13,303.

National Bureau Standards, Department of Commerce, Washington, D. C., continuation project on corrosion resistance and protective treatment of light alloys, June 0, $10,000.

National Surplus Sales, Kansas City, Mo., gyro and support assembly, Aug. 9, $3348.

Navy Department, Division of Chief, Bureau of Aeronautics, Washington, D. C., transmitting and receiving set, Aug. 9, $1200.

N. Y. Stand. Blackboard Co., Inc., New York, N. Y., blackboards and bulletin boards, Sept. 9, $3379.

Northrop Aircraft, Inc., Hawthorne, Calif., repair, XF-89 airplane, Oct. 9, $84,627; flight test program on YB-49 airplane, May 9, $108,141.

Ohio State Univ. Res. Fdn., Columbus, O., experimental investigations directed to design wide tuning range oscillations and amplifiers for frequencies of 150,000 megacycles per sec., output levels of at least 100 milliwatts, November 0, $65,244.

Okonite Co., Chicago, Ill., cable, Nov. 9, $6180.

Oleson, Otto K. Co., Hollywood, Calif., miscellaneous photographic, Aug. 9, $2464.

Ord. Bureau of Navy Dept., Dahlgren, Va., sheets of armor plate, Sept. 9, $4500.

Ord. Dept. of the Army, Washington, D. C., canopy remover type T-6, May 0, $26,357.

Parker Appliance Co., Cleveland, O., fuel valves, June 0, $10,000.

Perfection Stove Co., Cleveland, O., heater kits, Dec. 9, $9100.

Pesco Products, Division, Borg-Warner Corp., Cleveland, O., pump spare parts, Feb., 0, $20,636; fuel pumps, June 0, $10,000.

Phaostron Co., Pasadena, Calif., antenna, April 0, $81,702.

Phelps Dodge Copper Prod., Division Habirshaw Wire and Cable, New York, N. Y., rubber insulated wire, Oct. 9, $4203.

Plymouth Rubber Co., Canton, Mass., tape, Oct. 9, $11,755.

Pool, Dr. Marion L., Ohio State Univ., Columbus, O., reports on foreign investigation, Nov. 9, $2500.

Purolator Products, Inc., Newark, N. J., oil filters, Dec. 9, $5000.

RCA, Victor Division, Camden, N. J., miscellaneous photographic equipment, Oct. 9, $11,669; friction clutches, Nov. 9, $6680.

Rainier, Inc., Brooklyn, N. Y., clothing, July 9, $7886.

Ransohoff, N., Inc., Cincinnati, O., milling-machine, Dec. 9, $33,360.

Recordak Corp., Washington, D. C., photographic film, Oct. 9, $27,325.

Republic Aviation Corp., Farmingdale, N. Y., revise cockpit lighting on 58 F-84 airplanes, Oct. 9, $5239; spin test on F-84 airplane, Oct. 9, $2602; firing tests of pilot ejection seat on F-84E airplane, Dec. 9, $1457.

Revere Corp. of America, Wallingford, Conn., flowmeter, maximum working pressure, March 0, $8278.

Rhodes Lewis Co., Los Angeles, Calif., development of case and link collector, June 0, $78,750.

Rockwell Engineering Co., Blue Island, Ill., stand, assembly, engine, Oct. 9, $32,250.

Rosenberg, H. Z., Co., Buffalo, N. Y., spare parts for B-50 fire control Aug. 9, $2126; spare parts for B-29, Oct. 9, $1807.

Royal Electric Co., Jamestown, O., accelerometer, May 0, $73,919.

Ryan Industries, Inc., Detroit, Mich., development of case and link collectors, May 0, $41,395.

Schaffer Air Industries, Jamaica, N. Y., tester assembly and maintenance data, Oct. 9, $2590.

Schelp Helmut, W-P AF-Base, Ohio, scientific consultation services of foreign nationals, June 0, $7596.

Scintilla Magneto, Division Bendix Aviation Corp., Sidney, N. Y., maintenance data, Nov. 9, $2198.

Seaboard Electric Co., New York, N. Y., adapter, trim tab, Dec. 9, $1500.

Servo-Tek Products Co., Paterson, N. J., motor, Sept. 9, $1975.

Sheffield Corp., Dayton, O., sway braces, February 0, $2049.

Signal Officer, Washington, D. C., Air Forces share of expenses of maintaining secretariat for panel on electron tubes, November 0, $21,000.

Sikorsky Aircraft Division, United Aircraft Corp., Bridgeport, Conn., drawings and patterns of aircraft covers, July 0, $2104.

Simmonds Aerocessories, Inc., Tarrytown, N. Y., miscellaneous parts of V-1650 engines used in F-51 aircraft, June 0, $15,000.

Simpson Electric Co., Chicago, Ill., ammeters, Oct. 9, $1722.

Society Motion Picture Enginrs., New York, N. Y., photographic film, Nov. 9, $24,423.

Solar Aircraft Co., San Diego, Calif., spare parts for F-80 aircraft, Dec. 9, $93,881.

South Bend Lathe Works, South Bend, Ind., bench type lathe, Nov. 9, $84,462.

South Wind Div., Stewart-Warner Corp., Indianapolis, Ind., heater assembly, etc., June 0, $3000.

Specialty Assembly and Packaging Co., Brooklyn, N. Y., antenna base, April 0, $19,343.

Specialty Automatic Machine, Chelsea, Mass., antenna, April 0, $1003.

Specialty Sales Co., Dayton, O., drives, tail gun mount, azimuth and/or elevation, Aug. 9, $10,584.

Stewart-Warner Corp., Chicago, Ill., spares for L-2 fuel or oil servicing truck, Oct. 9, $2603.

Stone, Herman, Co., Dayton, Ohio, plate surface, cast iron, Sept. 9, $4281.

Summers Gyroscope Co., Santa Monica, Calif., control systems, Dec. 9, $13,141.

Surface Combustion Corp., Toledo, O., heating regulators, Nov. 9, $22,465.

Technicraft Corp., Kansas City, Mo. wing covers, Sept. 9, $6757.

Texas Engrg. and Mfg. Co., Dallas, Tex., cycle reconditioning of C-54 aircraft, Aug. 9, $1,834,000; cycle reconditioning of C-54 aircraft, Sept. 9, $1,066,000.

Thompson Products, Inc., Cleveland, O., fuel pumps, June 0, $10,000; boost pump lubrication system, $20,881.

Truck Engineering Corp., Cleveland, O., rear axle assembly, July 9, $2804.

Tufts College, Trustees of, Medford, Mass., continuation of research work on psychological factors, Oct. 9, $4100; research on psychological investigations of learning as affected by variables, Nov. 9, $18,530.

U. S. Electrical Tool Co., Cincinnati, Ohio, buffer and polisher, and maintenance data, Oct. 9, $22,656.

U. S. Electrical Tool Co., Cincinnati, O., drill, and maintenance data, Sept. 9, $1632.

United States Gauge Corp. Division, American Machine and Metals, Inc., Sellersville, Pa., airspeed indicator K-2, Dec. 9, $4300.

U. S. Rubber Co., Detroit, Mich., airplane casings and tubes, $56,558; casings, Sept. 9, $34,710.

U. S. Rubber Co., Mishawaka, Ind., fuel tank rubber self sealing, Sept. 9, $17,800.

U. S. Rubber Co., New York, N. Y., tape, Sept. 9, $1080.

Universal Steel Equip. Corp., Long Island, N. Y., display boards, Sept. 9, $5866.

Weatherhead Co., Cleveland, O., bolts, Sept. 9, $1171.

Western Electric Co., New York, N. Y., transmission line, May, $13,860; electronics, April 0, $83,545.

Western Mfg. Co., Detroit, Mich., transmission assembly-power, Sept. 9, $15,300; spare parts, drive assembly, Aug. 9, $3794.

White Tuning Corp., New York, N. Y., antenna base plugs, April 0, $12,401; probe

assembly, May $1496.

Whittaker, William R., Co., Los Angeles, Calif., valve assemblies and subassemblies, June 0, $5000.

Wickland Mfg. Co., Pasadena, Calif., urinal assembly, June 0, $5000.

Wolfe, C. Frederick, Inc., Glendale, N. Y., substitute exhibit for pioneer parachute drawing No. 100 and change site of installation of contract from W-P AFB to Muroc AFB, April 0, $31,608.

Wyzenbeck and Staff, Inc., Chicago, Ill. grinder, and maintenance data, Sept. 9, $6982.

Yale and Towne Mfg. Co., Philadelphia, Pa., switches and trolleys, Sept. 9, $1478.

Yawman-Erbe Mfg. Co., Washington, D. C., tables, Sept. 9, $19,833.

York Supply Co., Dayton, O., engine and maintenance data, Oct. 9, $37,786.

Latest USAF, Navy Bid Awards

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

ABSTRACTS

For 2790 aircraft storage batteries (49-1780):
National Battery Co., Depew, N. Y., on a bid of $149,729.40.

For signal generators (49-2120):
Harvey-Wells Electronics, Inc., Southbridge, Mass., on a bid of $194,204.

For piping system for wind tunnel (50-28):
Lieb-Jackson Co., Dayton, on a bid of $4590.

For 52 drill presses (49-2140):
Boice-Crane Co., Toledo, on a bid of $4128.

For oil pressure transmitter (50-27):
Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, on a bid of $38,969.05.

For altimeters (49-2363):
Kollsman Instrument Div. of Square D Co., Elmhurst, N. Y., on a bid of $131,972.54.

For 6652 gallons enamel (50-55):
Rockford Paint Mfg. Co., Rockford, Ill., on a bid of $11,241.88.

Naval Aviation Awards

Navy department has announced award of contracts for the following aviation items:

For fuel nozzle test stands:
Commercial Research Laboratories, Detroit, Mich., $51,700.

For propeller blade assemblies:
United Aircraft Corp., E. Hartford, Conn., $107,082.

For engines, Model R-2800-32W:
United Aircraft Corp., E. Hartford, Conn., $2,881,388.

For engines, Model R-2800-44W:
United Aircraft Corp., E. Hartford, Conn., $4,126,463.

For alternators-regulators:
Westinghouse Electric Corp., Washington, D. C., $82,589.

For technically trained employes to give instructions for assembly of aircraft electrical or electronic equipment:
Philco Corp., Philadelphia, Pa., $65,976.

For services and materials to convert hoist drive units for double vertical dredger type hoists:
Vickers, Inc., Detroit, Mich., $100,000 estimated).

For types I & II hoist power units:
Vickers, Inc., Detroit, Mich. $850,000 estimated).

AF Invitations to Bid

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

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

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

INVITATIONS

Acid, Hydrochloric Technical, 12,672 pounds, bid invitation No. 50-181, issue date 10 Oct., delivery 30 days.

Anodes, Cadmium, 50,000 pounds, bid invitation No. 50-178, issue date 10 Oct., delivery by March 1950.

Cloth, Mercerized Cotton, 530,500 yards, bid invitation No. 50-174, issue date 10 Oct., delivery 210 days.

Cord, Extension, 1130 each, bid invitation No. 50-190, issue date 10 Oct., delivery by 1 Feb., 1950.

Fitting Assembly, 1-2 items, bid invitation No. 50-169, issue date 10 Oct., delivery by March 1950.

Gaskets, 1-52 items, bid invitation No. 50-189, issue date 11 Oct., delivery 60 days.

Governor Assembly, 12 each, bid invitation No. 50-184, issue date 10 Oct., delivery 30 days.

Hardware, 1-13 items, bid invitation No. 50-170, issue date 5 Oct., delivery by 2 March 1950.

Hoist, Electric. 1-4 items, bid invitation No. 50-185, issue date 10 Oct., delivery 60 days.

Packing, O-Ring, 16,000 each, bid invitation No. 50-180, issue date 10 Oct., delivery 30 days.

Photographic Equipment, 1-11 items, bid invitation No. 50-186, issue date 10 Oct., delivery 90 days.

Pipe Fittings, 1-27 items, bid invitation No. 50-179, issue date 10 Oct., delivery by 2 March 1950.

Projector, 1-3 items, bid invitation No. 50-194, issue date 12 Oct., 1949, delivery within 180 days.

Pump & Refueling Assembly, 50 each, bid invitation No. 50-187, issue date 10 Oct., delivery 60 days.

Radio Receiving Set, 1-6 items, bid invitation No. 50-188, issue date 10 Oct., delivery by 1 Aug. 1950.

Seal, Lead, 100,000 each, bid invitation No. 50-177, issue date 10 Oct., delivery 120 days.

Shape Aluminum, 14 items, bid invitation No. 50-167, issue date 3 Oct., delivery 60 days.

Sheet, Synthetic Rubber, 1-9 items, bid invitation No. 50-193, issue date 11 Oct., delivery 60 days.

Tunnel, 1-3 items, bid invitation No. 50-160, issue date 28 Sept., delivery 30 days.

Wire, Electrical, 1-2 items, bid invitation No. 50-171, issue date 4 Oct., delivery by Jan. 1, 1950.

Navy Bid Invitations

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

Bronze cross valves, 50 ea., 100 lb. steam 425 deg. F, 4 in., std. plan 5-S-1162; bid invitation No. 8654; bids due Nov. 1.

Lathe cutters, 11 items, used with Armstrong tool holders, various sizes, BuShips spec. 46-S-37a; invitation No. 8658; bids due Oct. 25.

Laminated brass strips, 500 sheets, .062x 8x16 in., spec. S-122; invitation No. 8676; bids due Nov. 1.

Brass machine screws, 50 sizes, recessed round hd., NCTS, cl. 2, spec. 42-S-5e; invitation No. 8687; bids due Oct. 25.

Temperature regulator thermostatic valve assemblies, 7 sizes, type A, 45-V-29; invitation No. 8702; bids due Oct. 25.

Rubber extrusion, 9 items, class I and II, spec. 33-R-14Aer; invitation No. 8706; bids due Oct. 24.

Machine screws, 55 items, various heads, spec. FF-S-91, dwgs. AN505, 510, 515, 520; invitation No. 8711; bids due Oct. 24.

Synthetic pneumatic hose, 29,000 ft., ½ in. id., 25 ft. long, 800 psi, spec. ZZ-H-496a; invitation No. 8719; bids due Oct. 31.

Sandblast hose, syn. rubber, 70 ea. 50 ft. lengths, 1 in. id., type B, 500 psi; 16,500 ft. type A, 1¼ in. id., spec. 33-H-24; invitation No. 8720; bids due Oct. 31.

Braces and brackets, 11 items, 6 sizes inside corner brackets, 5 items brackets, spec. FF-H-111a; invitation No. 8722; bids due Oct. 26.

Compression type sink faucets, 1100 ea., brass, ½ in. IPS, Noland Co. cat. G; invitation No. 8724; bids due Oct. 26.

White enameled steel buckets, 300 ea., 12 qt. cap.; invitation No. 8731; bids due Oct. 26.

Extinguishers, 12 ea., carbon dioxide, wheeled units, 50-lb. cylinders, perm. shutoff valves; invitation No. 8732; bids due Oct. 31.

Abrasive cloth, alum. oxide, roll, 23 sizes, Carborundum Co.; also 3 items cloth sheets; 39,360 sheets electrocoated alum. oxide, 9x11 in., spec. P-C-451; invitation No. 8734; bids due Oct. 27.

Music wire, spring tempered steel, high, 11 sizes; also 4900 lb. ditto, medium carbon-manganese, gr. II, type A, spec. 22-W-11c, 47-S-4g; invitation No. 8745; bids due Oct. 27.

Life preserver cushion assemblies, 835 ea., type A-3, NAF dwg. 500176; invitation No. 8746; bids due Oct. 31.

Electroplating anodes, 100 ea. bars w/hooks, 5/16x18; 1 in. hook; also 500 ea. balls w/hooks, 2 in. dia., copper; 100 ea. ditto, bars with hooks, nickel, 4 in., type II, specs. QQ-C-61, QQ-C-493, QQ-N-265; invitation No. 8753; bids due Oct. 26.

Copper refrigeration fittings, 10 items 45-deg. elbows; 2 sizes 90-deg. brass elbows; invitation No. 8758; bids due Oct. 28.

Boiler compound, 247,500 lb., BuShips spec. 13-C-3, 50-lb. drums; invitation No. 8759; bids due Nov. 4.

Lighting and power wire, 15,000 ft. 12 AWG, red; type TW; also 25,000 ft. 8 AWG, blk; 20,000 ft. 6 AWG, blk., spec. J-C-129; invitation No. 8760; bids due Oct. 27.

Wire rope, 23 items, 25,200 ft. 6x12, 5/16 in.; 18,000 ft. 7/16 in. 6x19; 3600 ft. 6x7 9/32 in.; 3600 ft. ½ in.; 5400 ft. 1 in. 6x19, etc.; also 267,000 ft. ⅝ 6x37; various sizes and quantities, spec. 22-R-3i, -3f; invitation No. 8762; bids due Oct. 26.

Screws, 59 items, washer head, machine, spec. AN-S-52a, dwgs. AN525, 526, SK 70; invitation No. 8764; bids due Oct. 28.

Synthetic rubber extrusion, 8 items, various types, mfgrs. nos.; invitation No. 8787; bids due Nov. 14.

Hewlett-Packard Co., Palo Alto, Calif., oscillators, analyzers, and generator, Oct. 9, $5763.

Middletown, Township of, Middletown, N. J., guard services, July 0, $6152.

Rollin Co., Pasadena, Calif., generator, signal power type, frequency range 40-400 mc, January 0, $3345.

Tropic-Aire, Inc., Chicago, Ill., engine and air conditioner accessories, Nov. 9, $1330.

Plan Urged to Boost Plane Utility

Loening cites personal plane gains but calls for more technical development to achieve demands of public.

A hard-headed program of selling aviation's advantages as a transportation medium and of technical development to overcome present deficiencies was urged by Grover C. Loening, aeronautical engineer and NACA consultant, speaking at a recent Dayton section meeting of the Institute of the Aeronautical Sciences.

Pointing out that long strides had already been made by the aircraft industry, in developing both large and small planes for 300-mile-and-over trips, Loening urged more attention to the field of "shorter-range travel by air where airport limitations make the comparison with other modes of transportation so disadvantageous for aircraft."

▶ **Longer Trips**—Referring to longer trips, he said: "We can now say that with a 300 mph. cruising speed airliners have achieved success. . . . As to personal planes still using airports, we are up against what can be done with the wonderful new cars and the many new freeways available across the country and around cities.

"This means that a speed of not less than 150 mph. cruising, and better still, 200 mph., would give enough advantage over adverse winds and any other time-consuming items to make air travel highly advantageous in today's excellent personal planes for distances of over 300 miles. Such speeds (actually 150-170 mph.) are now already available either in (Beech) Bonanzas, (Ryan) Navions, Cessnas, etc., and business use of these fine planes is starting to become a reality and likely greatly to increase from the low production figures now in evidence."

▶ **Comfort Praised**—Loening praised seating comfort in today's personal planes, "as fine as any car," and pointed out: "There is much promise clearly in evidence for reducing the noise level of aircraft both externally and internally to an entirely acceptable one." He added that "structural reliability is within reach if we do not already have it. Highly developed aircraft in which a failure of structure or the power plant is as unthinkable and infrequent as it is in motor cars, are practically here now."

Radar and radionic devices, he forecast, will soon provide aerial highway markers making the task of the pilot one not much more difficult than that of the auto driver. "The air route is in the process now of being organized into one that can be just as well marked as the automobile route," he stated.

▶ **Relative Safety**—Loening pointed out that aviation must be as safe as other means of transportation to compete with them. But he pointed out automobile statistics prove: "If you have enough speed, enough reliability and comfort, enough ease of operation and a reasonable cost, the world will submit to the danger to get the result.

"If we could get the statistics on driving at over 60 or 70 mph. it surely would prove more dangerous than flying. There is no question that streamliner train operation is much more dangerous per passenger mile than airline operation per passenger mile," he asserted.

On the debit side of present day aviation Loening criticized:

- **Reactionaries in high places** whose inability to mold their minds to a progressive future cause hindrances to aviation development.
- **Easy public acceptance of cliches**, and later disillusionment. He referred to the public clamor for the backyard helicopter and subsequent discovery it was not yet ready for mass marketing.
- **Technical prejudices** against certain phases of aviation development, which are subject to reappraisal in light of new conditions, such as continuing prejudice against seaplanes, and earlier prejudice against monoplanes.
- **Price consciousness** which keeps industry from adding something new to an airplane because it will increase the price and make it harder to sell. "Fallacy in this," said Loening, "is that you may not sell it to the same person but you will sell it to someone new who hasn't bought any of the other aircraft because they didn't possess this quality."
- **CAA certification procedures** which complicate, delay and increase the cost of development of a new type of aircraft. He pointed out that similar restrictions are not invoked in construction of automobiles, locomotives, or small cruisers.

"The gentlemen who write these rules and regulations are neither inventors nor engineers nor developers. They are merely expert observers who are writing down the specifications for last year's aircraft because that is the only kind they know about. And the engineer who wants to develop next year's aircraft has to go laboriously through the process of having these rules altered so that his new idea will come under rules that didn't exist until his idea came along.

"There is built up a vast fabric of submissions for approvals and regulations and inspection all predicated on two questionable fundamentals:

- **"That the buyer doesn't know enough** to know what he is buying, and
- **"That the builder is an incompetent engineer** who has designed something for the public market that is likely to fall apart.

▶ **Survival Test**—"I do not need to review," Loening concluded, "the several instances of automobiles that were brought out and found dangerous and actually caused accidents and how quickly the public learned it and how quickly their business was ruined. The

CANARD FLYING BOAT TESTED

This single-place canard-type flying boat is an interesting experiment being conducted in private by a group of Curtiss-Wright employees at Columbus, Ohio. Designed and built by Fred O. Arnoldi, it's stated to be prototype for a four-place craft embodying similar design features. This test version, dubbed the Frenarda, is of all-wood construction, and powerplant is a 50-hp. Continental pusher. Plans now include removing tail-mounted fin- and-rudder, and placing of directional twin devices on float struts.

BRIEFING FOR DEALERS & DISTRIBUTORS

NEW FOUR-PLACER—The long awaited four-placer which C. G. Taylor has been developing for the last three years has been quietly test flying over at Conway-Pittsburgh Airport and is completing its ATC tests. Taylorcraft, Inc., showed the four-placer, the Tourist, to a few people in a hangar out at Cleveland at the time of the National Air Races but doesn't plan to make a full national announcement on it for several weeks until quantity production and delivery schedules are set.

Meanwhile Taylorcraft has announced a 1950 line of two-placers including a $2195 Special Deluxe of 65 hp., and two 85 hp. planes, the Custom Deluxe, $2585, and the Sportsman, $2950. Planes feature improved visibility, new doors, new brakes, more luggage room. Sportsman has a special hand-rubbed paint job, carries starter, generator, stall warning indicator and navigation lights as standard equipment.

92,658 AIRPLANES—Recent statistical study of U. S. civil aircraft released by CAA shows that, as of July 1, there were 92,658 civil aircraft. Of these, 86,212 were single-engine planes, 4521 were twin engine, 532 four-engine; 20 tri-motors, and one eight-engine plane (Hughes Hercules). New figures represent a careful sorting out by CAA of "deadwood" from previous listings, which carried planes after they had been retired from service for sundry reasons. Total figure is smaller than the 97,619 reported as of Aug. 1, 1948, but CAA statisticians think most of the difference is in "dead" registrations of last year. Current manufacturing rate however, especially on personal planes, has dropped to a point where it is doubtful if enough new planes are being produced in 1949 to replace those retired for various causes.

CALIFORNIA STILL ON TOP—As was the case a year ago, California leads the nation in number of planes with 10,452, only a slight variation from last year's 10,639. No. 2 state, Texas, showed a drop of more than 1000 planes, from 8148 to 7027. Other states in the first 10: Illinois, 4731; New York, 4460; Michigan, 4285; Ohio, 4180; Pennsylvania, 4140; Kansas, 2914; Indiana, 2710; Florida, 2553. These ten states together contained 47,452 planes or more than half the total in the country.

KAMAN DUSTER—First of the Kaman twin-rotor duster model helicopters to appear in the South, has been delivered to Capel Distributing Co., Candor, N. C., sales agent for the Kaman Aircraft Corp. in North and South Carolina, Georgia and Florida. Upon completion of its first cotton-dusting mission the helicopter will be taken to Florida for winter "aerial application" work on vegetable and citrus crops.

HORNBLOWER CARNEY—Bill Carney, field sales representative for Van Dusen Aircraft Supplies, has mounted an extra-loud truck horn on the landing gear of his Cessna as a means of demonstrating the Safe Flight pre-stall warning indicator. The horn is in addition to the regular "beeper" in the cockpit which sounds off whenever the pilot gets dangerously near a stalling attitude. But Carney's big bugle can be heard on the ground from 1000-ft. altitude, when he demonstrates various types of stalls.

WANTS PROOF—Sometimes it takes the aviation industry quite a long time to warm up to a new idea, as the action of the CAA's new Airport Advisory Committee demonstrated recently. The committee recommended continuing construction of multiple-direction runways at airports "until there is proof of the practical value of devices such as the castered landing gear which would tend to eliminate the necessity of more than single runways." Meanwhile CAA technical men have already certificated the cross-wind gear in planes as big as the Douglas DC-3. Just how much more proof is required is an interesting subject to ponder. But to be on the safe side, "the committee recognized the usefulness of the castered landing gear and stated that single-strip runways have a place in aviation and should receive federal aid."

—ALEXANDER McSURELY

automobile business is the striking example of the fact that the survival of the fittest is the best checkup of a stress analysis."

Loening forecast:

- **Existing good personal planes** such as the Bonanza, Cessna, Stinson-Piper and Navion will continue to improve and be extended in practical business and farm uses.
- **That the private owner really wants** the airplane which will fly from zero to 200 mph. This may be achieved either through a convertaplane with rotors for vertical lift and descent and fixed wing for high speed cross-country flying, or the slow-flying plane which uses an induced air flow over its wings to cause lift without translation.

Tours Europe in Rented Piper

Frank S. Jonas, Piper Aircraft Corp. export representative, has recently completed a six weeks' tour of Europe during which he made a number of trips using a 115 hp. four-place Piper Clipper. Longest was a six-day tour of 2100 mi. through France, Italy and Switzerland, starting from Paris, making stops at Cannes, Milano, Alasso, Geneva, Bern and Scion, and returning to Paris. The plane was owned by Uni-Air of Paris, one of a number of firms which has planes available for charter for business travel in Europe.

Jonas made another flight in a Piper to Frankfurt, Germany, where he reported interest in personal planes was very high among American military personnel.

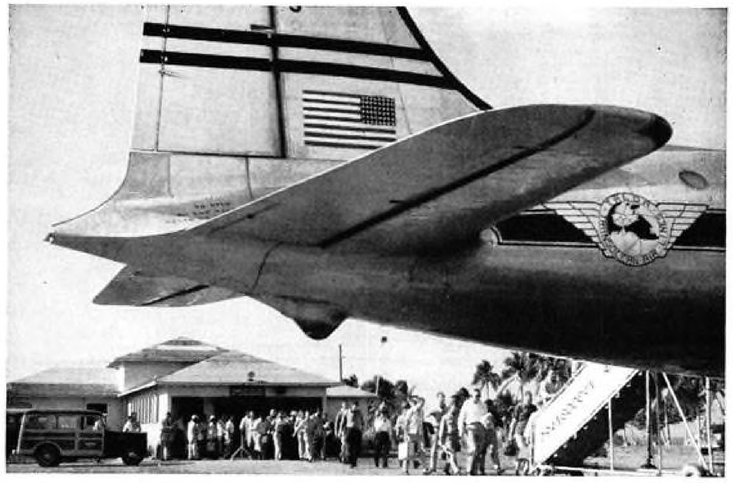
The Piper export representative said that gasoline appeared to be readily available, and that there were no hindrances or restrictions on business flying except in Germany.

Jonas believes that American business men who find extensive travel in Europe necessary can save time and inconvenience by using available charter personal aircraft, and that the saving, both in time and greater area covered, will compensate in many cases for any extra expense involved.

Trade Group Elects

Clay Swaim of Salisbury Aircraft Service was elected president of the North Carolina Aviation Trades Assn. at the recent annual meeting in Asheville, N. C. He succeeds R. S. (Bob) Northington, vice-president of Piedmont Aviation, Inc., Winston-Salem, who advanced to chairman of the board of directors. William H. Dunn, president of Air Progress, Inc., Wilmington, was named vice-president, and B. J. Holleman, Jacksonville Airport, Inc., was elected secretary-treasurer.

AIR TRANSPORT



CONSTRUCTION workers leave Guam for Oakland via Transocean.

Contract Flight Ban Weighed

Examiners in Transocean and Seaboard & Western cases offer basis for new restrictions on foreign operations.

By Charles Adams

Major U.S. contract airlines operating overseas are being fitted for an economic strait jacket which may prove even tighter than the one devised by the Civil Aeronautics Board for domestic nonskeds.

Recent CAB examiners' reports in enforcement cases against Transocean Air Lines and Seaboard & Western Air Lines seem indicative of the manner in which federal economic restrictions will be applied to contract carriers. In both proceedings (AVIATION WEEK, Oct. 3), the examiners said the companies' foreign operations had violated the Civil Aeronautics Act and recommended that the lines be ordered to cease and desist from further illegal activity.

► **Nonsked Critics**—Certificated U.S. flag lines have been increasingly disturbed over the activities of contract carriers. The current enforcement case against Seaboard & Western stems from a TWA complaint against the uncertificated company.

During the recent meeting of the International Air Transport Assn. at The Hague, Director General Sir William Hildred lashed out at "the professional skimmers of cream who can limit their operations to the zones, routes and times when the traffic is thickest."

CAB began cracking down on uncertificated international operators in 1947, when it prohibited them from transporting passengers on common carrier flights between the U.S. and foreign points. In addition, the stringent regulations governing frequency and regularity of service which affect domestic nonskeds' passenger and freight operations apply with equal force to cargo flights abroad.

Both Transocean and Seaboard & Western hold letters of registration as large irregular (nonscheduled) carriers. CAB enforcement attorneys earlier this year asked the Board to revoke or suspend the TAL and S&W letters of registration for alleged illegal activities. Thus the examiners' recommendation that the companies merely be ordered to cease and desist from further violations represents a somewhat more lenient attitude.

Transocean President Orvis M. Nelson claims his passenger-carrying flights abroad and most of TAL's other activities have been under contract. CAB enforcement attorneys and examiners say many of the operations were actually common carrier in nature even though a contract may have been signed.

► **Examiner's Recommendations**—In asking CAB to order Transocean to cease and desist from further violations of the Civil Aeronautics Act, Examiner Warren E. Baker also recommended that the company be forbidden to engage in private (contract) carriage for hire while holding authority to operate as a nonscheduled common carrier—except under these conditions:

- All alleged private carriage for hire will be performed pursuant to written contracts which provide for a series of flights over a stated period of time, with mutual obligations on both parties, and clear definitions of the categories and ownership of the cargo or character of the persons to be carried.
- No contracts for private carriage may be executed for transportation of persons or cargo between points where common carriage is provided unless the type of persons or cargo which is the subject of the alleged private carriage is excluded from the tariff filed for (common carrier) transportation between the points.
- No persons or cargo covered by a contract for private carriage may be carried in an aircraft at the same time as cargo or passengers transported in common carriage.
- All contracts for private carriage must be filed with CAB within 30 days after the date of execution.

► **Viewpoints Differ**—Quoting previous court opinions, Baker said the most striking characteristic of private (contract) carriage is the extremely narrow range of operations in which it may legally engage. In some cases, private carriage was proved only after it was shown that the company held a limited number of contracts of continuing nature and that there was an absence of solicitation or acceptance of new customers.

CAB enforcement attorneys went so far as to contend that an operator which is a common carrier on some occasions is almost certainly a common carrier in all its transportation. TAL contends it is possible to be both a common carrier and a contract carrier.

Orvis M. Nelson, TAL president.

Specifically, Baker found that Transocean's transportation of passengers between the U.S. and Okinawa under contracts with construction companies, and of students between the U.S. and Europe under contracts with Youth Argosy was common carriage and illegal. The examiner also found that U.S.-Europe passenger and cargo flights for the Army and Air Force may have been legitimate contract activity by themselves but taken together with Transocean's overall operations must be considered illegal.

► **Ask Legislation**—TAL President Nelson told AVIATION WEEK that "if the views of CAB attorneys prevail there will be no such thing as contract carriage by air." He believes Congress should enact legislation giving contract carriers a legitimate place in air transportation.

Nelson argues that it is economically unsound for a scheduled airline to maintain a fleet of planes and a staff of trained personnel to be shifted around the world solely for the handling of mass movements too large for the company's regular flight schedule. "If one scheduled airline is permitted to do so, all other scheduled carriers are entitled to the same privilege, and the taxpayers will foot the bill."

The TAL president says only contract operators with extremely flexible services are equipped to take care of emergency mass movements.

► **TAL Organization**—Organized shortly after the war, Transocean now has over 2000 employes and an annual payroll exceeding $8 million. Its fleet consists of 12 DC-4s (six owned and six on long-term leases) plus six C-46s leased from the Air Force.

Domestic bases are at Windsor Locks, Conn., and Oakland, Calif. Other facilities are at Honolulu, Wake, Guam, Tokyo, Gander, Caracas, Shannon, Munich, Rome and Karachi.

► **Operations**—TAL has made more than 50 round-the-world flights since 1946. It operated over 50 trans-Atlantic trips with Air Force personnel and supplies during the Berlin blockade. In other mass movements it has flown 20,000 workmen to U.S. Pacific island bases, 7000 British immigrants to Canada, over 2000 displaced persons to the U.S. and about 10,000 D.P.s from Europe to South America.

In a three-week period last December TAL flew nearly 1200 war brides from Munich to New York to beat an immigration law deadline.

During the past summer it transported 2000 students to Europe at a $150 one-way fare—less than half the regular airline rate. The company has flown nearly 1000 fishermen between Seattle and Alaska in a single week. It made mass evacuations of Europeans from China during the Communist advance and is a prime contractor to the United Nations' International Refugee Organization.

TAL would like to cash in on the heavy Holy Year traffic to Rome in 1950. It figures that with full round-trip DC-4 loads it could make a profit on the U.S.-Italy flights by charging less than $100 each way. Regular airline fare is $457.

Transocean's foreign-point-to-foreign-point operations are beyond CAB's economic jurisdiction. In this field, besides the refugee flights, the company has operated scheduled common carrier service between Geneva, Switzerland, and Lydda, Israel, and between Rome and Venezuela.

► **Revenues**—For the fiscal year ending May 31, 1949, TAL's gross revenue from transportation alone was $7,435,000. This is more than the reported domestic revenues of National Airlines, Northeast Airlines, Colonial, Continental or Mid-Continent during 1948.

Transocean showed a $450,000 profit in fiscal 1947, earned $15,000 in fiscal 1948 and nearly $400,000 in fiscal 1949. The company's net worth is around $1,250,000 and its stock has a book value of approximately $25 a share.

► **Operates Subsidiaries**—Nelson's company also established Philippine Air Lines' international operations to the U.S. and recently signed a contract with Pakistan to perform a similar service for that country. TAL operates the Landing Aids Experimental Station at Arcata, Calif., for the military and CAA, has a large overhaul business in its wholly-owned subsidiary, Aircraft Engineering and Maintenance Co.; and runs the Taloa Academy of Aeronautics at Oakland Airport.

A subsidiary company, Transocean Engineering Corp., is seeking airport and road construction contracts all over the world. This unit bought up all the surplus construction equipment on Wake Island (trucks, tractors, bulldozers, shovels, rock crushers, etc.) for around $550,000.

President Nelson has been in aviation 22 years. A graduate of Randolph and Kelly Fields, he holds an M.A. degree from the University of Washington, served five years in the Air Corps, was a United Air Lines pilot for 12 years and has logged over 13,000 hr. For four years he was first vice president of the Air Line Pilots Assn.

CMA Loses Valuable Route Permit

Possible revision of Mexican flight regulations seen as result of investigation into fatal crash against volcano.

(*McGraw-Hill World News*)

MEXICO CITY—The Mexican government has cancelled Compania Mexicana de Aviacion's permit to operate one of the carrier's most profitable routes between Mexico City and the Guatemalan border at Tapachula.

The cancellation came as a result of an investigation into the crash of a CMA DC-3 into towering, snow-covered Popocatepetl volcano near Mexico City Sept. 26. CMA, an affiliate of Pan American Airways, flies 26 DC-3s and DC-4s over four domestic routes.

► **Weather Bad** — The plane which crashed, killing 25 passengers and crew members, had been flying by "ground contact" although weather was extremely bad and visibility poor. It struck the volcano at the 15,000 ft. level, at a point some 3000 ft. below its peak.

Investigation so far has shown that the plane was equipped with the latest types of navigational aids, but was usually given the option of flying contact in good weather to shorten the route. Flying by instruments necessitated using a beam from Vera Cruz, considerably lengthening the flight, but also took it out of the way of the two towering volcanoes, Popocatepetl and Iztaccihuatl. Another plane crashed into Iztaccihuatl two years ago.

► **Cancellation Reasons**—The government, through the Department of Communications, which controls air transport in Mexico, cited the following reasons in cancelling the permit for CMA to fly this route (only airline schedule to cities in Southern Mexico):

- The pilot was responsible for the accident because he realized conditions did not warrant contact flying in the volcano area.
- The pilot, instead of using the route between the volcanoes, should have gone around by the alternative Calpulapan-Tepexpan route.
- The company, CMA, was responsible for not having cancelled the flight, since weather conditions were such as to make such cancellation mandatory.

► **Senator Killed**—The action against CMA by the government is felt to be at least partly due to the death aboard the plane of National Senator Gabriel Ramos Millan, a personal friend of President Aleman and an important political figure. A separate study is being conducted by the Mexican Senate.

Another outgrowth of the investigation is a demand by several leading Mexicans that the flight regulations for

Mexico must be completely overhauled. One of the principal points is that "ground contact" flying was permitted in order to shorten the route. A second point is that although the plane had latest type navigational aids, the proper radio beams to make these effective were not operating in Mexico.

The revision undoubtedly would be patterned on U. S. regulations.

▶ **CMA History**—CMA, which lost its permit on the southern leg, has three other important domestic routes—two to the north and one to the Yucatan peninsula.

The company was organized in 1927 as Mexico's first commercial line and was purchased by Pan American in 1929. Its crews were trained by Pan American and its flight system coordinated with PAA from 1929. In 1946, PAA sold out its controlling share of the stock in CMA to Mexican citizens. Several important government officials were reported to have received some of the stock. Pan American retained 40 percent.

▶ **Good Record**—The carrier has been one of two really profitable lines in Mexico and by far the biggest money maker. It had a good safety record until this crash and not long ago received a safety award.

Cancellation of the permit will work considerable hardship on the area involved. The only competitors that might be able to start flying the route at once include Lamsa, United Air Lines' affiliate in Mexico, and possibly one of the smaller Mexican-owned lines. It is a profitable run, and the planes on it are generally filled.

Court Will Review Piedmont Decision

The Supreme Court has agreed to review a case which may have an important bearing on how far the Civil Aeronautics Board will go in the future in awarding routes to a company that did not apply for them specifically.

At issue is CAB's Southeastern States Area decision of April, 1947, in which the board gave Piedmont Aviation, Inc., Winston-Salem, N. C., feeder routes in Ohio, Kentucky, West Virginia, Virginia and North Carolina. State Airlines, Charlotte, N. C., has been waging a continuous legal fight to have the decision upset.

▶ **CAB Reversed**—Last spring (AVIATION WEEK, Apr. 25), the U. S. Court of Appeals for the District of Columbia reversed CAB's order awarding the routes to Piedmont. The lower court said that of 39 points Piedmont asked to serve, only nine were on the links finally given to the company by CAB.

According to the Court of Appeals, the routes granted Piedmont by CAB could not even be considered a modification of that carrier's proposed system except by "distortion of reality and totally unreasonable, capricious and arbitrary interpretation of the word 'modification'." State Airlines had applied for routes similar to those awarded Piedmont.

Pending Supreme Court review of the Court of Appeals' decision, Piedmont will continue to operate its 1900-mi. short-haul system. The carrier activated the routes in February, 1948, under a three-year franchise.

Australia Has Lowest Air Travel Fares

(McGraw-Hill World News)

MELBOURNE—Devaluation of the Australian pound in terms of the U. S. dollar has lowered Australian air fares to the bargain basement in international air travel. The Sydney-Melbourne fare has been kept unchanged at a shade under threepence a mile—2.8 cents at the new rate of exchange.

Though passenger rates were raised some time ago by 25 percent on most lines, the slump in exchange value of Australian currency has wiped out this increase.

▶ **Dollar Trouble**—Because of the dollar component in operational costs, Australian airlines may be unable to maintain these low rates. The cost of replacing over-age American aircraft and of providing spare parts has shot up by 44 percent as a result of the exchange adjustment. Also, practically all aviation lubricants and a portion of the aviation gasoline used in Australia are of dollar area origin.

Writing down of American-built airliners at present-day replacement cost, if permitted, would bite deeply into the book profits of Australian airline operators. But being compelled to carry equipment on the books at original cost, the lines will not be able to show the effect of adjusted depreciation in their balance sheets until actual replacements are made.

▶ **Replacement Costs**—Most of Australia's civil air fleet was purchased cheaply immediately after the war from government liquidation assets and has been written off. The impact of present-day replacement expense will therefore be all the more drastic when it enters the overall cost picture.

As an alternative to hiking air fares, all major Australian airlines are considering the introduction of "tourist class" economy services. Conversion of DC-3s to carry 28 instead of 21 passengers, curtailing of flight schedules to increase load factors, and skipping of meals on short flights and of free bus transportation to and from airports are major features of the projected economy service.

SAE Forecast of Tomorrow's Airlines

Members of the Society of Automotive Engineers have given their crystal ball a rub to visualize the probable characteristics of the 1955 model airline transport.

Holding a panel discussion at SAE's national aeronautic meeting in Los Angeles recently, the engineers drew this picture of the latest thing in commercial aircraft six years from now:

- **Power** will be furnished by four turboprop (or perhaps turbojet) engines.
- **Capacity** will be 50 passengers internationally and 58 locally, with flights ranging from 830 to 3500 miles.
- **Speed** will be 500 mph.—possibly as much as 550 mph.—at altitudes of around 35,000 ft.
- **Airports** with runways up to 9000 ft. long will be required for the longest-range operations.

Carlos Wood, Douglas Aircraft Co. preliminary design engineer, estimated that a prototype of the 1955 SAE transport would cost a minimum of $22.5 million but said it might be possible to sell subsequent production jobs for about $2 million if orders for 100 were obtained. Orders for 300 of the domestic version could bring the unit price down to $1,320,000, Wood stated.

▶ **Engine Development**—D. J. Jordan, Pratt & Whitney project engineer, declared present reciprocating engines for transports may be outmoded by 1955, with the turbo-propeller engine being well advanced by that time and the turbo-jet perhaps coming into its own. He noted that a major share of present expenditures for aircraft power plant development is going to the jet engine, with the turboprop engine receiving a modest outlay of money and the reciprocating engine almost none.

E. H. Atkin, chief engineer of A. V. Roe Canada, Ltd. (builders of the C-102 Jetliner) expressed belief that present reciprocating engine transports may be discounted as overseas aircraft by 1955 since by that time jet engines with or without propellers will have advanced sufficiently to ensure a substantial economic margin over current types. He said there is still no evidence that a compound engine is likely to emerge which a manufacturer would care to use in the design for a 1955 model civil transport.

Such a compound engine, Atkin indicated, probably would be suitable only for ultra-long-range flights in the military field. He added that as a long-term development, the only type of civil aircraft to aim for is the straight jet transport.

SUPER DC-3 with Donald Douglas and Donald Douglas, Jr., stops at Houston where Pioneer Air Lines inspects the plane. Then to . . .

ATLANTA for Delta Air Lines President C. E. Woolman (right). Next, Washington and . . .

FIRST SALE to Capital's J. H. Carmichael.

Super DC-3 Goes on Selling Tour

Capital hopes to have 20 of the craft by 1952; Eastern with 52 DC-3s, is reported considering purchases.

With its first orders on the books, Douglas Aircraft Co. plans to keep its Super DC-3 selling program in high gear for the remainder of 1949.

A sister ship of the prototype Super DC-3, which has made a 10,000-mi. demonstration run, is expected to go on an exhibition tour shortly.

This second Super DC-3 will have 30-37 seats instead of the executive-type interior arrangement of the prototype. It will have 1450-hp. Pratt & Whitney R-2000 engines rather than the 1475-hp. Wright R-1820-C9HE engines on the prototype.

Douglas hopes to complete Super DC-3 certification tests by November.

▶ **Capital Breaks the Ice**—Sale of three planes to Capital Airlines (AVIATION WEEK, Sept. 19) broke the ice in the Super DC-3 sales campaign. By the end of 1952, when its 24 standard DC-3s must be retired from scheduled service under existing civil air regulations, Capital hopes to have 20 Super DC-3s as replacements.

Other domestic airlines which have not yet acquired postwar twin-engine aircraft are United Air Lines and TWA with 69 DC-3s each, Eastern with 51, Delta and Mid-Continent with 20 each, Braniff 15, Colonial and Chicago & Southern with 13. Including feederlines, the domestic carriers still have over 400 conventional DC-3s in service.

▶ **Foreign Markets**—With an eye to foreign markets, Douglas included Canada and Mexico on the itinerary of its first Super DC-3 tour. Dollar shortages and currency devaluations complicate foreign sales prospects, but an answer to the problem is being sought.

Licensing of Douglas service centers abroad to make the Super DC-3 conversion in Europe and South America has been under consideration. With this arrangement, complete kits of parts would be sent abroad.

Financial circles have reported that Douglas might enter into a working agreement with Canadian Car & Foundry Co., Ltd., Montreal, for manufacture of the Super DC-3 in the Dominion.

▶ **Performance**—Latest Douglas data on the Super DC-3 claims the craft will cruise at 250 mph. (50 mph. faster than the standard DC-3) at 15,400 ft. with the 1475-hp. Wright engines and at slightly lower speed with the 1450-hp. P&Ws. Top speed is listed at 270 mph. using either type engine.

The new plane's maximum gross takeoff weight of 31,000 lb. is 5800 lb. greater than the conventional DC-3. Capacity payload of over 7000 lb. is more than 2000 lb. over the standard DC-3.

With its higher-powered engines, redesigned outer wing panels, lengthened

fuselage and larger tail, the Super DC-3 is more than 60 percent a new plane, according to Donald Douglas. But he has resisted efforts to give the ship any of the entirely new names that have been suggested.

Douglas has spent about $3 million in tooling and development of the Super DC-3. The company is prepared to turn out about 10 of these planes a month.

PAA Crash Report

Crash of a Pan American Airways Convair-Liner at Rancho Boyeros Airport, Havana, Cuba, during takeoff last Dec. 9 was probably caused by the crew's inability to stop the plane under marginal conditions of stopping distance due to inadequate braking effectiveness.

This finding was made in a recently-issued Civil Aeronautics Board accident investigation report. Although the plane was damaged extensively, only one of the 44 persons aboard was injured in the accident.

▶Tires Blew—During the takeoff the crew sensed an unusual vibration at an approximate speed of 95 knots and immediately throttled the engines and applied brakes. The left outboard and right inboard tires blew out within 550 and 250 ft., respectively, after the brakes were applied; and the plane failed to stop within the required distance.

Test of a similar airplane using the same nosewheel and tire assemblies revealed no unusual vibration. Investigation disclosed no cause for the suspected trouble. Maintenance was satisfactory and weather was not a contributing factor.

The Convair-Liner involved was equipped with Hamilton Standard propellers with the reversible feature made inoperative by the carrier. CAA had certificated the plane for such operation over the route.

Evaluating all the evidence from the accident investigation, together with facts observed through day-to-day operations, Pan American concluded that "the braking system of the Convair-Liner is critical under certain operating conditions."

▶New Brakes—As a result, PAA changed propeller reversing from a regular modification to an immediate campaign modification. High-capacity brakes under test at the time of the accident (although not installed on the plane involved) are now used on Pan American's Convair-Liners.

These high-capacity brakes retain their braking effectiveness better under increased heat. PAA also enlarged its pilot training curriculum to include checking each pilot in actual use of the air brakes.

Employe Rights

Foremen and certain other supervisory employes of airlines have been granted the same right to organize and bargain collectively as similar workers on railroads.

In a precedent-making decision, the National Mediation Board upheld the claim of the International Assn. of Machinists that 57 supervisory employes in Northwest Airlines' mechanical department were entitled to form a bargaining unit.

NMB denied Northwest's contention that the Board lacked jurisdiction. NWA argued that persons affected were officials and didn't come under the Railway Labor Act.

In disagreeing, the Board based its ruling on two main points: Workers involved ranked sixth in the management hierarchy; and they lacked the authority to initiate or change company policy. "Their job is to carry out policies laid down by management," the Board said.

Nonsked Suit Grows

Two nonscheduled carriers, Air Transport Associates, Inc., Seattle, and Golden North Airways, Fairbanks, Alaska, have asked to intervene in the suit filed last April by S.S.W., Inc., Concord, Calif., another irregular operator, against 12 certificated airlines, the Air Transport Assn. and the Air Traffic Conference of America. The suit (AVIATION WEEK, Apr. 11) asked for $1.5 million damages and an injunction to prevent the defendants from engaging in a conspiracy to restrain interstate commerce violating anti-trust laws.

Star Route Bids

Detailed information on how to bid for contracts covering new air star mail routes authorized by recently-enacted legislation is now available from the office of Robert S. Burgess, deputy assistant postmaster general, Post Office Department, Washington 25, D. C. Air Star Route Law, H.R. 4498, Public Law No. 277, 81st Congress, was signed by the President late last month and provides that the postmaster general may award air star route contracts whenever he finds it in the public interest "because of the impracticability or inadequacy of surface transportation and where the cost is reasonably compatible with the service to be provided."

Central Ups Fleet

Central Airlines, Fort Worth, has ordered three more single-engine Beech Bonanzas for use on its feeder routes in Texas, Oklahoma, Arkansas and Kansas. The carrier, which began service last month, previously had bought eight Bonanzas (AVIATION WEEK, Aug. 22).

Boeings to Frankfurt

American Overseas Airlines plans to extend its New York-London Stratocruiser service to Frankfurt, Germany, Nov. 1. It will be the first time the double-deck Boeings are scheduled into continental Europe.

SHORTLINES

► **American**—U. S. Court of Appeals for District of Columbia has upheld award of $25,000 to a former Washington woman injured in an AA DC-3 crash near Rural Retreat, Va., February, 1945. Court said provisions of the Warsaw Convention limiting damage payment to $8291 is inoperable where "wilful misconduct" is shown to be the cause of the crash. It was claimed that the DC-3 was below its proper operating altitude when it hit a mountain.

► **British European Airways**—Passenger traffic hit all-time peak in August, and BEA showed an overall profit for the second straight month.

► **Canadian Pacific Air Lines**—Plans to add Chinese stewardesses on its weekly flights between Vancouver and the Orient.

► **Mid-Continent**—Reported $35,417 net profit in August, against $22,140 profit in the same month last year. Operating revenues were up 5 percent and expenses rose 2 percent over 1948.

► **Northwest**—Reports its transcontinental Stratocruiser flights had an average 75 percent load factor during initial weeks of the service. The company's coast-to-coast DC-4 coach run continued to operate at around 90 percent load factor last month.

► **Pacific Northern**—In the first eight months of 1949 increased its passenger traffic 9 percent, mail 45 percent and cargo 67 percent over same period last year.

► **Panagra**—States that the low-fare tourist-class service introduced in South America several months ago has been a success from every standpoint. Company recently completed reconditioning DC-4s used in the operation.

► **Pan American**—Starting Nov. 1 will offer winter excursion rates between the U. S. and Latin America at 25 percent discount from regular roundtrip fares. Tickets are good for 21 days. . . . PAA will start direct New York-Frankfurt, Germany, Stratocruiser service Nov. 5. . . . Company has received a CAB exemption to serve Nice, France, as a coterminal with Marseilles.

► **Scandinavian Airlines System**—Effective Oct. 26 will reduce the charge for sleeper berths on its U. S.-Europe DC-6 flights from $45 to $10.

► **Transocean**—Has asked CAB for an exemption to carry passengers and cargo on ten roundtrips between Guam and Tokyo. TAL said no direct commercial service between the two points is now available.

CAB SCHEDULE

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

Oct. 17—Hearing on service to Springfield, Mass., through Bradley Field. (Docket 3748 et al)

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

Oct. 18—Hearing on required communications equipment for aircraft on long over-water flights.

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

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

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

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

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

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

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

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

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

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

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"How Canadair Uses Liquid Envelope," a picture story of peelable protective plastic coatings utilized in the fabrication of aluminum and the protection of spare parts, available upon request to Better Finishes and Coatings, Inc., 268 Doremus Ave., Newark 5, N. J.

"Power Dome," a bulletin on nonrotating, double-acting air cylinders, available on request to W. C. Richards, Jr., The Bellows Co., 222 W. Market St., Akron, Ohio.

"Don't Fear Threading of Stainless," actual case studies giving speeds, tool angles, coolants and other pertinent data, available on request to The Cooper Alloy Foundry Co., Hillside 5, N. J.

New bulletins on light medium duty belt booster, Flex-Grid belt conveyor, portable cleated belt booster, Double-Flex chain and case conveyor are available on request to Island Equipment Corp., 2701 Bridge Plaza No., Long Island City 1, N. Y.

"Bulletin No. 1," on wire rope socket used in the utilization of wire rope is available on request to Wire Rope Institute, Shoreham Building, Washington 5, D. C.

Catalog covering a wide variety of primary and secondary flow instruments and control valves is available on request to Fischer and Porter Co., 50 County Line Road, Hatboro, Penn.

"The V.I. Story," a book by David O. Woodbury, covering the nature and purpose of varnished insulations, their origin and development, and their use in rotating apparatus, transformers, cables, power distribution systems, motor controllers, high-tension magnetos and electronic equipment. Available on request to National Electrical Manufacturers Assn., 155 East 44 St., New York 17, N. Y.

Booklet on heavy-duty autofeed presses, containing detailed information on special mechanical features, is available on request to Danly Machine Specialties, Inc., 2100 South 52 Ave., Cicero 50, Ill.

Booklet DB-19-025, describing standard and high-voltage selenium rectifiers for power supplies and electronic circuits, is available on request to Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Penn.

Circular 482, a bibliography of books and published reports on gas turbines, jet propulsion and rocket powerplants, by Ernes F. Fiock, is available at 20 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—OCTOBER 17, 1949

EDITORIAL

Mr. Dewey, Fearless Protector?

The New York state law enforcement machinery is relentlessly efficient in some places. State troopers bear down on motorists for a variety of prescribed reasons. But if you are a non-striker attempting to go to work at the struck Bell Aircraft Corp. plant outside the city limits of Buffalo we wouldn't give you a plugged nickel for your chances of protection.

You may not even be eligible for a union. Maybe you are a Bell executive or an engineer. If so, the chances are that you have already had several very fast runs at the company gates through a barrage of clubs and stones and fists. Maybe you were knocked out cold. This has happened to innocent passing motorists, whose cars have been overturned, to bus passengers—both workers and non-workers—and the drivers. Property damages to non-participants have amounted to thousands of dollars.

A sheriff and an inadequate band of deputies has been helpless to maintain order during any of several serious outbursts. President Lawrence Bell has wired New York's Governor Dewey repeatedly urging a sufficient force to maintain order. To this date the governor himself has yet even to acknowledge these appeals, let alone take any definite action or explain why he refuses. Acknowledgments have been dispatched, it is true, but by underlings, in the meaningless jargon of bureaucracy. Meanwhile, several indictments finally were obtained, but the next day the judge, a member of the state's Supreme Court, received telephoned threats at his home!

With this brief background, all of which—and much more—can be documented, it is encouraging to find one newspaper recognizing the public danger, and pointing out this strange inactivity of a governor who made his big bids for votes originally as a fearless protector of the citizenry. In a realistic editorial, quoted below, the New York Sun says:

DISPARITY AT PEEKSKILL AND BUFFALO

Something is decidedly wrong about these two pictures. The one shows 1000 deputy sheriffs and 200 state troopers preserving order at the Hollow Brook Country Club near Peekskill on September 4 when a militant and semi-military group of left-wingers went there to protect Paul Robeson, who was giving a concert, and his Communist cohorts.

The other shows a handful of deputy sheriffs assembled last week at the Bell aircraft plant in Buffalo to protect non-strikers from violence at the hands of strikers. At Peekskill a proper show of force did in fact maintain order until the concert was over. Afterwards groups of irate citizens threw stones at departing automobiles and a good many left-wingers got hurt.

At Buffalo the strikers pressed hard upon the ranks of deputies, hurling stones and sticks over their heads. By the time tear-gas bombs had dispersed the pickets no fewer than 25 deputies had been injured, to say nothing of a number of other private citizens whose only offense was that they were going where they lawfully had a right to go—to their jobs.

The affair at Peekskill had been advertised well in advance. The affair at Buffalo was but one in a series of riotous episodes of which all authorities from Governor Dewey on down had ample notice. This newspaper is utterly opposed to mob law. We believe in the duty of state, county and municipality to keep mobs from stoning Communists and to keep Communists from stoning citizens. We believe it wrong for pickets to stone non-strikers and for non-strikers to stone pickets. What we cannot understand is the disparity in measures taken to maintain order at Peekskill and at Buffalo. It is high time for somebody in authority to do a bit of explaining.

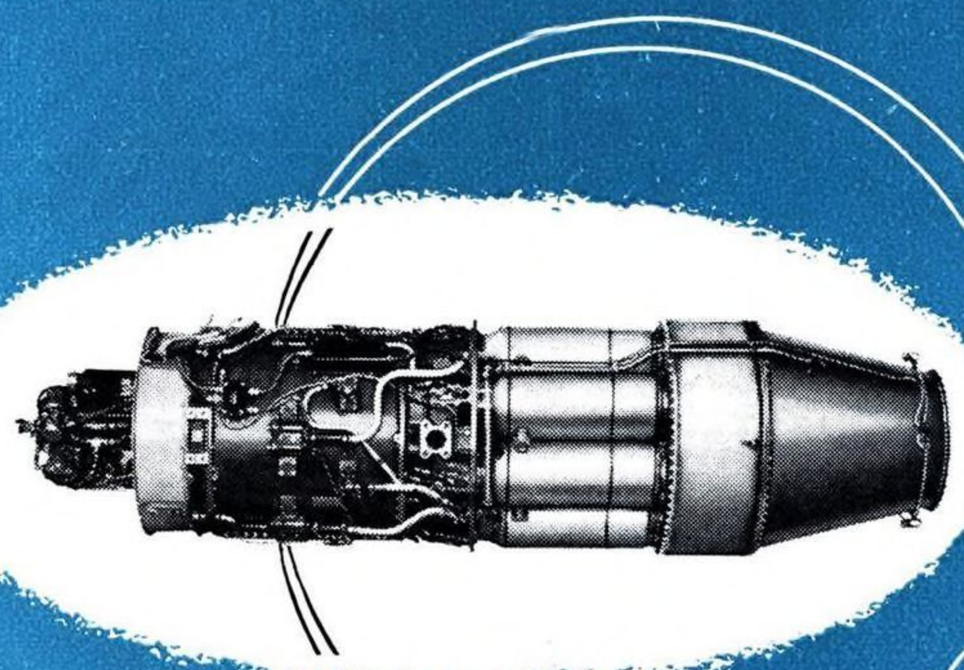
High time, indeed! Sometimes we feel that the American people cry out for at least a few public officials with guts. We think this is one of those times. Mr. Dewey may believe he is nurturing the pink and the labor votes. He should forget about the pinks in their present numerical strength. And he ought to know that the respectable elements of labor never countenance disorder and law-breaking. Certainly, a coldly practical politician should worry at least about the much more numerous votes of the law-abiding contingents of the public even if he is unconcerned about the voters themselves.

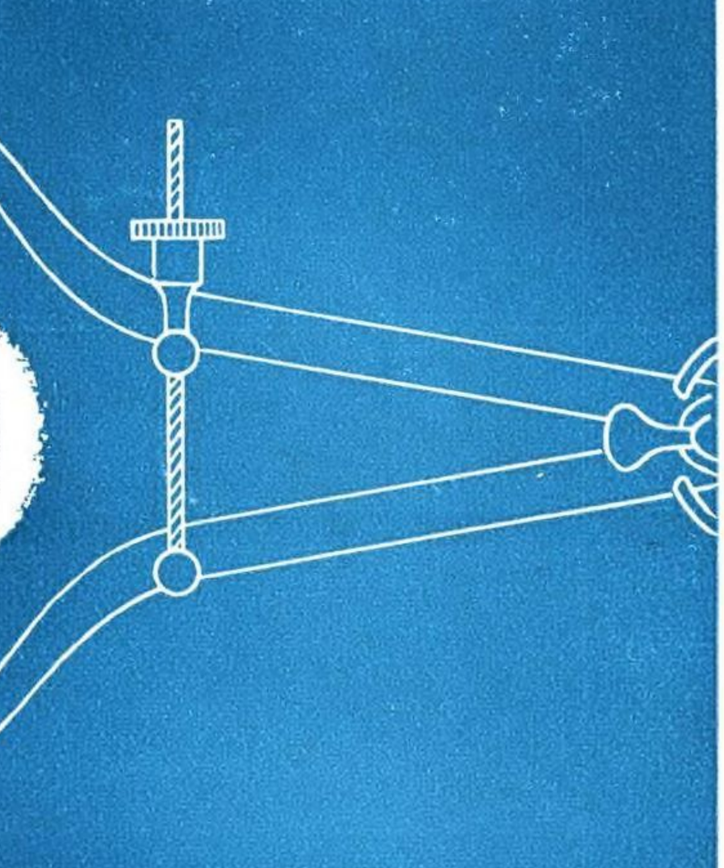
Maintain order Mr. Dewey.

More Contracts Released

An editorial on this page Oct. 3 announced that the Air Force had begun releasing to AVIATION WEEK lists of negotiated contracts of $100,000 or more. We also said that information concerning negotiated contracts under $100,000 had been promised, but had not been forthcoming. The Air Force since Oct. 3 has fulfilled its promise, and readers will find the latest list of negotiated contracts starting on page 41 of this issue. We thank the Air Force for its cooperation in making such vital information public to the taxpayers.

ROBERT H. WOOD





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Northrop RB-35B Flying Wing
Martin P4M-1 Mercator
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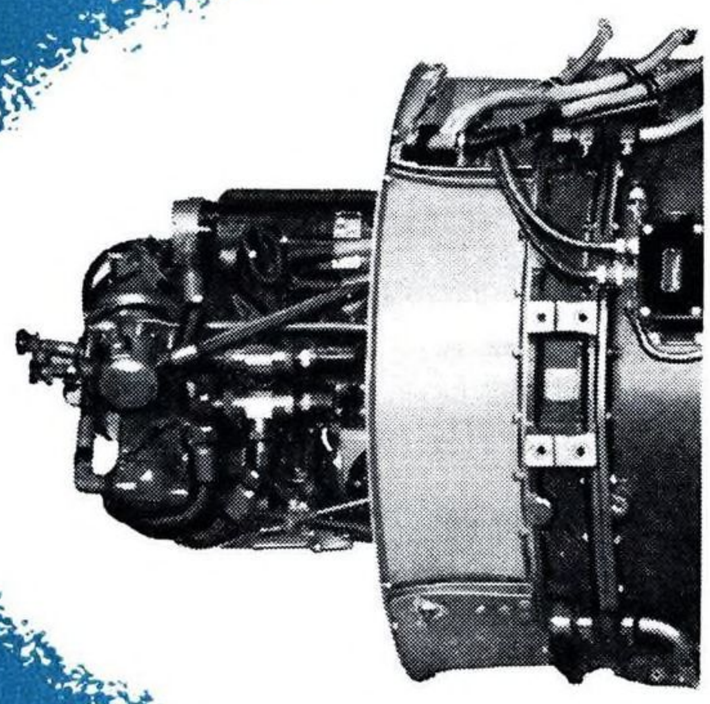

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