AVIATION WEEK

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JUNE 12, 1950

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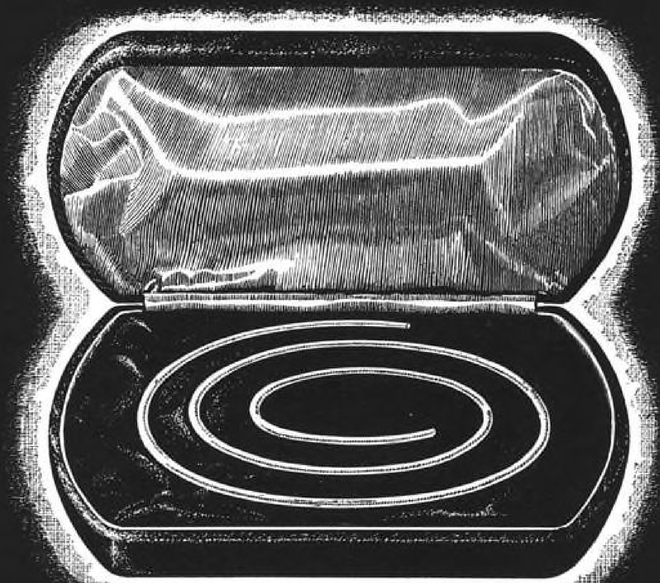

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WHO'S WHERE

In the Front Office

William J. Haley, coordinator of refining operations of Standard Oil Co. (N. J.) has been made president of Esso Export Corp., succeeding **Frank M. Balling,** who will remain as a director pending his retirement. **Harold W. Fisher** is named to fill Mr. Haley's previous position.

Tom Wolfe has been retained by Pacific Airmotive Corp. to assist in its domestic and international development activities, including a rapidly expanding jet engine program. Wolfe has been in aviation 27 years and has held down front office positions with Western Air Lines and Pan American World Airways. . . . **Walter J. Hyatt** has been appointed acting divisional manager for the company's Kansas City zone, replacing **W. E. Briece.**

Travel Log

Moustapha Riad Moursi Bey (right), director general of civil aviation for Egypt arrives in N. Y. to attend the ICAO conference in Montreal and inspect aviation facilities in the U.S. before returning home in about six weeks. He is accompanied by his wife **Allia Kenaouwi Mousri.** Other members of the Egyptian delegation are (left to right, second row): **Dr. Ahmad Fahmi Deheri,** royal counsel for the dept. of civil

aviation; **Osman Hamdi,** inspector general of the civil aviation dept.; (third row): **Mostafa Kamal Mortagi,** Egyptian AF squadron leader. **W. B. Swanson** (right rear), advisor for the international air traffic control standards for CAA also was aboard the flight.

Retirement

Capt. Willis H. Proctor, line pilot with American Airlines for 22 years, has retired at the age of 60. He made his final flight on May 31, climaxing a career involving 3,200,000 mi. over 42 states and 16 foreign countries, and covering 25 different types of commercial planes and 21 types of military craft. He made his first commercial flight for Colonial Airlines (predecessor company of AA) from Buffalo in December, 1927.

INDUSTRY OBSERVER

(*This week's column is compiled from observations of two* AVIATION WEEK *editors at Montreal last week.*)

►Canadair has offered to build 15 more North Star transports for Trans-Canada Air Lines, powered this time with Pratt & Whitney R-2800s. The plan would allow Trans-Canada to trade back 15 of its older North Star transports powered with Rolls-Royce Merlins. Reliable sources say Canadair could then resell the two-year-old planes to Brazil. This would allow Canadair to remain within its agreement with Douglas—to sell new planes only in the British Empire. But Trans-Canada is holding back. It foresees complications in maintenance and overhaul if it has some Rolls-Royce and some Pratt & Whitney powerplants.

►Avro Canada Ltd. will need extra fuselage tanks to fly the C-102 Jetliner across the Atlantic. Longest flight yet has been 880 mi. The Jetliner lost out by a few days to the de Havilland Comet, for the honor of being the world's first jet transport to fly. But now Avro is hoping to beat de Havilland to the first jet transport trans-Atlantic crossing. So Avro engineers are working at top speed to complete Certificate of Airworthiness procedures necessary before the flight. As soon as the C. of A. is complete, probably within a month, look for the Jetliner to takeoff for England.

►The forthcoming non-stop trans-Atlantic flight of the Avro CF-100 night fighter will give a significant demonstration of its range and undoubtedly will set a new speed record for the crossing. W. A. Waterton, British test pilot, who has done most of the plane's flights thus far, will be at the controls for the Atlantic hop.

►Canadair will call its new North Star transport to be powered with Pratt & Whitney R-2800s, the DC-5 or possibly the C-5. The designation presumably will lead to some confusion of the new plane with the prewar Douglas high-wing DC-5 transport.

►Canadian communications experts see a serious problem in the contemplated RTCA "ultimate" system for all-weather flying. They assume it will cost about $300 million for Canada. Yet it will still leave the country without air navigational facilities in the north. They are also disappointed in the shortcomings of the low-frequency Loran system, and believe that their present facilities would "break down" completely under a national emergency military and civil air traffic load.

►North American Aviation, Inc., is expected to handle the engineering involved in putting the Avro Orenda turbojet engine into the F-86 jet fighter, at Inglewood, Calif. Since the Orenda has not yet flown anywhere, the installation of the engine in the F-86 probably will not be made until some time this fall. Meanwhile two Orendas are ready to go for first flight within 30 days in the outboard nacelles of a Lancaster test-bed plane. Avro is also investigating afterburner possibilities for the Orenda.

►At least one Canadian Aircraft executive is unhappy about efforts in the International Civil Aviation Organization to standardize airworthiness requirements. His point is that any such standardization freezes designs and eliminates initiative. He says shipbuilders, for instance, have never had to meet such detailed requirements as to make it difficult to improve performance or produce a radically new ship. Significance of this view is that the executive represents de Havilland, which produces the jet-powered Comet transport, among other planes.

►Canadair Ltd., Montreal, at the present time is thinking more in terms of turboprop rather than turbojet for its future gas turbine transport. Canadair officials says its Canadair Four (DC-4M-4) is readily convertible to turboprops and that will be the next step.

►De Havilland Aircraft of Canada is demonstrating its Beaver bush freighter as a spray plane. Officials say the Beaver meets all requirements for an agricultural plane recently laid down by U. S. experts.

►Trans-Canada Air Lines is modifying the exhaust system on the Rolls-Royce Merlin engines of its Canadair DC-4Ms to reduce the noise level.

AVIATION CALENDAR

June 10-25—International aero exhibition, Centenary Palace, Brussels, Belgium.

June 12-14—Mid-year meeting of Aviation Distributors and Manufacturers Assn., La Salle Hotel, Chicago.

June 12-16—Conference on costs, budgeting and economics of industrial research, department of industrial research, Columbia University, New York.

June 12-16—AIEE summer and Pacific general meeting, Huntington Hotel, Pasadena, Calif.

June 19-23—American Society of Mechanical Engineers semi-annual meeting, with Institute of Aeronautical Sciences and American Helicopter Society joining ASME aviation division in two helicopter engineering sessions, St. Louis.

June 21-25—Ninety-Nines 1950 convention, Ft. Clark Guest Ranch, Brackettville, Tex.

June 26-30—53rd annual meeting, American Society for Testing Materials, ninth exhibit of testing apparatus and related equipment, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 29-July 1—1950 national meeting of Institute of Navigation, San Diego, Calif.

July 7-8—Royal Air Force 1950 display, Farnborough airfield, England.

July 10-28—Air Age Institute lecture series, Parks Air College, E. St. Louis, Ill.

July 12-14—Annual summer meeting of the Institute of Aeronautical Sciences, western headquarters building, Los Angeles.

July 16—Third efficiency race and air show, sponsored by Mansfield Aviation Club, Inc., Mansfield, O.

July 21-23—9th annual all-Ohio air tour, sponsored by Cleveland Junior Chamber of Commerce.

July 30-Aug 13—17th National Soaring Contest, Grand Prairie, Tex.

Aug. 2-13—17th National Soaring Contest, Grand Prairie, Texas.

Aug. 7—Lions Club Air Meet, Sky Harbour Airport, Goderich, Ontario, Canada.

Aug. 7-18—Special two-week program on high temperature ceramics, Massachusetts Institute of Technology, Cambridge, Mass.

Aug. 19-20—California Air Freight Clinic, sponsored by Calif. Aeronautics Commission and Oakland Chamber of Commerce Aviation Committee, Oakland.

Sept. 2-4—National Air Races, Cleveland.

Sept. 5-10—Eleventh flying display and exhibition, Society of British Aircraft Constructors, Farnborough airfield, England.

Sept. 7—Pratt & Whitney distributor operation and maintenance meeting, Pacific Airmotive Corp., Linden, N. J.

Sept. 18-22—Fifth national instrument conference and exhibit. Memorial Auditorium, Buffalo, N. Y.

Oct. 26-27—5th annual aviation conference, sponsored by aviation committee of Tucson Chamber of Commerce.

PICTURE CREDITS

7—TWA; 10—Wide World, B.I.P.P.A., Howard Levy, Off. Dept. of Defense; 12—Pratt & Whitney; 13—Douglas; 17—McGraw-Hill World News; 21, 22—Sperry Gyroscope Co.; 43—Boeing; 47—TWA; 56—Between Ourselves, TCA.

NEWS DIGEST

DOMESTIC

John A. McCone, was confirmed by the Senate last week as undersecretary of the Air Force following nomination of the Los Angeles Republican by President Truman. Other top Air Force shifts: Maj. Gen. William E. Kepner, from commandant, Air Proving Ground, Eglin AFB, Fla., to commander-in-chief, Alaskan Command; Lt. Gen. Lauris Norstad is expected to be named vice chief of staff, succeeding the late Gen. Muir S. Fairchild; Lt. Gen. Nathan F. Twining, commander-in-chief, Alaskan Command, is expected to be named deputy chief of staff for operations, succeeding Gen. Norstad.

PAA-AOA merger agreement has been extended until June 30. Previous deadline on the time within which government approval of the merger might be obtained was June 13.

Sales of aircraft, engines, propellers and parts for the first quarter of 1950 totaled $554 million, Bureau of the Census reports. Aircraft and parts sales amounted to $367 million, engines and parts, to $136 million. Total backlog at Mar. 31, 1950, was $2916 million, of which $1885 million was for aircraft and parts, and $761 million for engines and parts.

Personal aircraft shipments for April amounted to 323 planes valued at $1,503,000, eleven companies reported to the Aircraft Industries Assn. March shipments were 324 planes valued at $1,528,000.

CAB is discriminating against them, says Eastern Air Lines and Braniff Airways. The Board suspended tariffs filed by EAL, Braniff and Delta Air Lines, proposing elimination of the last surcharges still in effect domestically on DC-6 and Constellations. EAL and Braniff say CAB in the past has approved elimination of the surcharge in other parts of the country, and they ask reconsideration.

Crash in Atlantic Ocean of C-46 bound from Puerto Rico to Wilmington, N. C., resulted in six deaths, with 22 missing, of the estimated 65 persons aboard. Plane was chartered from West Air Co., Yakima, Wash.

More air coach service is planned. Chicago & Southern Air Lines is the latest to ask CAB for permission to run low-fare flights. C&S wants to start 55-passenger DC-4 flights July 2 between Chicago and New Orleans with stops at St. Louis, Memphis and Jackson.

Two airlines are going on the congressional carpet: Pan American, before Rep. Emmanuel Celler's anti-monopoly subcommittee of the House Judiciary Committee; Northwest, before Sen. William Fulbright's Senate Banking and Currency subcommittee. Celler wants to find out if PanAm is a monopoly in violation of the anti-trust act; Fulbright, checking up on the RFC, wants to know NWA's progress since it got RFC guarantee on a $12-million loan a year ago.

Aviation Writers Assn., in annual convention in Montreal, elected: Ansel E. Talbert, New York Herald Tribune, president; Ralph G. Platt, Cleveland News, first vice-president; Virginia Reiney, Beaumont Journal, second vice-president; William E. Corfield, London (Ontario) Free Press, third vice-president; Gerald B. Dobben, American Aviation, secretary; and Leslie V. Spencer of Bermingham, Castleman & Pierce, treasurer.

High speed wind tunnel will be constructed at Langley Laboratory by Eichleay Corp., Pittsburgh, under $2,540,000 contract from NACA.

FINANCIAL

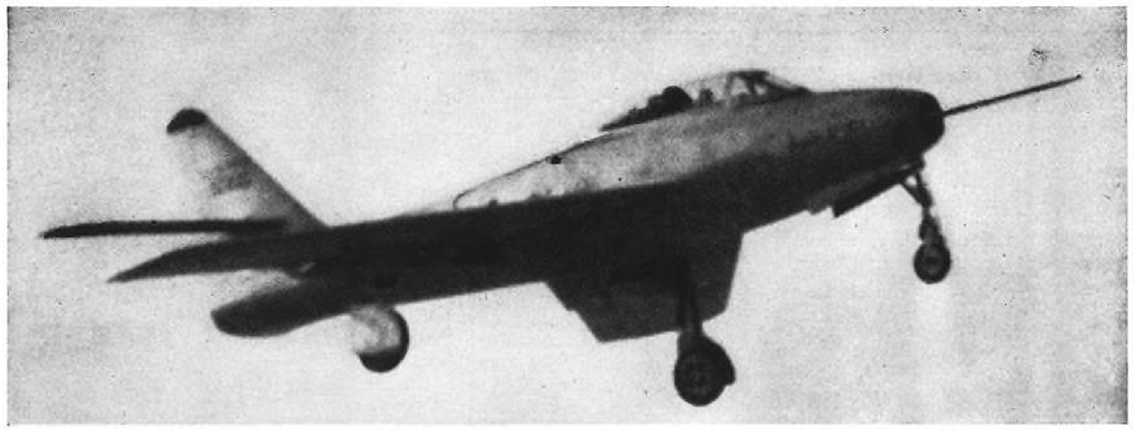
Braniff Airways reports system-wide net loss of $180,000 on $4,433,355 gross revenues in first-quarter 1950 against $370,000 loss on about $3,810,000 gross revenues in same period last year. But T. E. Braniff, president, expects first half-year to be profitable, and for the year to have "very satisfactory operating results."

INTERNATIONAL

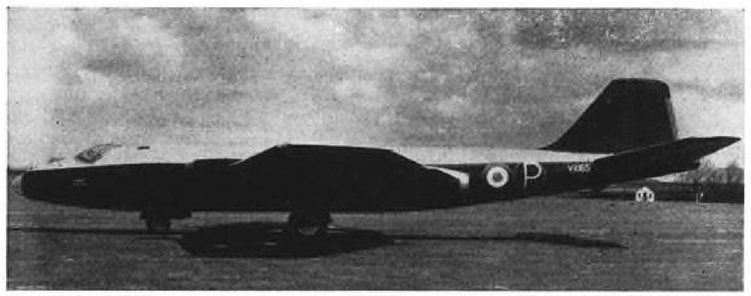
International Aviation Building in Montreal was dedicated in ceremonies participated in by Canadian, airline, IATA and ICAO officials. Building adjoins Montreal's Central Station, houses ICAO, IATA, international airlines serving Montreal, and has a concourse 80 by 200 ft. Cost: $4 million.

Federation Internationale Aeronautique meeting in Stockholm, admitted Yugoslavia to membership. Turned down: Bulgaria, Rumania, Korea for not meeting requirements. Permitted to send observers to technical meeting: Western Germany, which is forbidden any aviation activities at all.

News Picture Highlights . . .



YF-96A Takes off from Muroc on first flight piloted by Republic's O. P. Hass. Flight lasted an hour. Craft uses 60 percent of F-84 tooling, has a 5200-lb. thrust Allison J-35-A-25.



CANBERRA B.2 Twin-jet being produced for the RAF by English Electric shows up in night bomber warpaint and displays modified nose with new bombardier's sighting panel, also shorter dorsal fin. Two Rolls-Royce Avon axial-flow turbojets provide over 6500-lb. thrust each. Cabin is pressurized. One of the noteworthy design features is the very wide chord (19 ft.). The Canberra will also go into production in Australia.

HO3S-1G Sikorsky S-51 helicopter used by the Coast Guard sports a 57-gal. auxiliary fuel tank attached externally to the starboard side of the fuselage. This increased fuel capacity is reported to increase the craft's flight endurance 2 hr., giving a total of 5.5 hr. flight time. The copter has a rescue winch fitted on the port side. Powered by a 450-hp. P&W Wasp, top speed is approximately 105 mph. and normal range is 255 mi. Climb at sea level at 5500-lb. Gross weight is 1000 fpm. Litters may be attached externally on either side.

SB-29 Boeing Superfortress gets an Edo A-3 droppable lifeboat with a 100-ft. diameter chute. Planes thus fitted are being used by MATS for air rescue service. Sixteen B-29s are being modified for this work. Lower forward gun turret is removed to allow installation of the 30-ft. all-metal boat, which is powered by a four-cylinder water-cooled engine. The SB-29s are scheduled to replace SB-17s now being used, with final deliveries scheduled for October 10. Four each will be based in Alabama, Guam, Germany, and Japan.

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More USAF Business to Go to Canada?

New meaning put on "Buy America Act" may send about $25 million across border.

By William Kroger

Montreal—The Canadian aircraft industry is about to become a more important partner in North American air defense—but some U. S. manufacturers may not like it.

A new interpretation of the "Buy America Act" of 1933 will permit the U. S. government to buy as much aviation equipment in Canada as the Dominion buys in the U. S. Value of the equipment to be bought in Canada is still a bit fuzzy, but the figure usually mentioned here is $20-$25 million a year.

In the past, the U. S. government has been forbidden under the act to purchase outside the country—except under emergency conditions—items that are manufactured in the U. S. Canadian government and aircraft officials here last week said flatly that about two weeks ago Defense Secretary Johnson had issued a directive modifying the regulations interpreting the Buy America Act. In Washington, Defense Department spokesmen said they were unaware of such a directive. Canadians, positive that if the regulations haven't yet been altered they shortly will be, are making plans to capitalize on the change.

Informed Canadians here expect two big orders eventually to stem from the new policy:

- **De Havilland Beavers** bought by the U. S. Air Force for Arctic rescue work.
- **Avro CF-100** long-range two-seat jet fighters bought by USAF for night and penetration use.

▶ **Prospects**—Of the two, the Beaver order is nearly certain. Months ago, Col. Bernt Balchen, USAF's expert on Arctic flying, put in a strong recommendation for de Havilland's sturdy bush freighter. An initial order for 24 actually was prepared and was going through channels when the Air Force remembered the Buy America Act. USAF bought Cessna 190s instead. The civilian-type Beaver sells for $25,300, so at a minimum the expected USAF contract would total nearly three-quarters of a million dollars.

No price has been disclosed on the CF-100. This plane would run into far stiffer competition from U. S. manufacturers than would the Beaver, but Canadians feel the CF-100's long range (it will try the Atlantic crossing nonstop) and its power (two Rolls-Royce Avons of more than 6500-lb. thrust) give it better performance than planes of Lockheed, McDonnell, North American, Northrop and Republic designed for the same purpose.

▶ **Depression Baby**—Loosening of the Buy America Act as it applies to Canada comes after a hard-fought campaign by the Dominion government. The act, to begin with, was a depression baby, passed in 1933. The U. S. government was spending millions of dollars a year to "make work." It seemed a good idea at the time to prohibit the government from buying anything outside the country that would make the employment situation worse.

Times have changed, Canadian officials repeatedly have said. There is no depression now, and Canada is expected to be a partner with the U. S. in defensive measures. Canadians say here's why the Buy America Act doesn't make sense:

- **To be a full partner** in air defense of North America, Canada must strengthen its air force; to do this, she must buy certain equipment from the U. S.—for dollars.
- **To get dollars** Canada must sell to the U. S. at least as much as she buys; preferably a little more in view of the unfavorable exchange rate.
- **Canada has equipment** the U. S. needs and can't get elsewhere.

Because of these reasons, the lid on buying from Canada has been leaky around the edges for some time. The most notable instance has been the purchase from Canada of C-47 spare parts owned or produced by Canadair Ltd., Montreal.

▶ **Spares Wrangle**—A purely Canadair explanation of the spare parts sales is this: After the war, Douglas Aircraft Co. decided the C-47 (DC-3) type was obsolete and was little interested in its future. Canadair stepped in and bought a huge quantity of surplus C-47 spares. Later (in 1946), Canadair obtained a license from Douglas to make and sell C-47 spares.

Douglas now is suing Canadair, claiming a violation of that agreement and an earlier licensing arrangement with the Canadian government (subsequently turned over to Canadair) for manufacturing of DC-4-type aircraft and spares. Douglas says Canadair has sold spares to the U. S. government.

Canadair says the spares have been sold to the Canadian Commercial Corp., the Dominion's procurement agency, which sells to the U. S. So it's a deal between governments. In fact, Canadair does deal with the Air Force. It keeps the Air Force advised of what C-47 parts it has and is manufacturing (most of the original surplus spares have been sold), and under an informal working arrangement USAF buys about 60 percent of its spare C-47 parts from Douglas and the balance from Canadair—through the CCC. Canadair has sold about $7-million worth of C-47 spares to USAF in the past few years.

▶ **Loophole**—All this ties in with the Buy America Act in two ways: USAF couldn't get certain spares any place except from Canadair; and with each order to the CCC goes a letter from the assistant secretary of Air Force saying that the material being purchased is necessary to the defense of the U. S. and is unavailable in the U. S. Only through such an "exception" has it been possible to infringe the Buy America Act.

Tempering the Buy America Act as it applies to Canada will work toward increasing Canada's value in the common defense of North America by strengthening the Dominion's aircraft industry. It will give Canadian manufacturers a larger market. By feeding Canada's dollar supply it will enable Canada to buy the U. S. defense items not possible before.

U. S. manufacturers could be pardoned for not being eager to participate in strengthening Canada's aircraft industry. A Canadian worker's productivity, it is said here, is about equal to that of the U. S. worker. But the Canadian works for about 40 percent less pay. Canadian production facilities and tooling compare favorably with those in the U. S.

The Beaver and the CF-100 are the two biggest immediate competitive threats for U. S. aircraft manufacturers. But Canada's potential competition can be gleaned by fingering the Dominion's aircraft manufacturing fabric:

- **Canadair, Ltd.** is the largest aircraft manufacturing firm, with total floor space of 1,693,000 sq. ft. in two plants and employment expected to exceed 5000 late this year. Since the end of

the war it has turned out 71 four-engine transports, in addition to carrying on a large modification program.

It is now tooling-up for manufacture under license of the North American F-86 for the Royal Canadian Air Force. First plane is due in the fall. Production has been delayed because of change-over to the latest model, the F-86E. First planes of the initial order of 100 will be powered by GE J-47 engines, with later versions using the Avro Orenda (see Industry Observer).

Under the Canadair-North American license agreement, Canadair could not sell planes or spares to USAF even through the CCC. But in case of a production squeeze at North American, some way out of the agreement might be negotiated.

• **A. V. Roe Canada, Ltd.**, Toronto, now is employing about 4000 engaged in prototype production of the Jetliner, the CF-100 and the Orenda axial-flow jet engine. U. S. certification of the Jetliner is being pushed and Avro feels chances for sales to U. S. airlines are fair. That prospect isn't affected by the Buy America Act. But a sale to USAF for testing or experimental purposes would be possible by the new interpretation of the act, or through the exception clause. Same is true of the Orenda engine.

• **De Havilland Aircraft** of Canada Ltd., Toronto has a small hard core of workers, now numbering about 800, around which rapid expansion could take place. In addition to the Beaver, de Havilland has the Chipmunk two-place military primary trainer, now being produced at a rate of ten a month.

The Chipmunk has been made the standard British Royal Air Force trainer and is being produced by the parent factory in England. This plane might possibly be a competitor for USAF or Navy business, though this is unlikely in view of the U. S. trend toward heavier and faster trainers.

• **Increasing suppliers** who could offer keen competition to U. S. suppliers. Significantly, Avro's Jetliner contains 80 percent Canadian-produced equipment and materials; and its CF-100 about 90 percent. Many of the Canadian supply firms represent or were established by British aviation companies.

While there might be strong reaction in Congress to aviation-procurement money going to British firms, there is a good chance that the same objection wouldn't be heard against purchases from Canadian companies of equipment manufactured under license from a British firm.

► **Low Prices**—In speeches and informal talks here, Canadian officials carry the melody in the U. S.-Canada unity chorus. Undoubtedly they will keep working to eliminate any restrictions in the Buy America Act against Canadian purchases. They realize the importance of closer cooperation in purchasing between the RCAF and the USAF. But they realize also that, permitted to bid on even terms, Canadians' prices probably would be lower.

U. S. manufacturers uneasily realize the same thing.

P&W'S TURBINE RESEARCH LAB

This bird's-eye view of Pratt & Whitney's new $12 million Andrew Wilgoos Turbine Laboratory in E. Hartford shows layout of what is believed to be the largest privately owned jet research facility in the world. It is expected to be in full operation this summer. At lower left is pump house for sending 120,000 gpm. of water through the lab; near lower center is sluiceway for returning water to Connecticut River; light building in foreground contains two test cells for burner components or entire jet engines; dark buildings comprise central service equipment section for producing power necessary for testing. Behind this are two adjacent 135-ft.-long test cells—one for compressors, the other for turboprop engines or their turbines. "Pill-box" shaped structures just above the sluiceway, on the right of the lab and behind the end test cells are final expansion chambers of the lab's underground silencing equipment. At extreme right is a portion of the tank farm having a capacity of 93,270 barrels of oil and aviation fuel. Situated to the extreme left, just above pump house, are necessary silencers for the compressor laboratory which is already in operation.

Three Big Nonskeds Slapped by CAB

Civil Aeronautics Board last week continued its enforcement drive against large irregular air carriers (see story on page 48) by cracking down on three of the nation's most important uncertificated operators.

• **Viking Air Lines,** Burbank, Calif., which has flown the transcontinental route extensively, had its letter of registration revoked for "knowing and willful violations of the Civil Aeronautics Act."

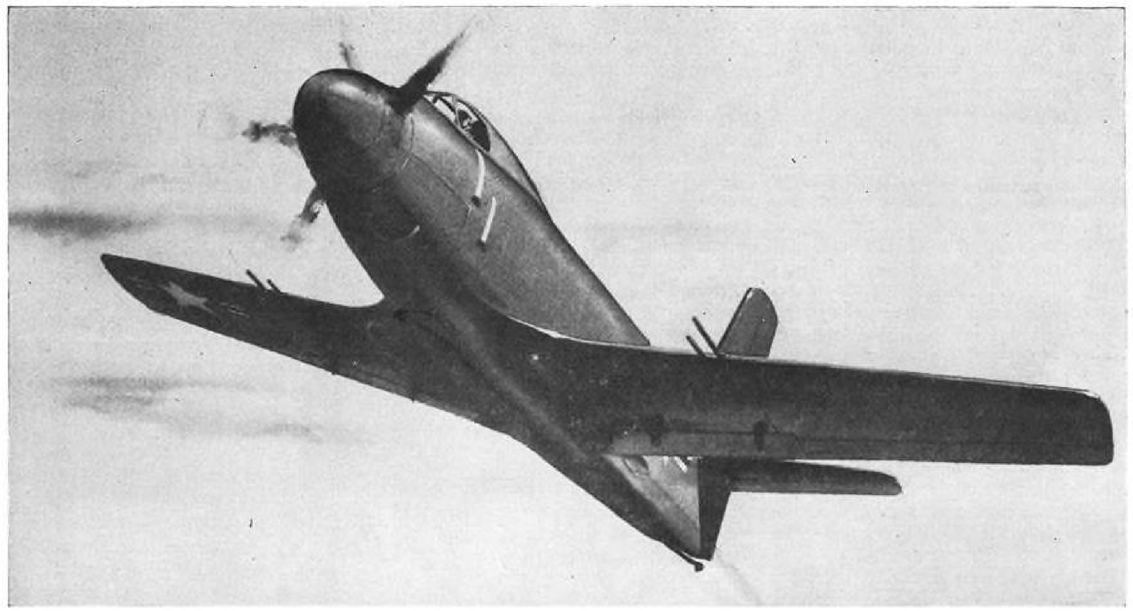
• **Transocean Air Lines,** Oakland, Calif., largest U. S. contract carrier, and Seaboard & Western Airlines, New York, trans-Atlantic cargo operator, were ordered to cease and desist from "certain knowing and willful violations" of economic regulations.

CAB ordered Viking's letter of registration revoked effective July 5. On that date the nonscheduled operator must stop engaging directly or indirectly in air transportation. The company was also ordered to cease and desist from further violations of the Civil Aeronautics Act between now and July 5.

► **Too Many Flights**—According to CAB, Viking had operated more flights than permitted under its authorization as an irregular carrier; had failed to report all flights to the Board; charged fares other than those filed with the Board; and failed to file required data.

Transocean was found to have violated the Civil Aeronautics Act by carrying passengers in foreign air transportation without proper authority from CAB. The Board said Seaboard violated the law by operating a regular cargo service; by carrying persons in foreign air transportation; committing irregularities in reporting to CAB; providing unauthorized free-passenger transportation between the U. S. and Europe; and failing to observe tariff rules.

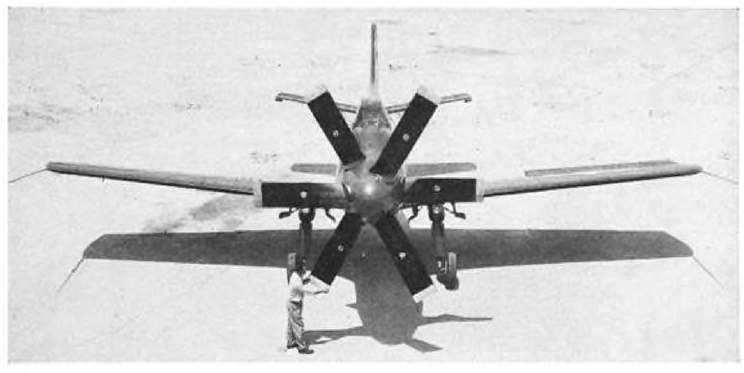
In putting Viking out of business, CAB said the carrier had evidenced such a persistent disregard for regulations that complete revocation of operating authority was necessary. But the Board decided that Transocean and Seaboard had made efforts to comply with the law, hence the milder action.

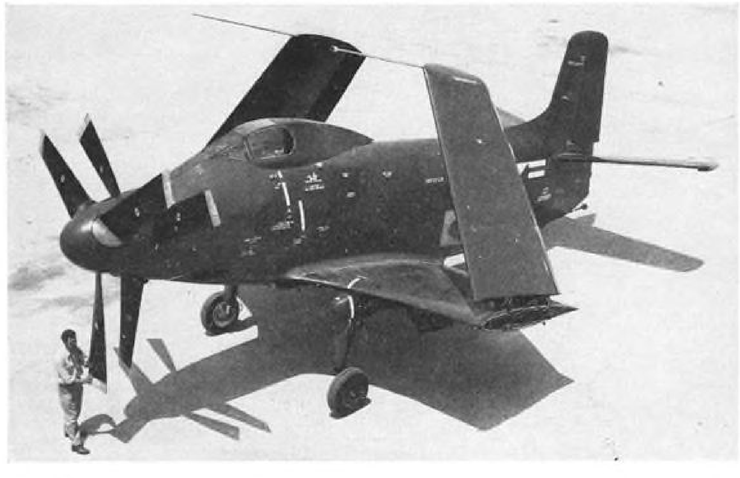


NAVY A2D, shown as a Douglas artist envisions it in flight, is the first carrier-based turboprop attack bomber.

Douglas Skyshark Makes First Flight

By Thomas M. Self





Flight tests of Douglas Aircraft's new Navy attack bomber, the turboprop-driven XA2D Skyshark have been highly successful, with hardly any "bugs" showing up in the first week's tests, the company announced.

Douglas has an order for three prototype models of the ship. And West Coast aviation observers expect the Navy will rush through an order for another ten.

The Skyshark's debut, following by two months the Convair P5Y flying boat, gave the Navy its second flying turboprop aircraft. With the pair, Navy will completely explore the capabilities of the turbine-propeller combination, a project it kept alive on this side of the ocean, though concentrating its main efforts on turbojets.

For Douglas, the A2D is a transition power development between maturing reciprocating engines and further jet types.

► **Skyraider Successor**—Douglas designed the Skyshark as a faster, more powerful successor to the AD Skyraider. But the company is also booming the A2D as an ideal plane for close support of all ground troops. Douglas people point out that a ground support plane should be able to hover over the fighting area, swooping down on call; and they say the A2D can do that very handily by cutting out one of its T-40 Allison twin turbines. Takeoff characteristics adapt

the Skyshark to jeep carriers or extremely short fields in forward combat areas.

Navy announcement said the Skyshark combines the speed of modern jet propulsion with the payload and economy of conventionally powered aircraft. Navy expects the A2D will come close to jet fighter performance except for high speed. It can climb to altitudes of most jets, can carry a heavier load, and has greater range. In addition it carries a load of bombs, rockets, or torpedoes.

Payload will be greater than any known jet bomber or fighter for the same expenditure of fuel. Additionally, the Navy announcement said, the Skyshark's weight is only a fraction of any other tactical support aircraft with its payload capacity.

In a first interview with E. H. Heinemann, chief engineer of the Douglas El Segundo plant, and designer of the Skyshark, AVIATION WEEK learned these details of the ship's expected performance.

► **Performance Data**—Present speed is about 550 mph. with latest Aeroproducts counter-rotating propellers. With improved propellers, Douglas expects speed can be boosted to 600-700 mph. (In a recent speech before the IAS in New York, Rear Adm. C. M. Bolster, Asst. Chief BuAer for Research, said that even at Mach number of .85 to 1.00 at 4000 ft. the turboprop could compete with the turbojet if the propulsive efficiency of the propeller is equal to or greater than about 70 percent.)

Compared with the reciprocating-engine AD Skyraider, the Skyshark has double the rate of climb, twice the ceiling, and 100 mi./hr. greater speed. And it carries a greater load, and is a heavier plane, grossing 17,000 lb.

With wingtip tanks range will be about 800 mi.

The T-40 turboprops give the A2D overall single-engine performance together with the dependability of twin engines.

When Douglas began its turboprop development, engineers decided to follow the design of the AD as closely as possible. But the inevitable changes in stress, speed, etc. dictated many changes. Yet, generally, you can see the traditional AD lines in the planform.

The Skyshark has the same wing span and wing area, but wing and tail surfaces are thinner. Landing gear strut is longer.

Cockpit is located farther forward, giving the Skyshark a downward vision angle somewhat better than the AD's remarkable 15 degrees. Cockpit has been designed to protect pilot in crash and for efficiency and convenience of control operations.

Single curvature laminated glass is used instead of plastic to give best performance on hot days. Double curvature was not available at time plane was started. A jettisonable seat is used because the laundry chute developed for the F3D Skynight is not practicable with turboprop engines.

► **Stores External**—Like the AD, the Skyshark carries its stores externally instead of in a bomb bay. External bomb racks permit carrying of bombs, torpedoes, 11-in. rockets, or droppable fuel tanks in nearly any combination. In addition to the three main bomb racks, rocket launchers are provided on the outer wings for 5-in. rockets.

Plane bomb load per mi. per hr. has been increased 50 percent. But gallons of fuel per ton of bombs per mi. is same as AD. That gives the Skyshark increased efficiency without an accompanying decrease in economy.

An AiResearch-combination gas turbine and turbine starter enables the A2D to operate without outside assistance.

While the A2D will probably make a good antisubmarine warfare plane, it is expected the Navy will continue to use the AD for that purpose; it's considered perfect for endurance and covering large areas of ocean.

In developing the successor to the AD Skyraider, Douglas engineers eyed turbojets at first. But studies showed they didn't have the landing speed, load or endurance characteristics needed.

Navy's interest in turboprops was summed up in a Bureau of Aeronautics comment in 1945: "Propeller-type gas turbine promises to be probably a more useful all-around power plant than the simple turbojet, at least for the majority of Navy aircraft applications."

However, because even the simplest propeller-driven gas turbines are considerably more complicated and difficult to develop, the Navy concentrated its immediate developments on the turbojet. It now hopes that most of the lessons learned in turbojet development can be applied to the propeller gas turbine.

First flight at Edwards AFB was made by George Jansen, decorated World War II veteran who has been a Douglas test pilot for five years.

PHOTO TORNADO GETS SLEEK SNOOT

Latest version of North American's four-jet bomber is this RB-45C photo-reconnaissance version sporting a new, highly streamlined nose. The RB-45C is fitted with five camera stations. Missions will include day and night reconnaissance at high and low altitudes, charting, mapping and photography. Maximum takeoff weight is 110,000 lb., service ceiling is over 40,000 ft., and normal tactical radius is over 1200 mi. when wingtip tanks are fitted. Range can be extended by using bomb-bay tanks. The four General Electric J-47 jet engines have a normal static thrust of 5200 lb. each. RB-45Cs are in production at Long Beach.

CAB Chief Helped By Reorganization

Major revamping of top-level functions of government civil aviation bodies is expected to result from the recently approved governmental reorganization plans. Changes in working-level operations will be minor.

Immediate effect of the reorganization was felt principally by the Civil Aeronautics Board.

► **Broader Authority**—Board Chairman Joseph O'Connell, Jr., had his authority increased with delegation of many duties and responsibilties previously carried on by the Board as a whole. Under the reorganization approved by Congress, he has control over all Board personnel, the distribution of work among Board units, and the use of funds. However his appointment of unit heads, and allocation of funds is subject to Board approval. The reorganization should expedite Board action by vesting control in a single administrative head.

Effect of the creation of a new Commerce undersecretary for transportation upon the Civil Aeronautics Administration was delayed until drafting of detailed plans were completed.

► **Rentzel Fits In**—First impressions at the Commerce Dept. were that CAA Administrator Delos Rentzel, who generally speaking has been handling CAA to the satisfaction of Commerce Secretary Charles Sawyer, would continue with little change in the operating procedures.

It is expected that Maj. Gen. Philip Fleming who has been nominated for the undersecretary post, will take over aviation matters directly concerned with CAA, heretofore handled by Tom Davis, assistant secretary of commerce for Air. Davis is expected to devote his attention to other matters. Heretofore Administrator Rentzel has been reporting directly to Sawyer on some matters, and working with Davis on others.

Any real shift in the top level operations however is expected to await confirmation of General Fleming by the Senate, and his return from a projected European trip.

The new commerce reorganization plan makes Secretary Sawyer directly responsible for maritime subsidy policy, and how much of this will be delegated to the undersecretary is not yet clear. Eventually a closer coordination of the various transportation functions of government including public roads, waterways, maritime, and aviation under the undersecretary is a logical prospect.

Overall, Secretary Sawyer becomes a much more powerful figure in government, with his tight control of CAA and other operating agencies of the Commerce Department which heretofore have enjoyed some independence.

Yet another reorganization proposal now pending in Congress would still further increase Sawyer's power. This would transfer activities of the Reconstruction Finance Corp. to the Commerce Department also, thus giving him control over RFC loans to business, including aviation firm borrowers.

► **Pattern Seen**—There is a distinct possibility that the civil aviation agencies may eventually follow the pattern of the maritime reorganization plan. This makes the chairman of a new Maritime Board also the administrator of the Maritime Administration. Under this combined setup the board and administrator are "subject to general policy guidance by the Secretary of Commerce in the performance of subsidy functions."

The maritime reorganization plan was vigorously fought by Air Transport Assn. because it seems to foreshadow the establishment of a similar setup for aviation. A Senate attempt to veto it failed on a 14 to 59 vote.

► **Parallel Groups**—In place of the old independent five-member Maritime Commission, the new plan establishes in the Commerce Department a three-member Maritime Board for regulation and a Maritime Administration for operation and promotional functions. The new board will parallel the CAB; and the Maritime Administration, the CAA.

Stuart Tipton, general counsel of Air Transport Assn., lists principal airline objections to the Maritime plan:

• **Little independence.** "It is unrealistic to expect its chairman, an agent of the secretary—as Maritime Administrator—for half the day, to change colors for the other half and be independent."

• **Arbitrary subsidy ceiling.** Under "general policy guidance" the Secretary will impose an arbitrary ceiling on subsidies. Desirable routes might have to be eliminated to keep shipping subsidies within the ceiling limitation.

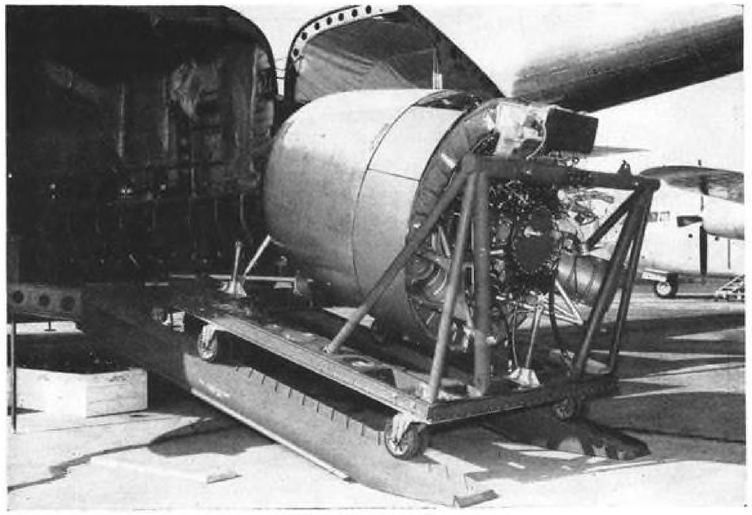
Transportation Association of America has called the plans "adroit steps to transfer complete control of transportation into the executive branch of the government. They would open the door for executive manipulation of functions which should be completely removed from the play of power politics. It is self-evident they are but a forerunner of other maneuvers toward the same end."

Copters Make Mark in Rescue Work

Increasing value of the helicopter for rescue work was highlighted last week when the New York City Police Dept. took delivery of three new Bell 47-D1s as replacements for an earlier Bell 47B credited by police officials with helping save 20 lives in its two years of service.

One Bell helicopter so completely proved its value, the N. Y. C. Police Dept. decided to expand their use.

The city plans to do this to the tune of $70,000, cost of the three new copters. They are using more powerful 200-hp. Franklin engines in place of the 178-hp. Franklins.



MAJOR GETS A DOLLY

An engine dolly for carrying the Pratt & Whitney Wasp Major power plant within the C-119 Packet has been developed by Fairchild engineers. Dolly structure measures 8¾ ft. by 7½ ft. With engine the entire assembly is said to weigh 4332 lb. The transportable unit is made of aluminum alloy and has castering wheels, which can be folded to permit fastening the carriage flush to the Packet's flooring with eight bolts. Three of the engines on their dollies can be carried at a time in the C-119.

Turboprop B-36 Flight Date Set

New model of big bomber due in 1952. Boeing B-52, to fly about same time, seen as B-36 replacement.

The first turboprop B-36 bomber with swept wings is scheduled to begin flight tests early in 1952, AVIATION WEEK has learned.

By June 1954, tentative Air Force schedules call for equipping at least two bomber groups with the 550-mph. very heavy bomber. The plane will probably carry a B-36-G designation.

Meanwhile the Boeing XB-52, eight-jet bomber groomed as the B-36 replacement, is also due to be ready for flight test early in 1952. It is expected to progress sufficiently in the following year, that tooling for production delivery can be started then if the plane is ordered into production. This would make it possible, Air Force sources say, to have the first production B-52s ready for operational replacements of the B-36 around 1954.

Current Air Force thinking is that 100 of the sweptwing turboprop B-36 bombers will be ordered out of fiscal 1952 funds. However, production of the B-52 (once planned, then delayed except for two prototype models) (AVIATION WEEK Feb. 27) may be resumed. According to present plans subsequent production of the B-52 will be geared to the international situation. If international conditions worsen, one-half of the 100-plane order may be switched to Boeing to get the B-52 into production.

► **Prime Factor**—Behind USAF decision to hold back B-52 production in favor of the sweptwing B-36 is economy. The B-36 now costs about $4.7 million each. Initial production cost of the Boeing B-52, is about $7.5 million each plus tooling for quantity production.

Development studies of the turboprop version of the B-36 (AVIATION WEEK Mar. 14, 1949) first considered use of Allison double turbine T-40 5500-hp. turboprop engines. Present planning indicates probable alternate use of 5000-hp. Pratt & Whitney PT-2 turboprop engines now under Navy development contract.

► **Performance**—Performance of the six-piston engined B-36 with full equipment and 10,000-lb. bomb load is reported officially at 372 mph. true air speed. Jet pods added to B-36D and E models have upped the speed to 436 mph. Sweep back of the outer wing panels plus tractor-type turboprop engine installations will increase performance of the bomber to an expected 500 mph. This changes the present Mach limitation from .69 to .75. Eventually USAF hopes to fly 550-mph. at 55,000 ft.

Meanwhile Consolidated-Vultee Aircraft Corp., delivered the first RB-36E reconnaissance bomber to USAF's Strategic Air Command. Plane is one of 21 B-36A bombers being converted to E series with addition of four jet engines slung in pods under the wingtips.

With the installation of high altitude camera equipment in the forward bomb bays all "A" series are being converted to RB-36E aircraft. The modified bomb bay contains 14 high altitude cameras including one with a 48-in. focal length lens. The airborne camera laboratory is said to be the largest ever designed into one plane.

Strategic Air Command currently has three reconnaissance bomb wings two of which are scheduled to receive RB-36D and E aircraft. The third will be equipped with Boeing RB-47s. Presently all three wings will be operational with B-29 Superfortresses (AVIATION WEEK June 5). By 1954 SAC will implement a third RB-36 wing.

USAF Orders—USAF has 217 B-36 bombers on order with approximately 120 already delivered to SAC. Of the total number of B-36s on order, 90 will be of the "RB" type and the remainder will be "B" types. This will give SAC an eventual strength of three 30-plane reconnaissance groups and four bomber groups of the B-36 type. The rest of the planes will be spares to both the RB and B groups.

RB-36As have been undergoing company-sponsored flight tests for the past five months. The first RB-36E, which carries the same standard defensive armament—16 20 mm cannon—as the B-36 bomber, was delivered to the 28th Reconnaissance Wing at Rapid City, S. D. Future deliveries of conversion and production RB-36s will be divided between the 28th and the 5th RB Wing at Fairfield-Siusun AFB, Calif.

Financial Aid Asked For Foreign Plants

The Administration is pressuring Congress for new authority to vitalize aircraft manufacturing and other war capacity in Western Europe, England, and Canada for increased output required under the North Atlantic mutual defense program.

An industry spokesman told AVIATION WEEK that the move, if successful, would not cutback existing business for U. S. plants but would deprive them of potential future business.

Program Outlined—The program outlined by defense ministers at The Hague to bolster Western defense would establish a single collective "force", instead of separate balanced forces. It would call for increased defense spending down-the-line by the 12 North Atlantic nations, with the U. S. assuming the lion's share of the burden. The program will not start before fiscal 1952.

A similar Truman-Johnson move last year to spur war production abroad was knocked down in Congress. In the $1.3-billion 1950 fiscal year Arms Aid Authorization Act, Congress prohibited the use of funds to stimulate foreign war plants. The act bans the use of defense aid "to construct or aid in the construction of any factory or other manufacturing establishment outside of the U. S. or to provide equipment or machinery . . . for any such factory . . . to defray the cost of maintaining any such factory . . . ; to make any payment in the form of a bonus, subsidy, indemnity, guaranty, or otherwise, to any owner or any such factory . . . as an inducement to . . . undertake or increase production of arms, ammunition, implements of war (etc.); or for the compensation of any person for . . . services rendered in or for any such factory . . . ."

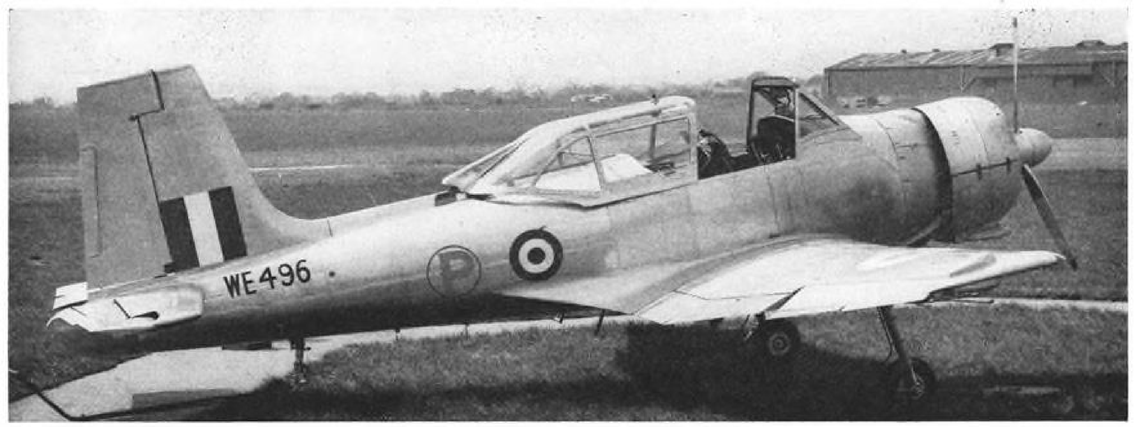
President Truman and Defense Secretary Johnson have urged that this provision be striken out of the $1.2-billion arms aid authorization for the coming year, now pending in Congress. Truman said that we should "help our partners to help themselves." Johnson argued that every dollar spent on plant capacity abroad would make possible "at least four dollars' worth of finished equipment."

► **Effect**—One effect would be stimulation of tactical aircraft production in Western Europe and England. Under the "single force" plan, these countries will assume major responsibility for ground forces and tactical aviation support, and the U. S. will concentrate on strategic air support.

Over the last five months of the 1950 fiscal year, Johnson reported, the U. S. will supply other North Atlantic Pact nations with the 195 military aircraft under the Arms Aid Program. Although the program was authorized last October, delaying preliminaries prevented the flow of supplies until January of this year. With the proposed 1951-fiscal year program at the same level, it is expected that the supply of military aircraft over the coming year will approximate this year's supply.

The President and Johnson also asked for a free-hand to sell war supplies to foreign countries. Under the 1950-fiscal year arms program, sales are limited to members of the North Atlantic Pact and the Hemisphere Defense Pact.

AVIATION WORLD NEWS



HANDLEY PAGE H.P.R. 2 side-by-side, all-metal construction trainer combines slow stalling speed and quick takeoff characteristics.

British Trainers Vie for RAF Bid

Percival P.56, Handley Page H.P.R. 2, both all-metal, use Armstrong Siddeley Cheetah 17 radial engine.

London—Percival Aircraft Ltd. and Handley Page (Reading) Ltd. are engaged in a two-sided competition for RAF business with new designs of a basic trainer. The two entries:

- **Percival P. 56.**
- **Handley Page H.P.R. 2.**

Both planes are built to the same Air Ministry specifications, issued last September, which means both design teams gave the project quick action.

The competition is for a two-seat primary trainer of improved performance over the Percival Prentice, the present RAF basic trainer. Both entries are low-wing monoplanes of rugged, all-metal construction. Both are powered by the Armstrong Siddeley Cheetah 17 engine, a radial air-cooled piston type of 420 hp. The Cheetah engine has been used for many years in twin-engined training planes, notably the Avro Anson and the Airspeed Oxford, but until now it has never been widely fitted in single-engined aircraft.

► **Percival's Project**—The Percival P. 56 is a clean-lined design (AVIATION WEEK June 2), marked by a prominent dorsal-fin forward extension and a tail-parachute enclosure. Flying and handling characteristics are said to be very satisfactory. A short takeoff run and a high rate of climb are reported.

In its construction special care has been taken to keep the P. 56 simple and capable of being maintained by semi-skilled personnel without aid of special tools and with the minimum of ground equipment. Normal maintenance on both engine and airframe, it is claimed, can be performed from the ground, from outside the fuselage and cockpit. Two-stage amber cockpit-canopy screens for night-flying training are fitted.

► **Handley Page's Hope**—The H.P.R. 2 is the first design to come from the Reading subsidiary of Handley Page since the remnants of the former Miles Aircraft Company were rescued from bankruptcy by the well-established bomber-builder of Cricklewood. It is marked by a squarecut fin-and-rudder assembly, and a dorsal-fin fairing extending all the way forward to the back of the cockpit enclosure.

First flown late in April, the H.P.R. 2 is said to have very low stalling speed and quick takeoff characteristics.

A sliding canopy encloses the crew and gives excellent all-round vision. Adequate protection, in the event of a crash, comes from a strong arch above the seats.

The H.P.R. 2 is designed for fast production by the use of split construction methods and allows maximum manpower to be concentrated simultaneously on many assembly jigs.

Maintenance is aided by the aircraft being split into numerous components easily replaced if damaged during instructional service. The entire cockpit can be inspected and maintained from the ground, through floor panels.

Both trainer projects will be given extensive testing by the RAF before the final decision is made and a quantity order is placed.

► **Side-By-Side**—The design called for a side-by-side seating arrangement, which the RAF likes. This had also been embodied in the design requirements of an advanced trainer, the basis for an earlier competition between the Avro Athena and the Boulton-Paul Balliol projects. These two types, initially laid down and flown with turbo prop engines, were later tried out with piston-engine installations. After extensive testing, Boulton-Paul's Balliol Mk.2, with the Rolls-Royce Merlin 35 piston-engine, got the production contract.

'Cupola' Will Test Europe's Air Defense

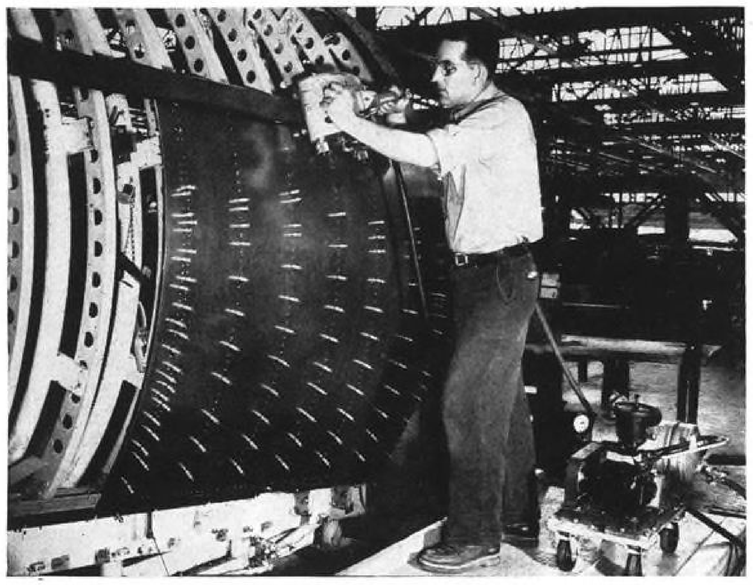
London—American B-29 bombers will join the combined air forces of the Western Union nations — Britain, France, Holland and Belgium—in Exercise "Cupola," a two-day test of Western Europe's air defenses in August.

RAF and United States bombers will play the role of the "enemy," with RAF Meteor and Vampire jets and similarly equipped fighters from the other countries cooperating with the anti-aircraft batteries in defense.

The exercise will be under the general direction of Air Chief Marshal Sir James Robb, Commander-in-Chief, Air Forces, Western Union, who will coordinate attacking and defending forces. The direction of the defending forces will be exercised through the national air defense commanders, and the detailed planning and coordination will be carried out by a small staff of officers from the headquarters of Air Forces, Western Europe, at Fontainebleu, France.

This will be the first combined air exercise to be held on the Continent.

PRODUCTION



SKIN TRIMMING SAW being guided along flexible track fitted to B-47 fuselage jig.

New Saw Speeds B-47 Skin Fitting

Boeing-developed time-and-labor saving device permits on-the-jig cutting to very fine tolerances.

A new power trimming saw developed by Boeing Airplane Co. has speeded up production of the swept wing B-47 Stratojet bomber while delivering an extra aerodynamic bonus in permitting very closely butted body skin joints.

The tool is the key to a new time-and-labor saving production sequence on the high-speed six-jet bomber which also permits use of less highly skilled workers.

Until the Boeing B-29, body skin joints were simply lapped about ¾ in., the average skin thickness of 0.40-in. creating no aerodynamic problem in lapping. On the B-29 and B-50, thicker body skins of 0.50-in. and more required butted joints but a liberal tolerance of .032 to .064-in. was allowed between skin edges.

With such a tolerance, fitting of the skin is not difficult. The skin sheets are cut to approximately the correct dimensions—a little large all around—then placed on the framework, scribed, taken off and cut with tin shears.

► **New Problems**—In critical areas of the B-47, however, joint tolerances have been reduced to .005 to .015-in. where the body dural ranges in thickness up to .250.

Tin snips cannot be used in such cases, because it is nearly impossible to hand-cut dural of such thickness and because snips can't cut accurately enough to meet the desired tolerances. On the two prototype B-47s and first production-model, power shears and saws were used, but the sheets still had to be taken off the framework for cutting. Much time-consuming filing also was required.

Boeing's answer is a 17-lb. circular trimmer saw that runs on a flexible steel track and is driven by a 1½-hp. air motor. Its blade is set with tungsten-carbide teeth which do not gum up with dural as does the ordinary high-speed cutter. The steel track may be integrally fastened to a job. Or it can be wrapped onto the cylindrical surface of the B-47 fuselage and held there during a cutting operation by broad-base Neoprene suction cups designed and manufactured by Boeing.

Lateral accuracy of the saw cut is controlled by the lateral rigidity of the otherwise-flexible track. Depth of the cut is regulated by a gaging wheel whose edge rides on the skin about ⅛-in. to one side of the saw blade. This wheel turns on a bushing whose bore revolves on the saw-blade shaft, but whose outside bearing surface is eccentric to that shaft.

Cutting depth of each saw is adjusted and locked so that it will cut to within approximately .005-in. of the thickness of the skin upon which it is used, thus permitting the cutting of one sheet atop another without marring the lower sheet. As the saw teeth are ground at a slight bevel, the waste portion left after the sawing tears off, leaves a very slight knife-edge.

► **B-47 Setup**—In applying skin to the B-47 fuselage, the first sheet is riveted on completely and permanently. Then the saw is run around the edges and the waste strips torn off. The next sheet, its edge lapping slightly over the first sheet, is riveted a few inches back from the edge of the first sheet. The saw then is set over the second sheet, along the lapped edge. After the saw cut is made in the second sheet and the waste portion is removed, the edge of the second sheet snaps down into place, butted against the edge of the first sheet.

Riveting then is completed on the second sheet and its remaining edges are sawed. As rivets are driven along the butted edge, the skin expands slightly and is thus fitted to the edge of the first sheet, usually to a very fine tolerance. Succeeding sheets are applied in the same manner.

The skin saw also is used for cutting door and window openings, where tolerances are small. It is not used on the B-47 wing, however, where dural of greater thickness is specified.

PRODUCTION BRIEFING

► **Minneapolis-Honeywell Regulator Co.** is starting construction of a building in Minneapolis to house its aviation engineering department. Occupancy is expected this November.

► **Northrop Aircraft, Inc.**, has arranged a long-term lease of facilities at Ontario International Airport, Los Angeles, to expedite production flight testing of F-89 Scorpion all-weather fighters.

► **Line Material Co.** has moved its headquarters to 700 W. Michigan St., Milwaukee, Wis.

► **Glenn L. Martin Co.** will shut down its plant from July 29-August 13 inclusive for the company's annual plant-wide vacation period. Only a few dozen of Martin's nearly 9000 employes will remain to handle maintenance and similar work.

► **Johnson Aircraft Co.**, Tyler, Smith County, Tex., has been adjudged bankrupt. A creditors' meeting is scheduled at the U. S. Court House, Tyler, for June 13.

Applications Extended For Zero Reader

Airline, military, and executive craft boost Sperry's backlog.

By George L. Christian

The Zero Reader has been placed in quantity production by the Sperry Gyroscope Co., Great Neck, N. Y., after almost two years of intensive laboratory and flight testing.

Although the largest orders are for military aircraft, considerable interest is being exhibited by the commercial airlines and by owners of executive planes.

A contract recently placed by North American Aviation, Inc., calls for installation of the Zero Reader in the F-95A, speedy all-weather version of the Sabre jet fighter. This first military production order came as a result of evaluation tests begun in April, 1949, by the All-Weather Flying division of the Air Force with "bread board" and experimental models of the instrument.

Zero Readers also will be installed in Lockheed's F-94 and Northrop's F-89. U. S. Navy is evaluating the Reader on a Douglas R5-D at Patuxent, Md. Sperry expects the military orders in negotiations will require considerable production quantities well into 1951.

The first commercial installation of the instrument will be made by South African Airways, which has purchased five units for their new Constellations. KLM has purchased three, one to be tested on a Connie on the Amsterdam-New York run, another scheduled for evaluation on a Convair 240. United States airlines have proceeded more slowly, but the following soon will be testing the unit: American, 4; American Overseas, Braniff, Continental and Pan American, 1 each.

► **Executive Readers**—Oddly enough, more Zero Readers have been sold to executive aircraft owners than to the airlines. To date 17 corporation ships have been, or are being equipped. Among them: Bethlehem Steel, Avco Mfg. Corp. (Lockheed Lodestars); Briggs Mfg. Co. (Grumman Mallard); Gaylord Container Corp. (B-25 and Beechcraft); General Electric Co. (Douglas B-23); General Mills, Arthur Godfrey Productions, Inc., and Plymouth Oil Co. (DC-3s).

The Zero Reader combines information normally supplied by the gyro-horizon, directional gyro, magnetic or Gyrosyn compass, sensitive alti-

ZERO READER shows versatility as Sperry DC-3 takes off under 50 ft. ceiling.

meter and the instrument landing system cross-pointer meter. Other radio tracks may be added for cross-country navigation (AVIATION WEEK Sept. 20, 1948).

The Sperry development of the Zero Reader program has been forthright and thorough. Coincident with the origination of the instrument itself, engineers brought forth a study "The Inter-Relationship of Approach Success, ILS Tolerances and Aircraft Coupling Requirements," published in January, 1950.

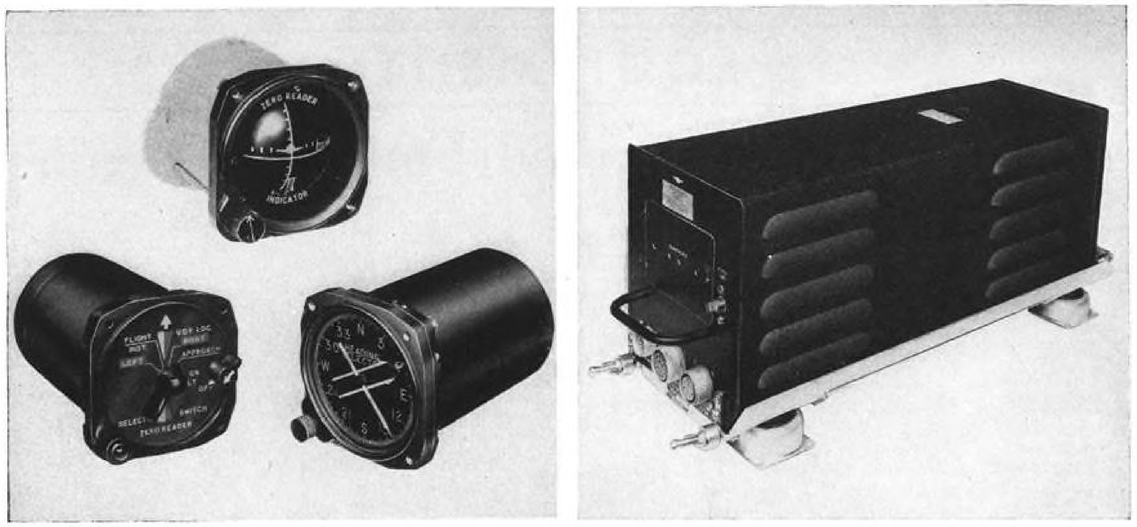
► **Approach Report**—This report presents, in comprehensive manner, data showing how ILS system tolerances affect aircraft approach performance. It develops the concept of "mandatory maneuvering lines" and of aircraft "coupling" means.

The former theory "shows how variation of course (beam) alignment and deviation sensitivity in the ILS equipment affect the approach success of an aircraft using various means of coupling." The line itself, for the glide path plane, is "the locus of all points projected into the plane containing the glide slope reference line and runway centerline from which a mandatory prescribed maneuver must be initiated in order that the aircraft descent path will become tangent to but not below a specified maximum displacement line."

Aircraft coupling "is the means used to link the aircraft to the approach system; i.e., conventional manual [ILS crosspoint indicator—Ed], semi-automatic (Zero Reader), or automatic (. . . Automatic Approach) operation of aircraft controls."

The report convincingly establishes that "an inter-relationship has been shown to exist between the variables: visual reference distance (ceiling), aircraft coupling requirements, and ILS tolerances. This inter-relationship forms the basis for the following conclusions:

- "In general, for given tolerances on the ILS equipment, aircraft coupling requirements tighten markedly as visual reference distances (ceilings) are decreased.
- "In general, for a given visual reference distance, coupling requirements tighten markedly as tolerances of the ILS equipment increase.
- "For the ICAO localizer transmitter tolerances investigated (i.e., a beam misalignment of 0.3 degree and a deviation sensitivity reduction of 20 percent), the effect of beam alignment on coupling requirements is more pronounced than the effect of sensitivity reduction.
- "For the ICAO glide slope transmitter tolerances investigated, the effect of beam misalignment on coupling require-



FOUR elements of Zero Reader, left to right: Slector Switch, Zero Reader indicator, heading selector and Zero Reader Control.

ments is not significantly different from the effect of reduced sensitivity.

• "For the actual glide slope transmitter and receiver combination investigated, a significant tightening of coupling requirements occurs as compared to a standard ICAO glide slope.

• "In general, for the ILS equipment tolerances investigated, coupling requirements as determined for the localizer are appreciably more severe than requirements determined for the glide slope."

► **Recommendations**—"The determination of the ILS tolerances as they **actually** exist in the field at the present time is the first important task for the immediate future. This must be accomplished by direct measurement and with no regard for original specifications.

"The measurement of ILS tolerances should show:

• "The variation of misalignment of the localizer and of the glide slope beams that any airborne receiver will detect on any ILS ground installation, providing both are considered to be operating normally.

• "The variation of deviation sensitivity for the localizer and for the glide slope as detected by any airborne receiver operating on any ILS ground installation, providing both are considered to be operating normally.

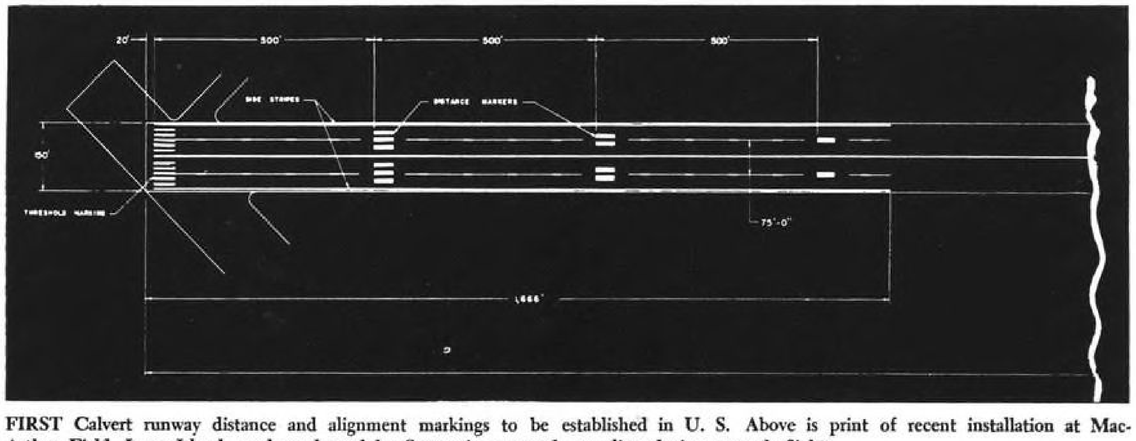
"An evaluation of various means of coupling the aircraft to the ILS must be carefully conducted. Such methods as full automatic control . . ., semi-automatic control . . ., and conventional manual control must be investigated in various degrees of turbulence and wind shift. Such experimental work must yield **numbers** that can be understood, and can be used eventually with the ILS tolerance figures to determine operating minimums scientifically."

Further investigation of the problems associated with ILS installations led to the publication, in May, 1950, of a paper entitled "Notes on the Standardization of Localizer Deviation Sensitivity."

The report attacks the proposal that "all localizer installations be adjusted to the same beam width, regardless of the length of runway served." Instead, it asserts that "the localizer angular deviation sensitivity at each side should be adjusted so that the indicated deviation current remains constant within tolerances for a given **distance** off the runway centerline at the ILS reference point."

► **Coupling Devices**—To substantiate this point, the paper shows that, through flight experience under low visibility conditions, it is essential to have available either automatic or semi-automatic coupling devices if aircraft are to be landed safely and consistently with ceilings of 200 ft.

Localizer deviation sensitivity, not critical in the past, assumes greater importance with the introduction of the more modern couplers. The two



FIRST Calvert runway distance and alignment markings to be established in U. S. Above is print of recent installation at MacArthur Field, Long Island, made and used by Sperry in approach coupling device research flights.

reasons: coupler requirements and approach visualization.

Sperry defines approach visualization as the "process by which the pilot views, in his mind, the position of the aircraft with respect to the runway, especially its displacement off the centerline in terms of whether or not the wheels will be on the pavement when crossing the threshold (end of the runway). This term does not include the visualization of aircraft attitude which is generally conveyed symbolically by . . . the gyro horizon . . . etc."

► **Coupler Requirements** – Fully automatic and Zero Reader couplers must be adjusted to operate in a certain range of deviation sensitivities. If the localizer deviation sensitivity is above this range, the coupler may cause the aircraft to hunt, and if below, will produce slow "loose" response.

Manual conventional gave little performance change over a wide range of localizer sensitivities. Therefore, in order to operate with optimum effectiveness, the new couplers require that "the distance deviation sensitivity at some given reference point in the landing area must be maintained to a tolerance, regardless of site or runway length."

► **Approach Visualization** – During an instrument approach, it is of greatest importance for the "deviation indicator" to enable the pilot to form an accurate mental picture of his displacement with respect to the runway. The more accurate this visualization, the fewer the number of missed approaches, since the pilot will see what he expects in the proper perspective, as he makes the transition from instrument to contact flight.

An inaccurate visualization inevitably results in pilot confusion and a frantic period of "flying half out the window and half on the gauges" in order to become reorientated.

"An accurate envisagement is also necessary before the transition begins. Should the aircraft . . . be in a position with respect to the runway from which transition would be hazardous, the pilot should always be able to evaluate the situation and take appropriate action. This is the 'go-no-go' function of the ILS deviation indicator which is vital to the safety of any low approach. . . .

". . . The pilot must be able to judge, regardless of site or length of the runway, whether or not the aircraft is over the runway.

"If this requirement is to be met, the localizer angular deviation sensitivity must be adjusted for each particular site."

According to the Sperry report, in order to meet these requirements, the localizer transmitter must be capable of adjustment from 1.7 to 3.5 degrees, which may or may not be possible depending on the type of equipment that is used.

Limits of present CAA localizers range in value from approximately 4 to 7 degrees.

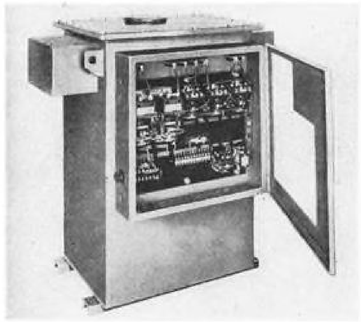
Sperry strongly endorses the Calvert system of runway distance indication markings, and center and border line demarcations.

These markings supply the pilot, after achieving contact flight, with the final reference guides he needs to complete a safe landing. These are: how far down the runway he is, how well he is lined up with the runway, and his displacement from the runway center line.

Few people realize how difficult it is to distinguish between runway and adjacent terrain under poor visibility conditions unless the runway borders are clearly delineated.

Sperry started with the development of a semi-automatic approach coupler and terminated with a comprehensive evaluation of approach media as applied to the ILS system, all with a view to making instrument landings safer and lowering acceptable flight minimums to an irreducible figure.

NEW AVIATION PRODUCTS



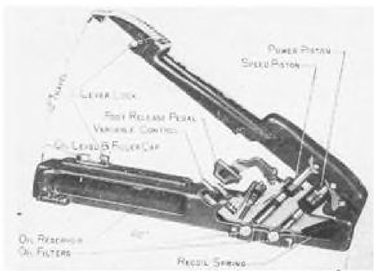
Brightness Control

Type CCRBL brightness control regulator with high speed switching, is for use with series runway lighting systems.

Device developed by **Hevi Duty Electric Co.** permits brightness taps to be switched at high speed under load. This eliminates "blackout" that occurs during switching with methods previously employed.

Unit is designed according to CAA Specification L-828. It consists of a static type constant current regulator and brightness controls mounted in compact unit. Switching operations are said to be practically instantaneous and are accomplished by means of standard 600v. contactors.

Regulator is designed to operate from 2400v. source and is made in four sizes: 7½, 15, 20 and 25kw. Output amperes are: B5 tap, 6.6; B4 tap, 5.2; B3 tap, 4.1; B2 tap, 3.4; B1 tap, 2.8.



Hydraulic Jack

"Go-Jack," new foot-operated hydraulic pumping device can be used with rams and arbor presses for assembly and disassembly of large parts, force-fitted parts and other machine shop applications.

Made by **Wihtol Industries**, Lewis St., Eatontown, N. J., unit develops up to 20 tons pressure. Manufacturer says compact size, high pressure range and simple operating features make it comparable in performance to existing power-controlled hydraulic jacks, but less expensive to buy.

Pumping and releasing phases of operation are under foot control at all times, leaving worker's hands free. Unit has two speeds controlled by selector valve. When selector is "out," foot pedal forces ram out quickly until work is contacted; unit then automatically changes to low speed to take advantage of full ram capacity. For light work, selector valve can be set to "in" position to operate jack constantly at high speed.

Pumping unit can be coupled to 4-, 7-, 10-, and 20-ton rams of standard make by means of connecting hose. This gives unit a wide range of uses and capacities.

All controls are on the device. Continued operation will not damage unit after maximum height of ram is reached. Body and foot pedal are aluminum-alloy castings. Total weight is 10 lb.

Small Converter

New 8½-oz., 400c. converter permits savings in space and weight. It is designed for high-altitude operation in various electronic and electrical equipment and in servo-mechanisms for aircraft and guided missiles. **Brown Instruments division of** Minneapolis-Honeywell Regulator Co., Wayne and Roberts Ave., Phila., is maker.

Device can be used with any system involving conversion of low-power direct voltage signals as low as one microvolt to 400c. alternating voltages. Unit is essentially a single-pole, double-throw, synchronous switch, actuated by a coil-driven vibrating reed.

Converter is housed in dust- and moisture-proof case. Leads to exciter coil can be connected to plug on side of cover, with remaining connections made through a six-prong, standard radio tube socket. Converter measures 4¾ x 3⅛ in. and is designed to operate continuously for more than 500 hours without requiring replacement.

Other specifications are: Driving coil requirements—18v, 94 milliamperes, 400c. + 10 percent. Contract rating—SPDT switching, nominal rating 28v to 1 microvolt, 1.0 milliampere, maximum power 100 microwatts. Switching action—each contact closed 55 percent of each cycle, contacts simultaneously 5 percent of the time, twice each cycle. Symmetry—within 5 percent. Load characteristics—resitive or inductive.

Engineers Advance Turbine Aircraft Data

Technicians at IATA symposium offer details to help airlines make true evaluation of future transports.

By Irving Stone

Manufacturers of engines and airframes for turbojet and turboprop craft are accumulating valuable data for the airlines, to bridge the gap between turbine-transport proving and use in regular service.

Some of this information was revealed in AVIATION WEEK's initial report (May 29) on the International Air Transport Assn.'s recent turbine-powered-aircraft symposium. Here are more factors the engineers and operators will have to consider:

► **Runaway Factors**—Present length runways should present no problem for turbojets or turboprops with use of water-methanol injection.

Advantages which might be gained from a rolling start would not seem to justify redesign of runway layout. If it were possible to take a rolling start into the runway and the rolling speed were 20 percent of takeoff speed, it is estimated that only 4 percent of runway length could be saved.

Since temperature will be an important factor in takeoff performance, measurements will have to be made with greater care. Those taken on the concrete runway probably would give considerable variation from those recorded at usual airport locations. Studies are now being conducted on difference values, and results will be circulated.

► **Debris, Water**—Debris on runways and aprons also will pose a problem. The Air Force reports that foreign matter taken into the engine air inlet has damaged compressor blades. Higher ducts may minimize this problem.

One manufacturer says a 1-15 percent decay in power may be expected according to type of material ingested. Rolls-Royce figure was about 2 percent.

Others feel that there should be no difficulty if oil is not present on surfaces to cause sticking of foreign matter.

Experience with runway slush and water varies. That with the Jetliner is significant because this craft presently has the lowest air intake. Avro reports that very heavy slush was encountered but none was taken into the inlet.

Rolls-Royce feels that water ingestion is no problem. Bristol experienced no trouble in torrential rain, nor has the USAF.

However, one manufacturer reports that with air inlet 10 ft. above ground level, a puddle of water was lifted into the intake as a sheet. This type of condition might possibly drown out the engine.

Concensus on effect of sand ingestion is that this should present little difficulty, although there are contrary opinions. The Air Material Command has conducted turbojet engine sand runs which have indicated no rapid or gross deterioration, but nevertheless warranting further serious study (AVIATION WEEK, Dec. 5, 1949).

► **Surfaces, Heat**—Airport surfaces will have to be considered. Effect of oil and dirty substances in exhaust on airport buildings depends on particular engines and type of fuel used.

Boeing technicians said it wouldn't be advisable to run up the engine on asphalt. The Air Force has had bad experience with the macadam type of surface, repeated fuel dripping tending to deteriorate it. Even filler joints in concrete may give trouble.

Boeing said that at pavement level, the hottest point aft of the jet pipe is at about 40 ft., where temperature probably would be 250 F. and exhaust velocity 270 fps. At about 100 ft. aft of tailpipe, temperature is 100 F., velocity is 70 fps. Avro engineers say there is no particular heat problem with jets on the ramp. They say they "haven't roasted anyone yet."

The Air Force feels that noise of many jet craft on the ramp will be a troublesome factor. However, the Jetliner, on the recent occasion of its demonstration at the New York International Airport was not annoyingly noisy.

And a turboprop is said to give appreciably less noise than that experienced with an equivalent piston-engine plane.

► **Crew Data**—Flight crew requirements for the typical four-engined turbine craft should pose no problems.

For the turboprop, the need for a flight engineer should be no greater (probably less because of fewer instruments) than on a piston-powered plane.

Avro and de Havilland do not consider a flight engineer necessary for their turbojets.

Crew qualifications, physiologically and training-wise, should be no different for high altitude turbine planes. Boeing reports that C-97 crews are being used in B-47 operations with no difficulty.

► **Restarts**—Altitude or acceleration engine-blowout probably will be no problem within operating heights of commercial turbine planes. Relighting of axial units has been improved up to 30,000 ft. Though flameout has caused some trouble in military operations, fuel flow redesign should prevent this.

Restarts should not be a bothersome factor at 20,000 ft. The Derwent Vs in the Jetliner have been restarted numerous times up to 15,000 ft. without use of the starter. And Bristol reports restarting at more than 20,000 ft.. with turboprop windmilling.

Restart is not generally advisable at high altitudes with a cold engine; the plane should be brought to a lower altitude, for this will give a higher ambient temperature, allow oil to thin and unfreeze kerosene if there is trouble on this score.

An electric type starter probably will be sufficient for commercial turbine craft.

► **Consumption, Power Loss**—Values mentioned for specific fuel consumption for the centrifugal turbojet was 1.02, and about .96 for the axial, but there is reason to believe that lower figures have been attained.

Optimism generally prevails for attaining improvement in fuel consumption in both the axial and centrifugal types.

Turbine acceleration characteristics are considered satisfactory to execute missed approach procedure. No trouble was reported for either the turboprop or turbojet.

Variations between power output of turbine engines is considered slightly larger than for piston engines. De Havilland reports a power output variation of about 3 percent, General Electric about 2 percent, Allison about 4 percent.

In test runs, power service loss (perhaps about 2 percent because of dirt collecting, etc.) has been restored with a water-methanol wash through the engine. The axial type may be more sensitive to service loss than the centrifugal.

► **Wheel Prerotation**—It is unlikely that bleed air will be used to prerotate landing gear wheels.

Frank Owner, Bristol's engine division chief engineer, sagely has observed that "compressed air isn't free." If

bleed is used only part of the time, it comes off the relatively little margin the designer has. Apparently, it is not advisable to bleed for miscellaneous services.

The Air Force has studied the general prerotation problem for years at Wright-Patterson AFB, and has found it impractical from point of cost. It does not consider it a severe problem, hence not too important.

One airline reports nose wheel prerotation unsatisfactory in that it gave heavy vibration.

► **Taxiing**—Obviously, fuel consumption will be an important factor in taxiing and run-up check, particularly when a full tank is needed for take off.

AOA feels that manufacturers should not include taxi or run-up times, but rather, include an average ground consumption and let each airline handle its own specific problem. It feels there is no overall answer to this problem.

De Havilland reported 13 gal./mi. consumption while taxiing at 30 mph.

Bristol uses a low idle condition (from which pilot would not accelerate engine) using about 10 percent of full load consumption.

Cockpit and instrument checks could be made while taxiing to runway.

Some feel that at a busy airport, the plane might have to be towed to a waiting apron to save fuel. BOAC thinks towing to runway would be too slow. Trans-Canada Air Lines also feels that towing is not practical. With towing, checks would have to be made at the runway.

► **Starting Times**—Bristol gives engine starting time at about 15 sec., GE and Allison about 25 sec. All four engines on the Jetliner are started in less than 1 min.

Avro Canada technicians hold that any provision for a 10-min. allowance from start to takeoff (as some have held) is by far excessive.

Time for the Viscount to start was given as 2 min., 17 sec., with 3 min., 50 sec. as full time from start to takeoff. Comet time to takeoff was put at 5 min.

Boeing anticipates 40-60 hp. to start some of the large engines.

For starting a large number of planes, a permanent installation may have to be used to supply power rather than resort to cart service.

► **Altitude Factors**—The Air Force does not feel that need for variation in cruising altitude to avoid storms and rough air should present much difficulty because the craft is over most of the weather at 30,000-35,000 ft. Thunderheads are not so intermingled at this altitude, and the craft can be diverted around them or change altitude only a little.

Sir Robert Watson-Watt indicates that the higher jet altitude brings the craft over the weather about 80 percent of the time, and when a comedown is necessary it doesn't run into 50 percent of the weather troubles encountered at the lower altitudes for conventional craft (weight of an acceptable airborne radar for cloud turbulence detection would be 60-100 lb.).

Using a climb procedure to avoid turbulent areas will depend, to some extent, on reliability of the pressurization system.

► **Consumption Change**—De Havilland reports that a 2500-ft. change from optimum cruising altitude gives a change in fuel consumption of about 7 percent.

Avro says that if the craft goes from 30,000 to 25,000 ft., increase will be 7½ percent; to 20,000 ft. will bring a 15 percent increase; whereas a climb might make no difference.

Boeing reports that a drop from 40,000 to 30,000 ft. would give a change of 14 percent in miles per pound of fuel.

Figure advanced for the Viscount in going from 30,000 to 25,000 ft. is 13 percent increase.

Rolls-Royce's L. G. Dawson said that when flying at a given IAS at 40,000 ft. to obtain 500-mph. TAS, the same IAS at 30,000 ft. would give 400 mph. TAS. This means that if there were a 100-mph. headwind at 40,000 ft., you would want to have no headwind at 30,000 ft. to get the same ground speed.

► **Pressurization Problems**—Range for rate of cabin ascent was mentioned at 200-1000 fpm., for descent, about 200-300 fpm.

Comet cabin is pressurized at 8000 ft. at 40,000 ft. Jetliner is 2000 ft. at 25,000 ft., 4000 ft. at 30,000 ft.

Danger of blowing a door at high altitude would undoubtedly be a serious factor, whereas popping a window might not be too serious, the probability being that the condition could be "caught up with" at a lower altitude.

Comet doors open inward. Thinking is that all doors should open inward and seal with pressure. Some feel that sliding doors would afford safer egress.

It is believed that a very high factor of safety will be needed for plastic installations for high differential pressures in pressurization. One airline technician advocates elimination of windows, possibly using a moving true panorama instead.

But others feel that attainment of safe windows will constitute no problem.

Military view is that it may be advisable to pressurize the cabin separately from the flight compartment.

► **Oxygen Supply**—Oxygen masks will have to be immediately available, for it is reported that at 35,000 ft. useful consciousness is only about 28 sec.; at 28,000 ft., about 1 min.

One observer feels that unless the mask is being worn, its use would not

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be practical in high-altitude blowout. Perhaps special equipment will be needed—such as a "cone" over pilot's head, giving him a blast of oxygen as it is pulled down.

► **Maintenance, Life**—For the turbine-powered engine, the theory essentially is that there will be fewer parts to consider from a maintenance angle.

Line maintenance should be appreciably less, and it is estimated that overhaul man-hours and materials cost will be about half that required for a high-power piston engine.

Figures given for the Dart are ¼ man-hours for the 25-hours check, 0.4 for the 50-hr., 3.3 on the 250-hr., and 51 on the 500-hr. check.

Bristol says longest compressor life is 800-900 hours and longest life on engine is 750 hours to date.

► **Prop Data**—Bristol uses a size smaller shaft than on a comparable piston engine and cuts blade weight about 30-50 lb. on the turboprop. It is said that there is no indication that a greater degree of balancing accuracy is necessary for the turboprop propeller. To go to higher speeds, however, some feel that the propeller will need dynamic balancing.

Engine and propeller controllability for the turboprop is now satisfactory for commercial operation.

► **Engine Pods**—The pod will be another turbine craft consideration. Though originally adopted because of the problem in locating the engine on the wing in high speed flight, other reasons now justify its use.

It allows easy maintenance access to engine, facilitates change procedure, and isolates engines from wing in event of fire.

Spacing between pod and wing is not considered as important as its position relative to the wing.

Commercial version of the B-47 probably would not have pods so far out on the wing.

► **Fuel Factors**—Bristol's Frank Owner feels that adoption of kerosene as turbine fuel, instead of gasoline, is one of the biggest steps in the direction of passenger safety.

While it is a safer fuel, it cannot be considered a safety fuel. Fire-spread with kerosene is relatively low. With a flash gasoline fire, the sudden intake of CO often knocks out the passengers, whereas with kerosene they may have the chance to walk away.

It is reported to give 10 percent more air miles per gallon and offer no boiling difficulties.

Freezing point, however, is —40F. as against —60F. for gasoline. One solution offered to counteract the relatively high freeze point is to submerge the oil cooler in the tank to raise fuel temperature.

Airlines would not want tanks in the fuselage, this being construed to mean beyond the wing root.

► **Utilization**—These present utilization values were given by airlines for piston engine craft: EAL-14 to 16 hr./day (this is an ultimate realization after a reasonable development period); AOA —8.3 hr./day (in trans-Atlantic service); TWA—12 hr./day; BEA—6 hr./day.

It would appear that utilization for the turbine-powered transport will run 6 to 10 hr./day for most airlines. However, EAL feels that after a reasonable familiarization period it would expect 14 to 16 hours utilization because of the high initial investment and inherent structural ruggedness of the high speed turbine transports.

► **Conversion**—Alteration of existing transports for turbojet engines is not considered feasible.

But change to accommodate turboprop is not deemed a major problem. For the alteration the craft would require a reasonably high critical Mach number, pressurization, and structural stretch.

It is felt that four present day designs will fit these requirements—Convair CV-240, Boeing B-377, Douglas DC-6 and Martin 4-0-4.

Surfacing Material Resists Kerosene

The harmful effects of kerosene-type jet engine fuel spilled on runways may be minimized by a new surfacing material developed by United States Rubber Co.

Called Aero-Sealz, it is a solvent-resistant rubber compound which can be mixed with tar to inhibit the dissolving effects of this type of fuel. The compound protects bituminous pavement and tar expansion joints in cement.

U. S. Rubber points out that damage caused by kerosene fuels has become a major problem because of their lower rate of evaporation compared to high octane gasoline. During normal operations, spillage from one jet plane may amount to five gallons before takeoff.

Cognizance of this problem was taken at the recent Jet Symposium of the IATA Technical Conference at Asbury Park, N. J. (see page 27).

The concensus at that meeting was that it is inadvisable to run up jet engines on asphalt and that even the expansion joints in concrete may give trouble. The new compound may alleviate these difficulties.

At present, the dissolving effect of kerosene fuels eventually strips the bituminous surface, leaving loose or free aggregates. Repeated spillage acts on progressively lower layers with further disintegration taking place from weather and traffic. This creates an additional hazard, especially for jet planes.

Let's Sell Today's Planes Today

Critics could legitimately show the real utility of present craft instead of common negative approach.

In recent months both aeronautical and non-aeronautical publications have been devoting space to the well-intended, though usually unconstructive views of many self-styled "authorities" or "experts" on "What's Wrong with Personal Aviation." Though self-criticism is a healthy prerequisite to normal progress, it often appears that such articles have been prompted by writers seeking merely financial gain or personal aggrandizement in the eyes of a nominally disinterested and uninformed general public.

Since criticism of the accomplishments of others is a characteristic more common in the modern world than personal achievement, original thought or accomplishment, it is logical that there should be those who sit smugly and comfortably in the rooting section and shout advice to the technically expert group which has its body and soul in the game and its heart set on winning. It is also understandable that such sideline help often has a negative result upon team morale and upon the final score.

Until recently, with few exceptions, the negative element has been contributed by writers with limited contact with aviation and its complex technical problems.

There were those who, misguided by the industry's own over-optimism, found they could not afford to buy a postwar "family airplane." Others bought the product as they might a second car, a dishwashing machine or a motion picture projector without first establishing a family need for its function. In either case, these groups had a good basis for dissatisfaction with the industry's promotional effort which created their disappointment. Unfortunately, the vocal and literary criticism was directed, without qualification, toward the product. It seems that we all assumed that the personal airplane would somehow achieve universal acceptance without enduring the evolutionary processes historically associated with mechanical development.

▶ **Sold Out**—It was concluded that the postwar airplane was "too expensive" and that it had no "utility." In a very short period of time, due to the effect of this reaction, the industry literally had sold itself out of business. By 1948 the industry had generally accepted this conclusion and had earnestly set about to realign itself to develop the legitimate immediate market in business and agriculture.

This original criticism, though based upon limited experience of individual consumers, often is richly deserved, not by the product, but by the industry itself for not recognizing the economic limitations of its product.

There is a growing type of criticism which, though technically correct in many respects, is insidious in character and carries unwarranted weight with a nontechnical reader group because the author has had some aeronautical education, experience or affiliation. This type of attack can too often be classified as "sour grapes." Unfortunately, the juice of sour grapes crushed under the wheels of progress remains to tarnish the rims. . . .

▶ **Not So Expert**—I am constantly amazed at the confidence with which some aeronautical figures write on personal aviation, a specialized phase of aviation with which they have little or **no** personal contact. In most cases there is no question of good intent, though the publicity medium used often raises the question as to what the author hoped his article would contribute to correction of the condition he criticizes.

It always has seemed to me that principles of democracy and free enterprise provided a channel for critics to present their views directly to those in a position to accommodate them. Lacking satisfactory accommodation, the critic with sufficient strength in his conviction can develop the organization and facilities to promote his own theories. Competition for public acceptance then demonstrates the true merit of the original thought. Unfortunately for aviation, there seems to be little tendency for the "experts" to follow up their criticism with any constructive action. (The Bollinger-Koppen project is an outstanding exception—more power to it!)

One syndicated aviation authority, widely known for his long-time efforts on behalf of aviation generally, has made the absurd statement that the postwar personal aircraft were generally ". . . . no worse but little better than the planes of 36 years before. . . ."

The Author

Eugene W. Norris has sound qualifications to discuss lightplanes. He formerly was Technical Director of the Aircraft Industries Assn. and from there went to Luscombe Airplane Corp. as vice president-engineering. The successful design of the Luscombe Sedan was very much his doing. Later he was Washington representative of Flight Safety Foundation. Now he is a Cessna distributor at San Antonio, Texas.

1940—Comparative Analysis—1950

Conventional 2-place Personal Aircraft

	1940	1950	Remarks
List Price (equipped)	$2750 (equivalent 1950 price $4850.)	$4050	16½% reduction in price
Engine	65 hp.	85–90 hp.	30% increase in power
Cruising speed	90 mph.	110–115 mph.	23% increase in speed
Cost per mile (fuel, oil, maintenance)	3¢	2¢	50% reduction in cost
Speed-range ratio	2.25:1	2.75:1	22% improvement
Rate of climb	500 fpm.	690 fpm	38% increase in climb
Cruising range	350 mi.	500 mi.	43% increase in range
Useful load	500 lb.	600 lb.	20% " in useful load
Baggage capacity	50 lb.	80 lb.	60% " in baggage cap.
Propeller	Wood	Metal	
Starter & Generator	None	Standard	
Landing lights	None	Wing lead. edge	
Instrument Illum.	None	Indirect red light with rheostat	
Sound proofing	None	Fiber glass insulation, mufflers, tightly sealed doors, flex. rubber engine mounts	
Comfortization	Non-adjustable seats	Foam rubber-adj.	
Tail wheel	Steerable, non-swivel	Steerable, full swivel	
Flaps	None	3 pos. hand opr.	
Construction	Fabric covered, steel tube, wood & wire	All metal monocoque	Reduced maintenance
Stall characteristics	Variable	Spin resistant	Improved safety
Aileron control	Variable	Effective throughout speed range	Improved safety
Pre-stall indicator	Not available	Standard	Improved safety
Rear windows	" "	"	Imp. visibility, safety
Top Windows	" "	"	Imp. " safety
Brakes	Mechanical (heel)	Hydraulic (toe)	Imp. ground handling imp. safety
Tie down rings	No provision	Standard	
Nap compartment	Too small in any	Adequate	
Mixture control	None	Standard	
Parking brake	None	Standard	
Instrument panel	Rigid	Rub. shock mount	
Cabin ventilators	None	Standard	
Cigarette lighter	None	Standard	
Carb. air filter	None	Standard	
Landing gear	Complicated kinematics with shock cord	Simple spring steel cantilever	Improved landing and and ground handling with reduced maintenance and greater safety
Radio	Limited range, dry cell receiver only with headphone	Two-way communication with broadcast reception, cabin speaker	Improved navigational, accuracy, increased safety and reduced costs.

With due respect to that columnist, I suggest that he open his eyes to the facts and flush the creeping paralysis of pessimism from his mind. Belittling the very excellent accomplishments of the past decade does not provide a very sound basis for healthy progress in the future. It is particularly destructive in personal aviation since it minimizes or neglects the many proven and currently accepted uses of the current product.

► **What Utility Means**—I wonder how many of the critics appreciate the Webster defines "utility" not merely as usefulness, but as "usefulness for some desired end." Thus, the question of the modern airplane utility must be discussed in relative rather than absolute terms and then only with reference to some "desired-end". . . .

Mr. W. T. Piper, Sr., one of the industry's strong figures, effectively answers criticism of the personal airplane's utility by comparing it to a pick-up truck. For the average family or traveler a pick-up truck has little utility and its cost would be prohibitive for the benefit gained. To a plumber, farmer or produce merchant, it would offer high utility at a moderate and easily justifiable cost.

Similarly, to the average family with limited travel requirements, any aircraft would be an expensive and relatively low utility vehicle. On the other hand, for those with certain types of travel requirements, the modern personal airplane is the most economical, comfortable, safe and useful method of transportation. In fact, many modern industrialists, merchants and salesmen who have taken to the air, report that their airplane is their most valuable business machine.

Since progressive product development in any industry depends upon acceptance and use, it is logical that any factor which unduly restricts acceptance and use will restrict the pace of development. If the critics would conscientiously investigate the many currently useful applications of the personal airplane, they might gain a new appreciation of its importance today and of its capacity for greater utilization through understanding.

► **Today's Airplane Today**—Turning their literary and vocal talents toward publishing the merit of today's product, the critical element could become a constructive force in the industry's effort to find more of those in a position to use today's airplane today.

Resultant competition within the industry would speed up the natural evolution of tomorrow's airplane. The pattern of usefulness is known and proven. The expansion of industrial application is a matter for education, publicity and intelligent sales effort.

Despite the critics' claims of European leadership in lightplane design, the fact remains that the U. S. product is the only one which has received any international acceptance whatever. . . .

The current U. S. personal plane industry produces a selection of models which offer greater air transportation value than is or has ever been offered by any other aviation industry in the world. The time has come for the critics to recognize this fact and to apply for a job on the team which is working with confidence and determination for the advancement of aviation through the free enterprise system.

Need Improved ILS Monitoring

Pilot calls for fully automatic monitors checking the entire approach course to remove present weaknesses.

The following is a "change of pace" in Aviation Week's *avionic reporting. It is presented because it puts a serious problem up to the avionic manufacturers and engineers, based not on theory, but on first-hand experience. The author is an American Airlines captain.* —Ed

By R. C. Robson

Airlines and pilots are reporting increasing concern over the reliability of the Instrument Landing System.

Sum and substance of the problem is that two safety features are needed to insure reliability of ILS:

- **Fully automatic monitors.**
- **Installation of a monitor** at a point in the approach area which will check the localizer accuracy along the entire approach course.

Some recent instances show what is worrying the airlines and pilots:

- **A DC-4** makes an ILS approach at Chicago. The cockpit instrument shows the ship 400 feet **high** during entire approach. GCA records the flight as 400 feet **low** during entire approach.
- **A DC-6** makes two ILS approaches at Buffalo, each a perfect job according to cockpit indications. Both times the pilot breaks out of the overcast too far to left of the runway to make a landing. As the boundary is passed his indicator swings to full left position. Monitors in the tower show the system is functioning correctly.
- **A DC-3 crashes** in the Potomac while making an ILS approach at Washington National Airport. Reasons "unknown" to date.
- **A Martin 2-0-2 crashes** nearly a mile from the airport at Minneapolis while making an ILS approach. Reasons "unknown" to date.

The Instrument Landing System consists of two transmitters—one for the runway localizer, the other for the glide slope. The antenna for the localizer is located 400-2000 ft. beyond the upwind end of the approach runway. There is a monitor component "pick up" unit 150 ft. in front of this and another is located 52 degrees off the runway azimuth. When significant deviations occur in the localizer up to this point, the monitors set off a warning system in the control tower. The operator then shuts down the system or switches to standby equipment.

▶ **Accuracy Challenged**—The accuracy of these monitors has been challenged recently by both airlines and their pilots. Radio waves are subject to many interferences which may cause them to deviate from their prescribed course. Because of these facts monitors are provided for all aeronautical radio installations to provide warning of deviation from course.

Type and location of monitors are of prime importance. There are good monitors and bad monitors. One that is not completely trustworthy is worse than none at all for its indications are always subject to suspicion.

The railroads learned long ago that manual warning systems are only as reliable as the human operator. The automatic block signal system was designed to eliminate human error. Safety records of lines equipped with this system have proven its worth. But many aeronautical warning systems are still manual!

With the increasingly heavy burden being placed upon tower operators, it is not surprising that a monitor signal can be overlooked—if only for a few seconds. Medical studies and airline experience have proven that horns, bells and warning lights may be ignored by humans. So automatic monitors—which shut off power and switch to standby equipment—may be the only answer. This applies not only to ILS but to VOR and every other aeronautical radio.

The CAA plans to convert ILS monitors to the automatic type this year. Many experts point out that this should have been done in the first place and indicate that the same thing is needed on VOR installations.

▶ **Location Counts Too**—So much for type of monitor. Location is even more important. A simple diagram shows why. On a straight line place three dots: A is a transmitter, B a monitor, C the outer marker of an approach system. It will be seen from this that the monitor can only verify the correctness of transmission from A to B. It cannot check B-C.

The assumption being made with ILS is that VHF radio waves proceed along an infinite straight line. This is not entirely correct. Any man-made electrical reflector will disturb them. So will electrically charged precipitation. An aircraft parked within 500 feet of the instrument runway centerline, for instance, will cause the localizer to veer and waver.

At airports having only one instrument landing runway (practically all major terminals) with landings being made every three minutes and take-offs sandwiched in between, the ILS is constantly subject to distortion. Tower controllers are aware of this and try to keep the "danger area" clear.

On some airports however—LaGuardia for instance—the touchdown and run-up areas at the end of the instrument runway are not visible to tower personnel.

And this situation exists at most airports when visibilities are at or below one mile. Therefore there is no positive proof that the area is clear. Further, powerplants of any sort located along the flight path cause trouble. At Washington National Airport the localizer has a pronounced "warp" in the direction of a power station at Alexandria.

▶ **Swinging Course**—Many reports are on record of pilots noticing a swinging localizer course. In an effort to verify this apparent discrepancy between the theoretical and actual path of the localizer the CAA recently installed a recording monitor at the outer marker at LaGuardia. Although official information has not yet been released, reliable sources have stated that the record is worse than expected. In other words the localizer does wander far off course. But with the present setup monitors are capable of checking the first 150 feet of transmission only!

There is a feeling often expressed that radar is a good substitute monitor; that any significant deviation from course will be noticed by the radar operator and a warning issued. For several reasons this is not adequate. Glide slopes on the GCA screens do not always coincide with ILS. At LaGuardia the ILS intersects the runway at a point 1700 feet from the end while the GCA path comes in at the end. Not until the middle marker is reached do the two coincide. An airplane is a small target and subject to misidentification. This is especially true in rain.

Rain hinders the passage of radio waves; their ability to penetrate water varies with frequency, power of transmitter, sensitivity of receiver, size of water droplets and density of droplets.

Investigation of radio waves, with specific reference to those used in radar, shows that the 10,000 megacycle band will not penetrate water until extremes of transmitter and receiver power are used. The 5000-10,000-mc. band, used by Precision Approach Radar (PAR), will penetrate light and some moderate precipitation. The 1500-5000-mc. band, used by surveillance radar, will penetrate light and moderate but not heavy precipitation. Low frequencies, 100-1500-mc., will penetrate all rain. It should be noted that the speed of aircraft defines the rainfall. Light rain may be falling on the ground, but a ship flying at 300 mph. is, in effect, passing through solid water.

So radar can hardly be considered an adequate substitute for a monitor.

The captain of a modern airliner is operating a million dollar business. While on an ILS approach, the flag alarm on his ILS instrument is his only check on the operation of the system. Since airliners are already too heavy with "rechecking" devices no one wants to add another complicated system to check ILS.

And with the new "phase modulated" localizers, soon to be installed, best experts say there is no known way of determining from the cockpit whether the correct azimuth is being received. This will mean an absolute dependence on ground monitors.

Dynamic Micrometer

A new measuring device, known as the Electro Dynamic Micrometer, is being used by jet engine builders to determine accurately turbine blade elongation caused by centrifugal force at high speed. Other applications are reported to include measurement of dynamic or static displacement due to eccentricity, radial whip, bearing clearance, reciprocating motion, and frequency and amplitude of vibration. Thickness of metal coatings on metal can also be determined.

Produced by Electro Products Laboratories Ins., 4501 Ravenswood Ave., Chicago, Ill., the unit consists of a conventional mechanical micrometer head with sensing unit connected to an amplifier and cathode-ray oscillograph. The oscillograph will show a displacement vs. time curve on a screen calibrated in .0001-in. divisions.

The device measures amplitude of dynamic movement at any speed to distances as small as .0001 of an inch; sensitivity is equal to 1 per cent of total displacement.

FINANCIAL

Avco Sells More Aviation Holdings

Company's sale of 366,954 PAA shares continues its move out of field in which it once specialized.

Avco Manufacturing Corp. has sold its entire block of Pan American World Airways, Inc. stock. This completes another major phase in its long-range program of divesting itself from aviation and concentrating in those fields in which it has manufacturing operations.

Avco's remaining aviation investments are 257,690 shares of American Airlines common stock and 60,000 shares of common stock of Roosevelt Field, Inc. The sole aviation manufacturing activity of Avco remains in its Lycoming-Spencer division which produces engines for light airplanes.

After its creation as the Aviation Corp. in 1929, as a holding company for aviation securities, the firm owned such old-time aviation properties as: Colonial Airways, 99 percent; Universal Aviation, 91.2 percent; Embry-Riddle Aviation Corp., 67 percent; Interstate Airlines, Inc., 100 percent; and Southern Air Transport, 99 percent.

This was not all: It held 53.3 percent of the old Fairchild Aviation Corp.; major participations in Roosevelt Field, Inc., Bendix Aviation, Fokker Aircraft, Pittsburgh Metal Aircraft, Western Air Express, Waco Aircraft, The B. G. Corp., and others.

In 1930, the parent holding company concentrated its airline efforts by combining the system that ultimately developed as American Airlines. It also was a major factor in launching PAA.

▶ **Shift**—The management of Aviation Corp. shifted to new interests in 1937. At that time, in addition to the holdings in American Airlines and Pan American Airways, investments extended to the old Vultee Aircraft Company, Lycoming and Stinson in the aircraft field.

As aircraft procurement accelerated during the early phases of war preparedness, Vultee after first acquiring a controlling stock interest in Consolidated Aircraft Co., was merged with that property. The new group was known as the Consolidated-Vultee Aircraft Corp. and contributed substantially to Aviation Corp.'s earnings.

Aviation Corp. had previously inherited such investments in non-aviation fields as the Auburn Automobile Co., New York Shipbuilding Corp. and other diverse interests. In 1945, with peak war production at an end, Aviation Corp. launched an aggressive diversification program away from aviation, by buying control of New Idea, Inc. (farm equipment), and the Crosley Corp. (radios, television, and refrigerators).

A total of 287,538 shares of the old common stock of American (prior to the five-for-one split) were owned by the Aviation Corp. This represented about 22 percent of the carrier's outstanding shares. The Civil Aeronautics Board, in October, 1945, ordered the holding company to divest itself of the bulk of its American Airlines stock. The order could not have come at a more opportune time to benefit Aviation Corp. During 1946, 211,000 shares of the old stock was sold, at what now appears to have been near peak prices, for a profit of almost $17 million, before taxes. Following the stock split in American, Aviation Corp. was left with 257,690 shares or 3.99 percent of the existing outstanding American Airlines common stock.

▶ **New Twist**—In 1947, Aviation Corp. removed itself from the airframe manufacturing industry in a corporate twist which segregated Convair's holdings.

In one of the most intricate deals in aviation finance, the non-aviation properties of Convair were centered in the newly created Nashville Corp. The latter became the repository of the consumer goods manufacturing activities previously conducted by Convair.

At the time of this segregation, the Aviation Corp., which had now become Avco Manufacturing Corp., owned 410,417 shares of Convair, carried on its books at $5,299,013. At the then prevailing market prices, it would appear that Avco suffered an apparent loss of about $1 million in the disposition of the aircraft property. This is misleading, however, as substantial income in the form of dividends were received during the war years and it is not known what ultimate realization may be had from the facilities which went into the Nashville Corp.

It is significant that it was the profits from aviation enterprises which permitted the present Avco management to make bold inroads in such fields as television and farm equipment.

At last reports, Avco carried its investment in the 366,954 shares of Pan American at $2,335,119. In the current sale, some $3,439,193 appears to have been realized, before expenses, indicating a book profit of around $1.1 million.

It is presumed that the proceeds from this transaction will more than cover the $2,300,000 invested by Avco recently in acquiring 167,500 shares of Bendix Home Appliances, Inc., common stock. It is ironic to note that a predecessor unit of Aviation Corp. sold its entire holdings of Bendix Home Appliances, Inc., in 1938 for 15,000 shares of founders' stock of the New York Shipbuilding Corp. Such New York Shipbuilding stock now has a market valuation of around $270,000. More than twelve years later, Aviation Corp. returned to "recover" a 16 percent interest in Bendix Home Appliances at a price of almost nine times of what it received for this entire company when it was first sold.

▶ **Likes Lycoming**—Despite its consistent divestment of its aviation properties, Avco shows a desire to retain its Lycoming facility to manufacture aircraft engines and related parts. The management reported that Lycoming has been successful in securing orders for almost 2000 engines for 1950 delivery as against only 500 during 1949. Further, seven aircraft manufacturers (in the lightplane group) were reported using Lycoming engines ranging from 65 to 260 h.p.

It must be realized, however, that Lycoming aircraft sales account for a very small percentage of total Avco sales, probably less than 2 percent.

Among its manufacturing activities, Avco formerly included Republic Aircraft Products division, producer of hardened and ground precision aircraft engine and propeller parts. This division, however, has disappeared from the present Avco line-up.

It is logical to assume that ultimately Avco may see fit to complete the liquidation processes of its aviation investments. While in total dollars the amounts to be so realized are not large, the percentage gain, at present market levels, are very great. The 60,000 shares of Roosevelt Field Inc., representing some 20 percent of the outstanding capital stock, were last carried on Avco's balance sheet at $30,000, but would command about $480,000 at prevailing market prices. Similarly, the remaining 257,690 shares of American Airlines were last valued on Avco's books at $322,112 but would bring more than $2.8 million at present market prices.

It remains clear that Avco has firmly fixed its course away from aviation and regardless how long it retains its remaining investments in the industry, it no longer will assume the major status it formerly enjoyed in aeronautical activities.

—Selig Altschul

SALES & SERVICE

Babb Assumes Control of Namco

Aircraft sales organization also acquires maintenance firm's favorable long-term lease at Newark Airport.

Charles Babb has added the well-fixed National Aviation Maintenance Corp. at Newark Airport to his extensive collection of aviation enterprises. Babb exercised his option covering controlling interest in the airport service operator in April, and placed Ed Lund, vice president and general manager of Babb Co., Inc.'s New York and Newark offices in charge. William Cunningham, former president, has resigned.

The acquisition of Namco marks the second step the aircraft sales company has recently taken in the maintenance field; Babb also controls Aircraft Industries of Canada, Ltd., located at St. Johns, Newfoundland.

▶ **Namco Advantages**—Namco enjoys an excellent setup at Newark. And its facilities readily dovetail with Babbco activities. The service operator occupies two hangars—one acquired by Babb along with a favorable long-term lease from Eastern Air Lines prior to the Port of New York Authority's taking over of the field. The other is leased from Cities Service.

Namco has built up its shops since it came to Newark a little over a year ago to where it can now do major work, including custom conversions, on four-engine craft. Facilities include radio, sheet metal, wood working, propeller, and accessory overhaul equipment. An instrument shop is being planned. Engines are sent out to the larger approved overhaul centers in the vicinity who put the work on an assembly line. Namco has been overhauling all accessories (except magnetos) for all U. S. Coast Guard aircraft for fiscal 1950.

Among the planes in the shops now are an Argentine Army C-54 for overhaul, several surplus Lockheed Ventura patrol bombers being converted into executive transports, and the N. Y. Daily News' recently purchased DH Beaver being custom modified. Expected soon is a Grumman F7F-1 Tigercat to be reworked into a two-place high-speed research plane for a manufacturer. Turnaround maintenance is being done on a number of the Newark-based nonskeds.

▶ **New Fuel Setup**—A recent benefit to Namco was expiration on March 31 of Esso Standard Oil Co.'s exclusive petroleum products vending contract covering itinerant planes at Newark. The fixed-base operator is a Shell vendor and now services such craft including the nonskeds.

▶ **Babb Sales**—The firm has added a new sales office in Paris to its lineup. It will exhibit a Fairchild Cornell trainer at the forthcoming Brussels international aero exhibition. The plane will be available at the airport for on-the-spot demonstrations.

The company has sold about 100 planes of all types in the past twelve months. It reports that transport craft prices are down somewhat over last year, in some measure due to conversion costs being lessened through experience. DC-3s are going for about $35,000; DC-4s, about $250,000; Beech 18s, about $45,000. The Lockheed Lodestar, now selling for approximately $55-60,000, is regaining popularity as an executive transport because of its range and roominess.

Babbco at present has title to about 160 planes of all types.

Beech Warns Pilots On 'Standing Waves'

The peculiar dangers lurking for the unwary pilot in "standing wave" phenomena is the subject of a recent Beech Aircraft safety suggestions bulletin. This is the fourth in a series the company has distributed to thousands of pilots in its campaign to get safer flying and to quench idle airport rumors concerning the airworthiness of personal aircraft.

As explained in the new Beech bulletin, standing waves occur in the lee of a slope under certain not yet clearly understood conditions, and consist of alternating upward and downward moving air currents continuing downwind from the obstruction initiating the phenomena.

Strato-cumulus and lenticular clouds are usually present near standing waves. Lenticular clouds, with their long axis perpendicular to the wind condition and parallel to the ridge are frequently found at the top of the wave. But these phenomena may also be found where there are no significant cloud formations.

▶ **Dangers**—Beech explains that high turbulence is generally encountered at low altitudes below either the up or down draft portions of the wave. At higher altitudes, the down draft portion, especially near the lee of a lenticular cloud, may be very turbulent. Thus, a pilot running into these conditions while on instruments could run into trouble, where an updraft could toss him into a cloud and tumble the aircraft's gyros.

A further hazard is present in the lee of the ridge causing the standing wave and extending to the first updraft. This is an area of lowered atmospheric pressure. Thus altimeters would indicate height higher than the plane actually was and rate-of-climb indicator could show climb when the plane was actually losing altitude. The dangers of such errors in mountainous areas is obvious.

▶ **Bonanza Investigation**—The company reports a case where a Bonanza became involved in a turbulent cloud condition and the gyros tumbled. Recovery involved an abrupt pull-out. On landing, the plane's wings were noted to have taken a permanent set. The company tested the wing and observed it took over a 6G load to distort the wing to the set it had taken. Load was increased until failure occurred at 8.58Gs.

The incident proved the importance of avoiding turbulence that can cause an aircraft to be thrown out of control, possibly putting heavy and dangerous loads on the structure during recovery.

BRIEFING FOR DEALERS AND DISTRIBUTORS

▶ **Copter for Spray/Dust Studies**—University of Illinois will now be able to increase its agricultural aviation research program. Recent acquisition of a Sikorsky R-4B copter donated by Carbide Specialty Works, Milwaukee, makes this possible. Craft will also be used for student flight training, photography, and various research projects. The university already has a copter obtained through war surplus, but stipulations prevented flying it.

▶ **Skimmer Progress**—Static tests are supposed to start in a few days on the new Colonial Skimmer personal amphibian (AVIATION WEEK Oct. 31,1949). Since most of the craft's structures reports have already received CAA approval, completion of all CAA certification requirements is expected to be made before Sept. 1. The design has been "frozen" with the Lycoming O-290-D engine, which reportedly gives the 2-3 placer a top speed of over 125 mph. and better than 600-fpm. rate of climb.

▶ **Willson Products Appoints**—Van Dusen Aircraft Supplies, Inc., has been named Willson Products aviation representative for the company's pilot glasses.

LETTERS

How About Navy?

Mr. K.S.B.'s "interesting comparison between the USAF and the Navy," in your Apr. 24 Letters, leaves the reader with the impression that the Vought F4U propeller-driven Corsair is the only airplane in the Navy.

It is true that the Navy is still buying F4U-5Ns from Chance Vought Aircraft. It is true that the Navy has "some very good technical reasons" for wanting fast, propeller-driven night-fighters. The Corsair, incidentally, isn't as archaic as K.S.B. implies, having undergone 1027 major engineering changes and 20,184 production changes since it first saw action. But it is not the only airplane the Navy has.

K.S.B. was greatly impressed by the fact that the Lockheed F-80 jet fighter is going out of production, to be replaced by a new Air Force jet airplane. The Navy has had similar experiences. At Chance Vought, the F7U Cutlass is replacing the F6U Pirate, which is now out of production. At McDonnell, the F2H Banshee is replacing the FH-1 Phantom, another jet which is now out of production. The Navy also has Grumman F9F jet Panthers, and Douglas XF3D-1 Skynights are on the way.

Things are not as wrong here as the apprehensive K.S.B. seems to think.

KEITH BAKER, Public Relations Manager
Chance Vought Aircraft
Division of United Aircraft Corp.
Dallas, Texas

Pilot Squabble

Your article in Shortlines May 8 showing such concern for the poor Panagra pilots touches me deeply. It would indeed be a pity if they were confined to their own routes and trackage.

These few pilots in turn have taken over a similar number of PAA jobs and PAA pilots have been forced to sell out in the resort city (Miami) and accept transfers to other bases.

Also, if you will recall a news item in your Jan. 16 issue you will find PAA furloughed 146 pilots as of the first of the year. Approximately 31 of these 146, many senior in service time to the junior men of Panagra, would still be working for the airline of their choice.

JIM SHARMAN, PAA pilot
P. O. Box 394
Setauket, N. Y.

Our Reply

Transport Editor Charles Adams wrote Mr. Sharman as follows:

Dear Mr. Sharman: I guess this just isn't *Be Kind to Editors Week. Here I pull into the office on Sunday evening after congratulating myself on out-witting all the other weekend drivers and right on top of my stack of mail is your letter.*

I'll grant that I may be touched—but certainly not with pity for Panagra pilots. Any time the fellows on AVIATION WEEK*'s news staff feel emotional about anything, they have to bleed on the editorial page, not in other sections of the magazine.*

So if the Shortlines item you refer to was biased it was certainly unintentional. Briefly, here's what happened:

Last Feb. 13 your PAA Councils 10, 17, 26, 30, 36, 37, 55, 56 and 61 filed a petition with the CAB asking CAB to deny further approval of the through flight agreement after May 5. That wasn't news because ALPA always opposed interchanges in any way, shape or form, as a matter of principle.

Then, last month, up comes this other petition from ALPA's Panagra Councils 38 and 83. Instead of just stating their support for continuation of the through flight agreement, the Panagra councils went on to explain the reasons for their stand.

Well, when there's a fight it's news, whether it involves airline presidents or ALPA councils. So we gave brief mention to it in Shortlines, citing the Panagra pilots' argument as presented to CAB. We're just as anxious to print your side of the case, and we plan to publish your letter. Thanks for writing.

Names & Copyrights

The letter you published on page 54 of your May 1 issue in reference to speed clips requires an answer.

We were the first to put the words "speed clips and speed clamps" into print. After its first appearance in print, George Tinnerman liked it so well he asked us to get the words copyrighted.

We explained to him that the federal government has never permitted copyright protection of any word or words currently used in the English language. The agency's client has not had exclusive right to those words in the past nor can it obtain exclusive rights in the future.

The words "Universal," "Gold Medal," "Standard" and scores of others are also trade marked by various companies. But this does not forbid others from using the same words for the simple reason that those words, like speed clips or clamps, cannot be copyrighted.

I might also add that any outside dictation of editorial policy is also in violation of the code of ethics of Sigma Delta Chi—the national honorary journalistic fraternity. Let us hope there will be no more letters published from agents of the advertiser telling editors what words they may not print when those words can never be protected by copyright for exclusive use by anyone.

HARM WHITE, President
White Advertising Company
Union Commerce Building
Cleveland 14, O.

Allison Does It

Needless to say, my associates and myself were much gratified to read your editorial entitled, "Allison Goes and Does It" . . .

It is our belief that Allison's purchase of the transport aircraft for proof testing the turboprop engines is a constructive move from the standpoint of the manufacturers, the airlines, the military services and ourselves. We believe that we have good engines in the T-38 and T-40 models and we are anxious to verify their adequacy and dependability as soon as practicable. However, we also want to assure ourselves that we are not proceeding prematurely . . . .

I read your magazine regularly to obtain the important news of the industry . . . .

E. B. NEWILL, General Manager
Allison division
General Motors Corp.
Indianapolis, Ind.

Free Copies

I seem to receive complimentary copies of all American aviation publications except yours. I am prepared to agree that yours is the most useful publication of them all but at the present time our government will not approve dollars for subscriptions to American magazines, so there is nothing I can do about it.

E. J. CONNELLAN
Connellan Airways
Alice Springs
Central Australia

Our Reply

To this and all other requests for free issues, AVIATION WEEK *must say no. Some publishers do not operate on a subscription basis. They give away their magazines free.* AVIATION WEEK *does not. But we appreciate Mr. Connellan's interest.*

For the Record

I appreciate your sending me a copy of your editorial, "The Great Train Robbery," of May 22. . . .

I have inserted the editorial in the Congressional Record for May 25, along with the extension of my own remarks.

I am hopeful that my House Resolution 547 will be authorized, and I am also hopeful if it is, and the special committee is created, that the whole picture will be brought to the attention of the American people.

JOHN R. WALSH
House of Representatives
Washington, D. C.

Death & Headlines

All of us in Capital like very much your editorial, "Death and Headlines." We feel as you do that the industry should publicize its remarkable safety record. Obviously, with the thought in mind which you suggested; even one person is too many to die, however, the public must be inescapable to the fact that there is danger in motion and the transportation companies will continue, unfortunately, to have accidents.

If we can do as you have done in your editorial, continue to put the emphasis on the facts of safety, then we will find that the public mind will not be so shocked whenever there are unfortunate accidents, but accept them as one of the hazards of this modern age.

HAYES DEVER, Secretary and Director—
Public Relations
Capital Airlines
Washington, D. C.

Domestic Airfreight Traffic
(Millions of Ton Miles)

Carrier	First 4 Mos. 1950	1949	1948	1947	1946
American	9.1	31.8	21.8	14.8	10.5
Eastern	4.1	8.5	5.7	2.5	.3
Flying Tigers	6.0	11.9	12.6	5.7	5.8
Slick	9.5	24.2	26.4	21.9	11.2
TWA	3.7	12.0	10.0	4.9	2.2
United	8.0	23.6	19.8	10.1	4.4
U. S.	1.0	1.4	.4	1.3	2.6
Totals	41.4	113.4	96.7	61.2	37.0

Profits Trail Zooming Airfreight

Traffic is 15 percent above 1949, but all-cargo lines run in red; Tigers' profit due to maintenance work.

By Charles Adams

Airfreight traffic records, which have tumbled with monotonous regularity during the past five years, are going by the boards again in 1950.

But the payoff question about airfreight remains unanswered: When will the airlines' postwar Topsy be able to stand on its own two feet? Although some carriers claim to be making money on airfreight, many observers contend that red ink is still the most significant commodity in the cargo picture.

Overall domestic freight traffic has been running more than 100 times the rate of five years ago. Volume during the first four months of 1950 was 15 percent ahead of 1949.

► **Losses Continue**—Yet two of the three all-cargo trunk carriers certificated last summer continue to show substantial losses. A third airfreighter—the Flying Tiger Line—has been operating in the black, but about one-fourth of its revenues have been derived from plane maintenance and leasing activities.

According to Civil Aeronautics Board experts, the all-cargo carriers are the most reliable yardstick for determining the profitability of airfreight. The regular trunklines do not segregate their costs sufficiently to show whether revenues from passengers, mail and express are subsidizing cargo.

American Airlines says that on an added-cost or reasonably allocated-cost basis it is showing a slight profit on freight. However, the carrier does not claim to be making money on cargo on a fully allocated-cost basis.

One top AA official compares the airlines' freight business with the meat packers' bone meal and fertilizer production. "Taken together with other operations, the sideline shows a profit. If it had to stand by itself, it wouldn't pay off."

► **Optimist's View**—Capital Airlines, which last year ranked just under the "Big Four" in cargo volume, is especially optimistic in its analysis of airfreight's profitability. The company is making a thorough study of freight costs and believes cargo is a money-maker even when it shoulders a full share of overhead—excluding such items as reservations, meal and hostess expense, which are chargeable solely to passenger operations.

Capital is certain it is making a clear profit on freight hauled on combination passenger-cargo flights. It admits that its four cargo C-54s don't make money on a fully allocated-cost basis, but points out that these planes, after deducting direct costs, contributed over $600,000 towards meeting the company's indirect operating expense last year.

During several recent periods, Capital's revenue per plane-mile from its C-54 cargo planes has been within 2 cents of its plane-mile receipts from DC-4 passenger operations. The cargo planes have been running about 70 percent full. Capital feels that if traffic increases sufficiently to support eight cargo C-54s at the same load factor, overhead will be spread sufficiently to permit a net profit on any accounting.

Neither American nor Capital complains that freight rates are too low. They emphasize that cargo is still in an experimental stage.

► **Difficulties Expected**—Last August, when CAB by a three-to-two vote cer-

CONNIE AIRCOACH TAKES 114 ALOFT

TWA really achieved a memorable load factor on its first westbound Constellation air coach flight Memorial Day weekend—on board were 77 adults, 32 infants in arms under two years old, and five crew members. It's believed that this flight set a record for number of persons flown on any regularly scheduled airline flight. The airline reports that since it put Constellation Sky Coaches in service on the New York-Chicago-Los Angeles run on May 26, the flights have averaged 89 percent load factor. The Sky Coach Connies normally carry a passenger load of 81 persons.

tificated Slick Airways, the Flying Tiger Line, U. S. Airlines and intrastate Airnews for all-cargo routes, the Board's majority conceded that the freight operators would continue to lose money for awhile. Passenger-carrying airlines, the Post Office Dept. and the CAB minority saw no end to the all-cargo carriers' deficits and predicted that the airfreighters would ask for mail pay and RFC loans to bail them out of financial difficulty.

With CAB's airfreight decision now more than ten months old, a review of the certificated all-cargo lines' record shows they are in no bed of roses. There have been no pleas for mail pay, but Slick has applied for a million-dollar RFC loan.

• **U. S. Airlines,** certificated for north-south cargo routes mainly east of the Mississippi River, has had the toughest time developing business. The CAB majority recognized this situation in its August, 1949, decision, and therefore refused to certificate a second all-cargo carrier to compete with U. S.

Since starting operations late in 1945, U. S. has lost more than $2,500,000. This includes a $367,665 net loss last year and a $125,413 net loss in the first quarter of 1950.

The carrier's C-46s flew nearly 1 million freight ton-miles during the first four months of this year. While representing a gain over the same 1949 period, the volume was only a small fraction of that reported by other major cargo carriers.

• **The Flying Tiger Line** has made an excellent showing since its certification for transcontinental routes nearly a year ago. With the help of non-freight revenues, it reported a $292,550 net profit for the nine months ended Mar. 31, 1950, and earned another $11,873 in April. But the company still shows an overall loss of $900,000 since starting service in July, 1945.

Cargo handled by the Tigers this year is running well ahead of 1949. During the first four months of 1950, the carrier flew nearly 6 million freight ton-miles—equal to more than half its volume for all last year.

• **Slick Airways** regained its lead as the largest freight carrier during the first four months of 1950. The carrier's 22 C-46s flew 9,493,000 freight ton-miles in the period, compared with 9,078,000 for American Airlines.

In May, Slick flew 2,901,000 freight ton-miles—up 39 percent over a year ago. New directional commodity rates (as much as 40 percent under previous levels) have stimulated traffic moving eastward from California and northward from Texas.

After being the biggest airfreighter in 1946, 1947 and 1948, Slick lost the title to American last year. AA believes it would also have been on top during the first four months of 1950 except for the strike by ground workers in March.

Losses have continued to mark Slick's operations during most of the period since its certification. The carrier had a $343,352 net loss in 1949 and a $147,787 net deficit in first-quarter 1950.

▶ **Supplemental Revenue**—Last year, Slick's revenues were bolstered by completion of a $2,100,000 Air Force contract for modification of 83 C-46s and by a smaller contract for modification of liaison aircraft. Altogether, activities of their supply and service division accounted for $2,621,000 in revenue, or more than 40 percent of the total.

On coast-to-coast transport operations alone, Slick lost $506,146 last year. Supply and service division came up with a $389,826 operating profit to slash the overall deficit, and Slick is looking for more contracts to keep the unit busy. Except for maintenance and overhaul profits, Slick would have shown more than $200,000 loss in first-quarter 1950 instead of a $147,787 deficit.

▶ **Traffic Soars**—In general, Slick considers 1949 and first-quarter 1950 financial results "disappointing" but not discouraging. Traffic, on the other hand, has exceeded expectations. Company officials believe volume this year will be at least 25 percent ahead of 1949.

While operating costs leveled off last year, addition of new stations has cut the average length of Slick's freight haul, boosting handling expense. But the carrier is economizing through personnel reductions. Last November, Slick was permitted to increase the maximum gross weight of its C-46s from 45,000 to 48,000 lb., permitting substantial gains in payload.

Slick says its present competitive situation is "unfair and untenable" because it must fight for business with subsidized carriers. President Earl Slick claims his company's costs are by far the lowest in the industry, but future prospects will be limited "until a basis of competition is developed in which there is some reward for good management and efficiency of operation."

▶ **Subsidies and Suits**—Separation of the trunklines' service mail pay from subsidy could ease the competitive situation, Slick believes. He hopes that evidence submitted in the pending Big Four mail rate case will show that cargo operations of American, United and TWA are being subsidized by mail pay.

CAB has pledged that it will not underwrite unnecessary all-cargo flights with mail pay and has disallowed several carriers' claims for such compensation. The pending $30-million anti-trust suit filed against American, United, TWA, the Air Transport Assn. and Air Cargo, Inc. (AVIATION WEEK Apr. 10) is another weapon in Slick's arsenal. However, none of these moves is likely to bear fruit for many months.

Meanwhile, Slick plans to defer the purchase of more efficient equipment—such as DC-6As or new Constellations.

CAB Gets Tough With Big Nonskeds

Moves to put eleven out of business, accusing them of misrepresenting services, abusing responsibilities.

Nonskeds operating transport-type equipment are reeling under new blows from the Civil Aeronautics Board.

The Federal agency has issued orders designed to put eleven more large irregular operators permanently out of business. And it has announced bluntly that the same treatment is in store for many other nonskeds whose operations have violated the Civil Aeronautics Act.

In a sharp indictment of nonsked practices, CAB said the irregulars have operated with little regard to their responsibilities to the public as common carriers. The Board accused the independents of misrepresenting their services, charging discriminatory rates, using inadequate and makeshift equipment and canceling flights for which tickets had been sold to increase their profits.

▶ **Safety Violations**—CAB cited cases in which the nonskeds have disregarded safety requirements by overloading their planes, by failing to maintain their equipment or have it inspected at required intervals, and by overworking their flight crews.

Basis for the Board's latest action against the nonskeds is its modification in May, 1949, of Section 292.1 of the Economic Regulations. At that time, the general exemption permitting carriers to engage in irregular air transportation was withdrawn. After June 20, 1949, only those nonskeds which had filed for individual exemptions were permitted to continue service pending a CAB decision on their new requests.

These moves, combined with previous CAB crackdowns and a high rate of bankruptcies, have brought a sharp decline in the number of large irregular operators.

Between 140 and 150 nonscheduled airlines held authority to operate DC-3s and other large-type transports late in 1948. Of these, 105 still held valid letters of registration in May, 1949. But only 96 applications for individual exemption were filed before the June 20, 1949, deadline.

▶ **More Casualties**—During the past year, suspensions and cancellations of operating authority have cut the number of large irregulars to 90. Latest series of orders would push the total below 80.

In 1949, the 49 most important "large irregular" domestic airlines flew about 125,000 passengers 300 million passenger-miles. This is less than 5 percent of the passenger mileage and less than 1 percent of the total passengers flown by the certificated domestic carriers in the same period.

About 150 transport-type planes were being used domestically by the nonskeds at the end of last year, compared with 771 for the certificated domestic trunklines.

▶ **Diversion Claimed**—But CAB claims the large irregulars have caused substantial diversion of certificated airline traffic on a number of important domestic routes. During the last half of 1949, the Board found that 21 nonskeds made 1017 one-way flights between New York and Miami.

In the same period there were 18 irregulars making 753 flights between New York and Los Angeles; 26 carriers and 688 flights between New York and Chicago; 9 carriers, 638 flights, New York-Detroit; 20 carriers, 585 flights, Chicago-Los Angeles; 18 carriers, 443 flights, Los Angeles-San Francisco; 10 carriers, 353 flights, New York-Puerto Rico; 8 carriers, 333 flights, Miami-Puerto Rico; 17 carriers making 319 flights.

TEST TAIL LOADS

NACA technicians are installing pressure measuring equipment in the towering empennage of the XR60-1 Constitution prior to a series of research flights. Object is to determine influence of size on changes in tail loads due to abrupt control motions. Current data on aircraft tail loads experienced during flight has been based on relatively small craft, and some question remains as to whether this information is sufficient for planes the size of the giant Lockheed. NACA's Ames laboratory at Moffett Field is seeking the answers.

New York-San Francisco; and 17 carriers, 214 flights, Chicago-San Francisco.

► **Exemptions Denied**—CAB plans to deny individual exemptions to eight nonskeds because they have either failed to operate under the letters of registration they now hold or because they have not conducted service for more than a year. These dormant carriers are: Aero Finance Corp. (C. N. Shelton & Co.), Miami; Reg. L. Robbins, Houston; Parr Air Services, Philadelphia; Virgin Islands Air Service, Inc., Miami; Samoan Area Airways, Honolulu; Nu-Way Air Express (Conchita B. Tormos), New York City; E. E. Saldana, Inc., San Juan, P. R.; and Hemisphere Air Transport, New York.

Also turned down were applications of Inter-American Airways, Inc., Miami Springs, Fla.; Standard Air Lines, Long Beach, Calif.; and Consolidated Air Lines, Seattle. Inter-American, active on the New York-San Juan run, had its operating certificate revoked last December for failure to get its aircraft engines inspected periodically. The company has repeatedly been the subject of CAB enforcement action for violation of economic regulations.

Standard, once a major transcontinental nonsked, had its letter of registration revoked last June for knowing and willful violation of economic regulations. Consolidated's request for individual exemption was denied because of the death of its owner, William F. Leland.

Each of the 11 carriers was given 30 days to ask CAB for reconsideration of its decision or for a hearing.

► **Applications Granted**—Two large irregular operators, Johnson Flying Service, Missoula, Mont., and Capitol Airways, Inc., Nashville, Tenn., were granted two-year individual exemptions. CAB said that neither carrier had conducted "route" services between large cities or operated between any two points with excessive frequency or regularity.

Johnson, which owns two DC-3s and three Ford Tri-Motors, operated only four nonscheduled flights with transport-type equipment last year. The company is active in student training, aerial firefighting, crop-dusting, aerial photography and aircraft maintenance.

Capitol Airways, which has two DC-3s, made only 91 flights with large equipment in 1949, carrying 976 passengers. Last year it made no more than four flights between any pair of cities.

► **Severe Restrictions**—Individual exemptions issued Johnson and Capitol contain severe restrictions which will be applied to any other nonskeds granted similar operating authority in the future. The carriers are prohibited from operating more than three flights in the same direction during any four successive calendar weeks between: New York and Miami, Los Angeles, San Francisco, Chicago or Detroit; between Los Angeles and San Francisco; and between Chicago and Los Angeles, San Francisco, Seattle, Washington or Miami.

Further, the nonskeds may not make more than eight flights in the same direction during any four successive calendar weeks between any two points other than those specified above. The eight-flight-a-month limit includes the Seattle-Alaska run, where, according to CAB, the three-flight maximum would be unduly restrictive.

► **Contract Flights Hit**—The limits apply to all flights made by a carrier whether or not the company considers them as being common carriage. CAB believes that, with rare exceptions, all charter or contract services performed by common carriers constitute common carriage. The Board feels that lumping both types of service together under the flight limitations will prevent attempts to evade regulations through "so-called contract operations."

Large irregulars granted individual exemptions will be prohibited from entering into agreements with other parties whereby the combined operation would exceed the authority granted to the individual carrier alone. Pooling arrangements through ticket agents will also be restricted; and advertising must clearly designate that flights are offered on an irregular basis.

Exemptions will continue in effect only as long as the nonsked has exclusive use of one or more transport-type aircraft, by ownership or lease, for a period of at least six months. Otherwise, the exemption will terminate.

CAB's drive against illegal nonscheduled operations has not directly affected some 2400 "small irregular" carriers using aircraft of less than 12,500-lb. maximum gross takeoff weight.

Spare That Mink!

Mink are entitled to peace of mind, and Trans-Canada Air Lines learned about it the hard way.

TCA has lost a $10,000 damage suit in the Supreme Court of Nova Scotia for flying too low over a mink farm in May, 1948. Owner of the farm claimed the mink were frightened so badly they killed each other.

The $10,000 award is a scale-down from the $13,120 damages asked by the mink rancher. But TCA is appealing the case because the principle involved affects the carrier's operations throughout Canada.

Counterattack

ATA claims railroad passenger losses exceed by far airline gains.

Air Transport Assn. has launched a statistical counterattack against charges that "subsidized" airline competition is hurting railroad traffic and finances.

Robert Ramspeck, ATA's executive vice-president, noted that the railroad's passenger traffic loss last year was more than seven times as great as the airlines' traffic gain. He told a Senate Interstate and Foreign Commerce subcommittee investigating surface carrier problems that rail passenger traffic has been skidding since the close of World War I—long before the arrival of commercial air transport.

► **Trend Reviewed**—The railroads' 5.7-billion-passenger-mile traffic loss in 1949 consisted of a reduction of 4 billion coach passenger-miles and 1.7 billion Pullman passenger-miles. The airlines' gain for the year was 740 million passenger-miles.

Ramspeck said railroad attempts to saddle the airlines with the full cost of public airports do not make sense. The ATA official pointed out that last year the scheduled airlines made less than 20 percent of the landings and takeoffs at commercial airports with control towers. The balance of the airport traffic involved military aircraft, fixed-base operators, nonscheduled carriers and other itinerant planes.

► **Airport Charges**—Landing fees, rentals and other airport charges are paid by the airlines in open negotiation with the municipalities, Ramspeck continued. "And in these negotiations, the airline has very little with which to bargain, since it is required by the Civil Aeronautics Board to serve the city."

Ramspeck pointed out that the airlines share airways facilities with all other aircraft operators, including the military. He observed that the congressional Aviation Policy Board in 1948 estimated that around 90 percent of future federal airways expenditures is directly chargeable to national defense.

As for mail subsidies, Ramspeck said that the "Big Four" trunklines (American, Eastern, TWA and United) receive purely compensatory rates. These four carriers, he declared, transport 71 percent of the domestic airline passenger business; "therefore, it cannot be argued that any part of this traffic has been diverted from the railroads by reason of air mail subsidy."

► **Rates a Factor**—The ATA official emphasized that rail coach rates had increased 44 percent, Pullman fares 36 percent, and airline fares only 10 percent since the end of the war. These

lower fares, together with improved airline service, have brought increased patronage.

Not subsidies, but better equipment and operating efficiency which cut airline operating costs from 65 cents a drevenue ton-mile in 1940 to 54 cents in 1949 permitted the airlines to hold the line on rates, according to Ramspeck. While airline operating costs were declining 17 percent, rail costs were soaring 63 percent, the ATA executive declared.

Ramspeck suggested that the railroads, instead of blaming the airlines for their losses, might find it more profitable to improve their passenger services. He said that a number of progressive railroads had made commendable efforts in this direction and had found that the public responded.

Central Requests System Extension

Central Airlines has asked the Civil Aeronautics Board to extend its feeder system to 32 additional points in Oklahoma, Texas, Kansas and Nebraska. One of the proposed new links would extend northward from the Ft. Worth carrier's present terminal at Wichita, Kans., to Omaha. Central currently serves 25 cities with its single-engine Beech Bonanzas.

ATA Lifts Sights

Air Transport Assn. has lifted its sights on 1950's domestic trunkline traffic.

At the beginning of the year, ATA hopefully predicted that 1950 revenue ton-mileage would increase 8 percent over 1949. But on the basis of the past five months it now predicts an 11-percent gain.

ATA thinks domestic trunkline passenger-mileage will rise from 6,562,580,000 in 1949 to 7,300,000,000 in 1950. The 11-percent gain would compare with a 13-percent increase in 1949 over 1948. Express and freight volume should make substantial gains this year, but mail traffic will show little change from its normal volume.

► **Revenue Gain**—"Total domestic trunkline operating revenues may reach $501,600,000 this year, compared with $460,000,000 in 1949," ATA declared. With some further reduction in unit costs expected, the association says net operating profits should approximate last year's $25 million.

While the airlines racked up further gains, railroad coach, Pullman and bus traffic continued to decline during early 1950. Last year, while domestic trunkline passenger volume was gaining 13 percent, Pullman traffic was off 14 percent, rail coach business slumped 16.6 percent and intercity bus volume dropped 9.6 percent.

SHORTLINES

► **American**—R. Dixon Speas, who recently resigned as special assistant to President C. R. Smith to become U.S. representative of A. V. Roe, Canada, Ltd., says he made the move because of his conviction that the era of the pure jet transport is near. He believes testing and experimental operation of Avro Canada's Jetliner will be completed in about two years and contends that turbojet transports will precede turboprop airliners into scheduled service.

► **Australia**—Route mileage of the country's domestic airlines increased 18 percent last year over 1948; passenger traffic gained 7.6 percent; and freight volume rose 24 percent.

► **Brazil**—A bill appropriating about $2 million a year subsidy for national airlines flying to foreign countries has been approved by the Brazilian congress.

► **BOAC**—Early this month put Stratocruisers on its Montreal-London route, replacing Constellations which are being shifted to BOAC's London-South America service.

► **Buffalo Trolley**—Planned to start intrastate air service between LaGuardia Field, N. Y., and Buffalo last week. One-way fare of $12 compares with $18.40 on the certificated airlines.

► **Civil Aeronautics Board**—Has advised airline attorneys that requests for oral argument, delay in procedural steps and submission of briefs over the 50-page limit will be denied more frequently in the future in the interest of economy. . . . The Board will soon hold hearings on applications of Braniff, Continental and Pioneer to cut excess baggage charges 50 percent on weights in excess of 26 lb.

► **Eastern**—New agreement with the Air Line Stewards and Stewardesses Assn. gives 450 flight attendants a 4-percent pay increase. Monthly rates now start at $190 and reach $270 maximum in the seventh year.

► **Federated Airlines**—The New York nonsked has asked CAB to reconsider its decision denying Federated's application to operate trans-Atlantic charter flights this summer (AVIATION WEEK May 29). Carrier contends limitation of such operations to Transocean Air Lines, Seaboard & Western Airlines and the Flying Tiger Line gives these companies a monopoly on the overseas contract business.

► **Flying Tiger Line**—Has signed interline freight agreements with American Airlines and Western Air Lines.

► **ICAO**—CAB Member Russell Adams, chairman of the U.S. delegation, told the fourth session of the International Civil Aviation Organization Assembly in Montreal that the U.S. still favors a multilateral agreement on commercial rights in international air transport but believes that further discussion of the subject now "would not be fruitful."

► **Linea Aeropostal Venezolana**—Venezuelan government has appropriated an additional $1,200,000 for operation of state-owned LAV. Money will be used largely to cover losses sustained in operating uneconomic routes which must be maintained in the public service. Remaining funds may be applied to the purchase of additional C-46s.

► **Mid-Continent**—Earned $36,665 net profit in April, compared with $34,202 in April, 1949. Passenger miles flown and passenger load factor were down slightly.

► **Mid-West Airlines**—Plans to start service to Creston, La., this month.

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► **Northwest**—Planned to start service to the Chinese Nationalist base of Taipeh, Formosa, early this month.

► **Pan American**—GCA equipment installed at Gander, Newfoundland, in December, 1946, has been used for more than 10,000 landings. PAA operates the unit for all major U. S. and foreign lines flying the Atlantic.

► **Saunders-Roe, Ltd.**—May enter one of its ten-engine, turboprop Princess flying boats in the 1953 London-New Zealand air race (AVIATION WEEK May 29). First Princess is expected to fly next year.

► **Seaboard & Western**—U. S. Supreme Court has refused to grant the trans-Atlantic cargo carrier a writ authorizing full intervention in Civil Aeronautics Board mail rate cases involving Pan American Airways, TWA and American Overseas Airlines. S&W contends that mail pay received by the three certificated carriers enables them to compete unfairly with Seaboard's unsubsidized operation, and full intervention is necessary to protect Seaboard's interests.

► **Trans Caribbean Air Cargo Lines**—CAB has granted the nonsked carrier an exemption permitting it to lease DC-4 equipment to Eastern Air Lines.

► **United**—Now plans to start San Francisco-Portland-Seattle coach service on July 5. CAB denied the carrier's short-notice request to begin flights June 4.

► **Western**—Has started service to Brookings, S. D.

CAB SCHEDULE

June 12—Hearing on approval of Transocean Air Lines' agreements with Loftleider, h.f., and Trans-Asiatic, Ltd., (Docket 4344)

June 12—Oral argument on additional service to Puerto Rico. (Docket 2123 et al)

June 14—Resumption of hearing in National Airlines route investigation. Postponed from June 1. (Docket 3500 et al)

June 19—Prehearing conference on application of Lineas Aereas Costarricenses for a foreign air carrier permit to operate between San Jose, Costa Rica, and Miami. (Docket 4198)

June 20—Hearing in CAB enforcement proceeding against Metropolitan Air Freight Depot. (Docket 4319)

June 26—Hearing in Florida-Bahamas service case. (Docket 2824 et al)

July 10—Resumption of hearing in Colonial Airlines mail rate case (Docket 2724)

July 17—Hearing on Lehman Brothers' interlocking relationships case involving partners of firm holding airline directorships. (Docket 3605 et al)

Jan. 8, 1951—Hearing in Big Four mail rate case and CAB investigation of the carriers' economy and efficiency. (Docket 2849 et al)

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STRICTLY PERSONAL

CALLING ALL TWIRLY BIRDS—R. Allen Price, Secretary of the Twirly Birds, beseeches us to ask all members of that organization—or those eligible to membership—to please write him, giving their names and addresses. He is at Stanley Aviation Corp., 1560 Harlem Rd., Buffalo, N. Y. Says he:

"During the annual forum of the American Helicopter Society in Philadelphia, the annual get-together of the Twirly Birds was held. This is a group of pilots who had soloed a rotary-winged aircraft prior to VJ-Day." President is **Steve Tremper,** at Piasecki Helicopter Corp., Morton, Pa.

* * *

SPLIT PERSONALITY—Thanks to Reader **David Jameson** of Pulaski, Va., who tells us about **Dr. Douglas Southall Freeman,** the historian, who addressed a meeting of top officials and 600 employes of the Norfolk & Western Railway at Roanoke recently. Furthermore, he is a director of the Southern Railway, and in his address he attacked the subsidies received by the airlines. He even presented statistics to show trains are safer than planes. As soon as the good doctor completed his speech he excused himself and beat it for the airport to catch a plane home.

". . . and now for some four-stripe dramatics on how much ice he picked up."

DR. VON FLUGEN'S AVIATION GLOSSARY
(Continued)

BALLAST: See BOOM.
BANK INDICATOR: A device used by safe crackers to locate prospective business sites.
BARREL ROLL: A type of athletic contest. Usually occurs at company picnics and is enjoyed only because the barrels have been previously emptied by the contestants.
BASE METAL: A term used by makers of aluminum products in referring to stainless steel, and vice versa.
BOOM: See BALLAST.
BRAZIER: A garment used to minimize the effects of flutter and vibration.
BUCKING BARS: A pilot's favorite pastime.
BUFFETING: Eating dinner while standing up.
BULKHEAD: A derogatory expression usually applied to persons of questionable intelligence.
BURBLING: What the stewardess does to your baby after it has eaten.
BUTT JOINT: A disreputable establishment.
CANOPY: Censored.
CAP STRIP: To remove one's headgear.
CARBURETOR ICING: A sweet substance applied over carburetors to improve palatability and/or appearance.
CASTOR OIL: A lubricant used for cross-wind landing gears and wheel chairs.
CERTIFICATED AIRCRAFT: An aircraft, all hazardous features of which have been either overlooked or camouflaged.
CHARACTERISTIC CURVES: Easiest way to distinguish between a steward and a stewardess.
CHIEF ENGINEER: A person, totally devoid of all engineering knowledge, who married the boss' daughter.

(To be Continued) —R. H. W.

WHAT'S NEW

New Books

Fundamentals of Powerplants for Aircraft by Joseph Liston, professor of aeronautical engineering at Purdue University, is a generalized presentation for student engineers. The author makes no attempt to treat any topic exhaustively, preferring to give broader coverage to the entire field. He presents powerplant characteristics in such manner as to enable the student to become familiar with each basic type, and to appraise objectively the advantages of newer types.

Beginning with basic requirements and past achievements, the text develops the theme of engine performance through discussions of energy utilization, fuels, charge handling, cylinder phenomena, test techniques and data reduction. A chapter dealing with turbine engine characteristics concludes the book.

Much of the material is timely, including data on pulsejet, ramjet and rocket engines, although only brief mention is made of the compound engine.

The text is fully illustrated, but many of the graphs and diagrams are crudely drawn. Many references are listed at section ends.

Lack of an index, and the physical size of the book (11¼ in. is too high for most bookcases) will prove minor annoyances to students.

Published and distributed by the Tri-State Offset Co., 817 Main St., Cincinnati 2, Ohio, the book retails for $5.50.

The Thunderstorm by Horace R. Byers and Roscoe R. Braham is a thorough analysis of this phenomenon gathered as a result of observing over 179 thunderstorms in Florida and Ohio during 1946 and 1947. The book describes the findings of the Air Force thunderstorm project, which flew 1363 flights through these types of storms, and the use of radar to pick the safest routes in bad weather.

Author Byers was director of the project and was awarded the Institute of Aeronautical Sciences' Robert M. Losey award in 1941 for his contributions to weather research. Mr. Braham is a United States Weather Bureau expert.

New Literature

Catalog describing clips, clamps and brackets, including five new cushioning materials, is available from Thomas Associates, 4607 Alger St., Los Angeles 39, Calif.

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AVIATION WEEK—JUNE 12, 1950

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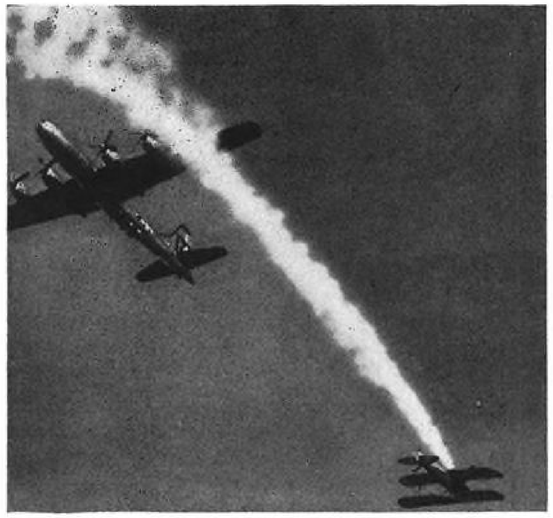
SEARCHLIGHT SECTION
(Classified Advertising)

EDITORIAL



Risking Death for "Thrills"

This picture won a Pulitzer prize in photography.

It tells a dramatic story of a miraculous escape from death.

They say a picture is better than 10,000 words. This one certainly is the best sermon for safe and sane air shows that we ever saw.

William Crouch, a staff photographer for the Oakland Tribune, was covering a show last October and snapped this picture as a B-29 wandered over the area and nearly collided with a busy smoke-trailing stunt plane.

You can be sure the crowds watching the air show were "thrilled." And it's true that the Air Force crew and the stunter got out of this with their hides. And none of the spectators below got killed. But you can bet they all went home talking about everybody's remarkable escape.

"Those poor devils in that B-29 couldn't have done a thing to help themselves."

"Why, we were standing right under those planes when they nearly hit."

"You can never tell when something like that is going to happen to airplanes."

And don't think those hundreds or thousands of spectators kept their story to themselves. They told everybody they met for days. The picture was in all the papers to thrill people who weren't there. It's a miracle that the picture wasn't one of those ground views of smoking debris and arrows denoting bodies. How could sponsors of this air show have justified taking a chance with so many human lives, for "thrills"?

Safe and sane air shows draw as many crowds as stunters. Those who have the best interests of aviation at heart will ban stunts forever. Let's go out of our way to sell the public on safe flying, not kill them with careless flying.

"Fair Play" or Service?

You may remember that several months ago on this page (Mar. 27) we quoted Robert Ramspeck, Executive Vice-President of the Air Transport Assn. He regretted that ATA has no industry public relations program. "In fact," he said, "We have had no industry program. We have been waiting until the fire bell rang—then we rush out to stop the fire. That is defensive action only. We need a positive program."

There is such a program in behalf of the railroads. We have none other than S. M. Felton, president of the American Railway Car Institute, to prove it. Mr. Felton let the cat out of the bag some months ago in a surprisingly blunt speech before the New York Railroad Club. The speech got little attention at the time it was delivered.

Mr. Felton gives the inside story of some of the current rash of ads and press releases for the railroads as follows:

. . . Ten months ago (about Mar. 1949) the car-building industry formulated a plan of information and education designed to help create a "thought climate" in which the problems of the railroads might command an increasing amount of attention from the American people. The plan was presented to the railroads in the East, West and South for their counsel. This was gladly given and the plan was thus tailored to fit their ideas and suggestions.

After five months of intensive preparation, the program was started in Aug. 1949. Based upon the theme of Fair Play for America's Railroads, it includes advertising in magazines of general circulation reaching a readership of 24,000,000, printed material, publicity and other methods of public communication. It is aimed at reaching both the public at large and those thought leaders within the public who usually are most important in influencing others. The objective of this "Fair Play" program is a positive one of presenting the railroads' position. At the same time, it has necessarily indicated the unfairness of some aspects of the present competitive picture.

This program has now been in effect long enough to enable us to gauge its impact to some extent. We feel that it has been productive of excellent results but we are also frank to admit that our program would undoubtedly be even more productive if augmented and expanded with the assistance of other interested groups.

At this point I should like to have you recall the thought expressed at the outset of this talk—namely that the objective of fair play for the railroads is far broader than the matter of bringing the railroads back to a state of economic health. It is, as indicated, more than a fight to preserve one industry. It is a fight for the preservation of free enterprise in the American republic.

We hope that when the airlines decide to do a little creating of "thought climates" themselves they will base it on something closer to public interest than a cry urging "Fair play for us." That's too much like whining.

The American public, we think, still admires those with get-up-and-go. The best way for the rails to get a square deal is to earn it with outstanding public service. Ditto for the airlines.

—Robert H. Wood

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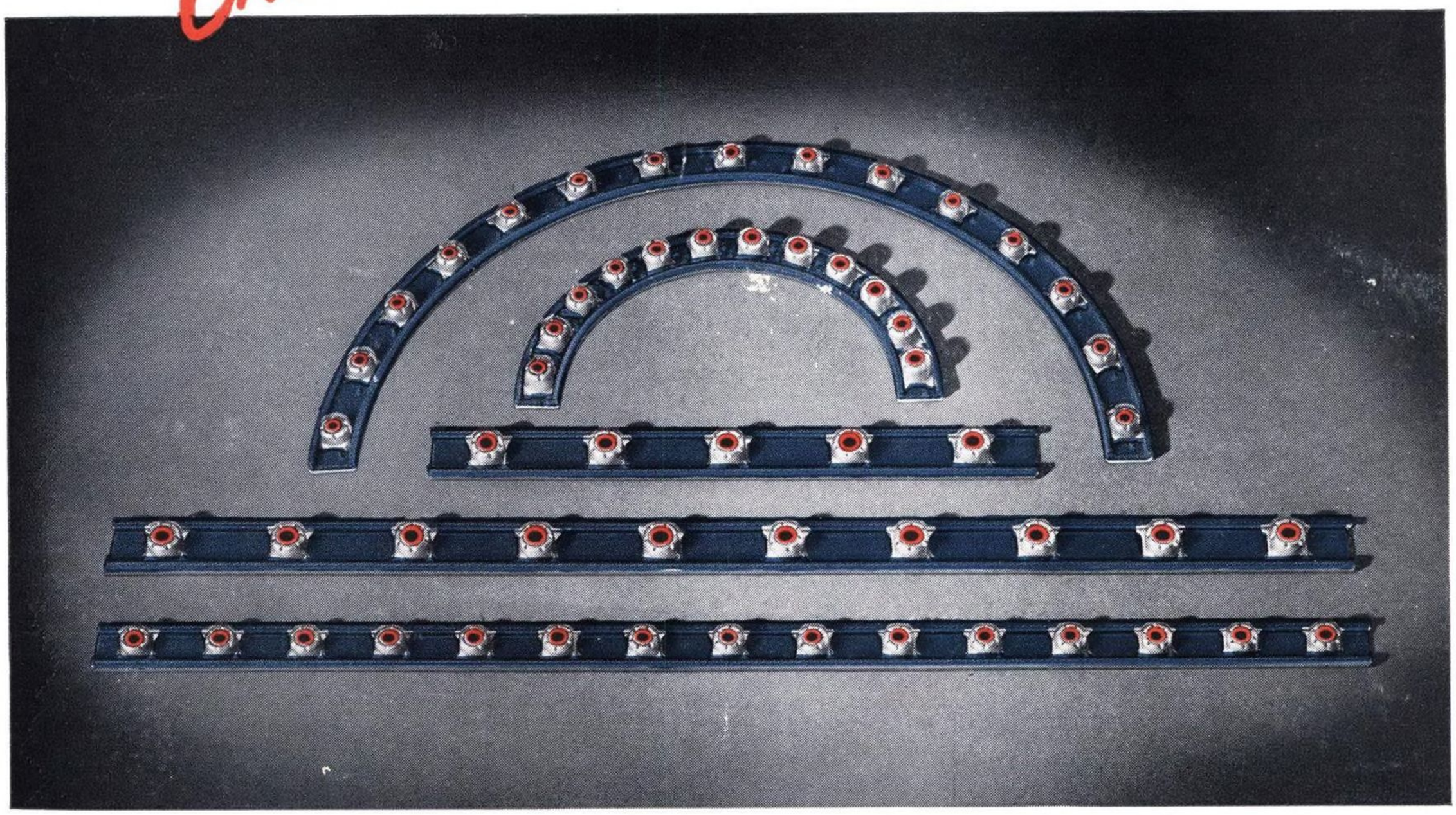

—New High Strength 24S-T4 Aluminum Alloy Channel Strip—Colored Blue for Easy Identification!

During production, mis-alignment of sub-assembly components can result in twisted channel strips—or nuts pushed out. This is particularly true in such applications as access covers and panels. Therefore, to promote additional production line economy and to further simplify time-saving multi-unit nut installations, ESNA developed their new 24S-T4 gang channel strips.

The extra tough aluminum alloy used for this new product provides additional strength for these unusual assemblies . . . and a new method of cut and raised dimpling retains the nuts securely, and prevents over-riding.

In addition, the new ESNA gang channel features a Nylon Locking Insert that assures *reuseability for over 100 applications.* This means tremendous savings in maintenance costs. Why? Because access covers, panels and similar components are regularly detached to permit inspection or repairs. Formerly, nut strips used on these assemblies had to be replaced, because of the high re-use factor. Now, however, the new ESNA Gang Channel Nuts, with the nylon red elastic locking collar, guarantee long range maintenance economy—the *self-locking torque is assured for the life of the aircraft.* And like all Elastic Stop Nuts, they protect fastenings against vibration . . . impact . . . and shock! The famous nylon red elastic collar keeps bolt and nut threads rust-free, seals against liquid seepage . . . and is RE-USEABLE . . . OVER ONE HUNDRED TIMES!

HERE'S A CHALLENGE: Send us complete details of your toughest bolted trouble spot whether it involves a gang channel nut application or another type of Elastic Stop Nut. We'll supply test nuts—FREE, in experimental quantities. Or for data sheets on the new ESNA Gang Channel—Write: Elastic Stop Nut Corporation of America, Union, N. J. Representatives and Agents are located in Milwaukee; New York City; Cleveland; Indianapolis; Boston; Detroit; Chicago; Pittsburgh; Houston; Bradenton, Florida; Beverly Hills, Calif.; Montreal, Canada.

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