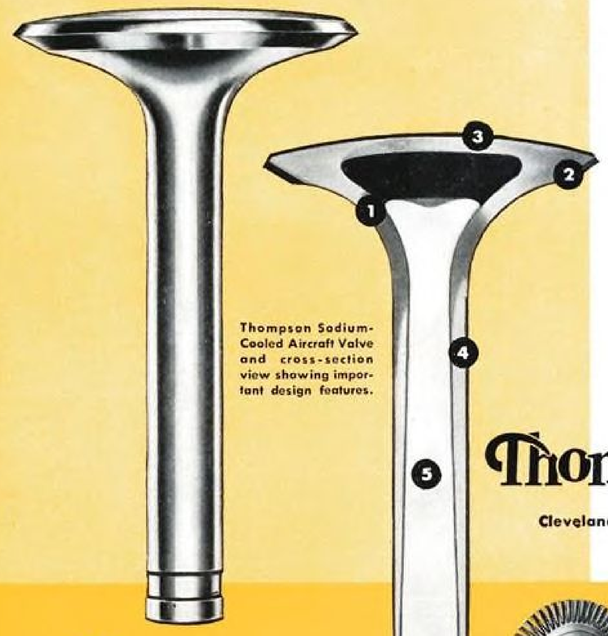
AVIATION WEEK

NOV. 3, 1947

INCORPORATING AVIATION AND AVIATION NEWS

A McGRAW-HILL PUBLICATION

Built to Withstand Mayhem



Thompson Sodium-Cooled Aircraft Valve and cross-section view showing important design features.

AN AIRCRAFT VALVE is subjected to all forms of violence. It is blasted by white-hot gases and its head pounded against the valve seat twenty times or more each second. Friction attacks it from the sides, while the stem tip takes the trip-hammer blows of the camshaft.

Yet the Thompson Sodium-Cooled Aircraft Valve takes this heat, wear and battering for thousands of flying hours before replacement is necessary.

That is why you will find Thompson Sodium-Cooled Valves so universally used as original equipment by leading American aircraft engine builders.

1. **Steel developed especially for aircraft service.**
2. **Hard alloy steel ring where valve contacts valve seat.**
3. **Heat-resistant alloy to protect valve head from hot combustion gases.**
4. **Nitrogen-impregnated stem to resist frictional wear against valve guide.**
5. **Sodium content liquefies under engine heat to cool valve head.**
6. **Hard alloy tip to resist camshaft pounding.**

The Thompson Aircraft Valve is only one of hundreds of hardened and ground parts made by Thompson for all types of aircraft engines, including jet turbine wheels and nozzle diaphragms.

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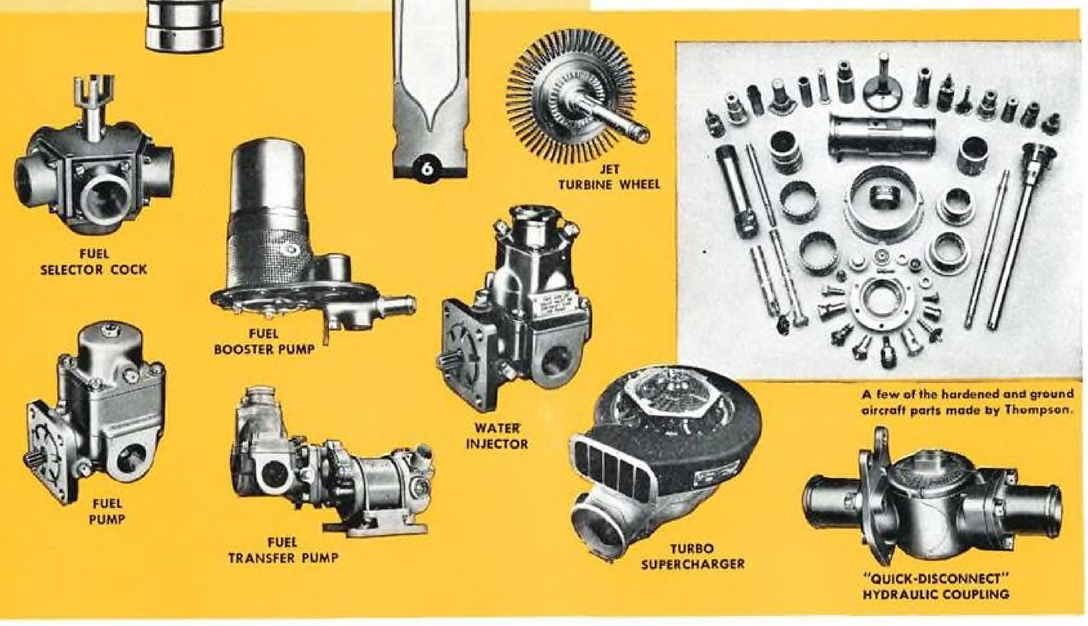

A few of the hardened and ground aircraft parts made by Thompson.

This airplane lands on a package

ONE of the important things an airplane designer looks for in landing gear equipment is ground control. For the best take-off, landing and taxi performance, brake, wheel, tire and tube must all meet specific needs of the airplane.

To provide *maximum* ground control, B. F. Goodrich has developed a landing gear "package" for every modern type of plane. It's made up of a B. F. Goodrich Expander Tube brake, B. F. Goodrich wheel, and B. F. Goodrich tire and tube.

Each part of the assembly helps to improve ground control.

B. F. Goodrich Expander Tube brakes cannot lock, grab or drag. They respond smoothly to minimum pressure. Their full-circle braking surface, combined with the even pressure of the expanding tube, gives their action maximum power.

Fully tested B. F. Goodrich wheels meet all strength and endurance requirements, take landing shocks and loads in their stride. They are precision manufactured for true alignment of parts and balanced to close tolerances.

Better grip, more cushioning and greater safety are built into B. F. Goodrich tires and tubes. Cord construction, tread and section width of tires are all tailored to specific requirements of each plane model.

From the 56″ size on the Lockheed Constitution to the 6.00 x 6 size on the Bellanca shown above, the B. F. Goodrich assembly assures excellent, trouble-free performance . . . long life . . . easy, low-cost maintenance. The complete assembly, ready to install on a plane's axles, is now available to manufacturers. *The B. F. Goodrich Company, Aeronautical Div., Akron, Ohio.*

B.F.Goodrich
FIRST IN RUBBER

AVIATION WEEK

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THE AVIATION WEEK

PRESSURE ON AIRLINES—From every direction and in every way, the scheduled, certificated airlines have been under increasing pressure for the past several months —on safety, on operations, on management, on rates. The ultimate may have been reached with the investigation of airmail rates by a House subcommittee.

This could force a show-down in both legislative and executive branches of the government and in the industry on a variety of issues—some not obviously related to the main theme of the investigation.

The significance of the probe can hardly be missed by industry observers who remember that more than a decade ago another Congressional group—although on the Senate side—touched off the events that led to the airmail cancellations, wrecked the then existing air transport pattern and also caused the revamping of much of the manufacturing industry.

It is difficult to see at this juncture how results of the present investigation could be as far-reaching—but they will be serious.

PROBLEM OF EMPHASIS—In attempting to weigh the importance and ultimate effects of the current investigation, the industry is faced by a bewildering array of factors that is above par even in the political point and counterpoint atmosphere of Washington.

What eventually will happen may well depend upon which of those factors the House subcommittee chooses to emphasize.

Without reading into the announcement of the subcommittee's chairman, Rep. Edward Rees (R., Kans.), motives which may not be there, experienced bystanders in Washington cannot help but be impressed by the fact that the inquiry (A) could serve political ends useful to a Republican-controlled legislature (with the airlines as the foil); and (B) will not be exactly bad news to steamship companies, particularly those anxious to get into air transport, and to other surface carriers who long have been baiting the airlines about government financial assistance.

POST OFFICE ON SPOT—If the Rees probe in the end results in a change in method of calculating or awarding airmail payments, the airlines of course would feel the main effects. But the investigation may be directed more at the Post Office Department than at the carriers.

The Post Office is historically the greatest patronage dispenser in the government and at the present time is controlled by Democrats. The Rees subcommittee, regardless of its sincere desire to effect economies in government, cannot duck out from under the obvious inference.

And to the assertion that CAB, not the Post Office, sets airmail rates, those putting a political interpretation on the subcommittee's action point out that CAB, too, is controlled by Democrats.

STEAMSHIP PATTERN—In most airline and government aviation circles, the word "subsidy," used in the same sentence with "airmail," is extremely distasteful. Yet, to most people outside those circles, and even to a small number within air transport, those words are synonymous. This fact focuses attention on another aspect of the Rees investigation.

Steamship interests assume as a matter of course that airmail payments are subsidies and little else. Some Congressmen believe the payments are largely subsidies.

Under those circumstances, shipping representatives in Washington found important acceptance in Congress of a proposal first put forth last spring that payments to air carriers should be labeled as service fees or subsidies.

Significantly, Rees now states that in order to get the airmail service on a "self-sufficient, business-like basis" it might be necessary to separate "subsidies" from service payments to airlines.

Another cherished proposal of some steamship lines has not yet appeared in the airmail investigation. This would tie the award of outright subsidies to an official declaration that the air carriers to be so benefited must have honest, efficient management. This reflects the contention of some of the hardest scrappers on the steamship side of the sea-air fight that airmail payments have been underwriting airlines management mistakes.

From at least one viewpoint, air transport officials are justified in taking a dim outlook toward proposals. For many years, the steamship lines, under law, have been subsidized to enable them to compete with foreign-flag lines that pay lower wages and have lower initial equipment cost.

Despite this, before the war the U. S. Merchant Marine trailed dismally in the wake of the fleets of four or five foreign nations.

MAIN EVENT—Reflecting the effects of another controversy in which the airlines find themselves, the Rees announcement brought up the fact that the airlines are asking for mail pay boosts while cutting freight rates.

This is indicative of how deep the probe may go.

Appraisers of airline economics see no quick solution to present airlines financial difficulties except mail pay increases. So to the extent that the Rees investigation affects the possibilities for such increases, it controls the future of the airlines.

In this respect, the present inquiry is fully as important and dynamite-laden as the Black committee probe of 1933 in the Senate. In this respect also, the other Congressional antics in which aviation has found itself involved lately may have been only preliminaries to the main event.

NEWS DIGEST

DOMESTIC

Lieut. Gen. Lauris Norstad has assumed his new post as Air Force deputy chief of staff for operations following appointment of Lieut. Gen. Albert C. Wedemeyer to Norstad's former job as director of plans and operations division of the Army.

Milton Reynolds, sponsor of Floyd Odom's projected round-the-world flight across the Poles, has delayed the project at the request of the Air Force.

Nationwide Air Transport Service, Miami Springs, Fla., has been denied a Civil Aeronautics Board exemption authorizing nonscheduled passenger service between the U. S. and Barbados, British West Indies.

Roger W. Griswold, Jr. was elected vice president and director of White Aircraft Corp., Palmer, Mass.

Navy will take title to the $20,000,000 Curtiss-Wright Corp. aircraft plant in Columbus, Ohio on Jan. 1, 1948 in order to preserve the plant's status as a major stand-by facility. C-W will continue to occupy the main factory building under the supervision of the Bureau of Aeronautics.

FINANCIAL

Continental Motors Corp. reports net loss of $54,779 after application of estimated tax refund for the quarter ending July 31. C. J. Reese, president, stated operations since that date have been on a profitable basis, which should continue. First half losses totalled $676,209.

AVCO Manufacturing Corp. declared a dividend of 20 cents a share on common stock payable Jan. 2 to holders of record Nov. 28, 1947. This follows a 10 cent dividend paid last May 15. Net income for first nine months of the year totalled $4,622,314 on sales of $76,395,205.

Exports and Imports of merchandise by air dropped from $21,973,000 in July to $18,688,000 in August. Shipping weight declined from 4,587,000 lb. to 4,179,000 lb.

FOREIGN

British South American Airways Corp. has announced an agreement to purchase British West Indian Airways.

Compagnia Aeroespressi Italiana has ordered four additional Ryan Navions, bringing to a total of six those operated from the firm's Milan, Italy base. In addition, two Republic Seabees and a Norseman transport are used in fixed-base operations.

NEWS SIDELIGHTS

BRITISH RESEARCH OVERPLAYED—Responsible Americans discount recent publicity from Britain on speeds attained by winged missiles—mistakenly described as airplanes. Actually, NACA says England is two years behind our transonic flight research program. We have been firing winged missiles at speeds far exceeding velocity of sound for over three years. Bulletin: Correlation of all data obtained during the 55-second flight of the British winged missile launched from a Mosquito bomber shows it did not hit the speed of sound.

NATS-ATC AS CONTRACT ROUTES—Sen. Brewster favors transferring Naval Air Transport Service and Air Transport Command operations to the private airlines under contract. The transport subcommittee of the joint Congressional Air Policy Committee which Brewster heads is considering the subject.

CAB SECURITY CONSCIOUS—CAB again is probing leaks in its system which have permitted contents of opinions to become public knowledge hours, sometimes days, before official announcement. Fact is that the advance information seeps out from Board big-wigs, not from underlings.

FEEDER WORRIES—Statements by Post Office and CAB officials opposing further extension of feeder lines worry local service applicants in the remaining area cases—Mississippi Valley, Middle Atlantic, and Arizona-New Mexico. Actually, however, feeder authorities like James Ray of Southwest ask who expected the local service companies to start operations in the black? Most efficient feeders operating are Pioneer and Southwest. Their records are good; in some respects better than expected. Joseph Garside's Wiggins Airways is studying possibility of starting service in the spring.

MIKE QUILL BODES ILL—Some responsible industry people fear that airlines having contracts with Mike Quill's radical Transport Workers Union (CIO) are in for trouble, especially if relations with Russia continue to deteriorate. Practice of left-wing maritime and dock-workers' unions in pulling frequent "quickie" strikes could spread to the airlines through TWU. Recent TWU testimony in favor of not one but three additional flight crew members on all four-engine transports over long hops is interpreted as a clue to maximum demands on management, under the guise of enhancing public safety.

DENVER-TWIN CITIES DEAL LAGS—United Air Lines is not pressing to purchase Western's Denver-Twin Cities link. Northwest has its hands full with its expansion to the Orient but if the link is put on the block next year Mid-Continent, Continental and Braniff might be bidders.

HEADLINE HUNTERS—Senators Brewster and Ferguson were the only majority members of the War Investigating Committee in Washington when the "Committee" made its quickie decision to advance the date for the second round of hearings on Howard Hughes' $40 million government plane contracts from Nov. 17 to Nov. 3. The "Committee" decision came the day after Hughes dispatched invitations to Senators to view a flight test of his 200-ton cargo ship—one of the planes under investigation—during the first week of November. Ferguson, chairman of the subcommittee making the Hughes investigation, replied by notifying Hughes that he would be re-called to the Capital during the first week of November. Just to keep news of the first flight of the world's largest plane from hitting the headlines before the Senate committee had its second chance to convince the public that the craft was a waste of government funds!

AERONCA'S WITHDRAWAL—Resignation of Aeronca Aircraft Corp. from the Personal Aircraft Council of AIA, scheduled for Nov. 1, is attributed to the company's rigid economy program which also resulted in release of a number of regional sales representatives. A new chairman of the council who will succeed John Friedlander, Aeronca president, is to be named at a PAC meeting at the National Aviation Clinic Nov. 20. Vice chairman of the PAC, Gordon Sleeper, former Republic Aviation Corp. personal plane sales manager, was not replaced when he left the council last summer. Sidney F. Brody, new vice president and secretary of Aeronca, is taking an active role in company management.

SOLOMON STUDIES NORTHEAST—Sam Solomon, popular ex-president and ex-chairman of Northeast Airlines, has been talking with Atlas Corp. on possibility of returning to the airline. Solomon would prefer to combine NEA with his own proposed Atlantic Airlines whose chances for a certificate now seem slim. When Atlas takes over Convair sometime after Nov. 3, there is some question as to whether the Civil Aeronautics Act will permit Atlas to continue its management of NEA.

PREPARED BY THE STAFF, EDITED BY ROBERT H. WOOD

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AVIATION WEEK

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INCORPORATING AVIATION AND AVIATION NEWS

Congressional Probe Will Seek Answers to Air Mail Losses

Post Office estimates of $14,859,469 loss during 1947 fiscal year stirs investigation by Rees Subcommittee.

Post Office Department's estimate of $14,859,469 loss in 1947 fiscal year air mail operations has spurred a Congressional investigation into the whys and wherefores. Directed by Chairman Edward Rees (R., Kans.) of the House Post Office and Civil Service Committee, the probe is being made by a subcommittee composed of Rees, Rep. Charles Vursell (R., Ill.) and Rep. Tom Murray (D., Tenn.).

Asserting a determination "to get the air mail service on a self-sufficient business-like basis," Rees suggested last week that the solution may be separation of cost-plus-reasonable-profit payments to carriers from subsidy payments, removing subsidies as weights on the debit side of post office department balance sheets.

▶ **Subsidy Plan**—The Rees proposal, which has substantial support in Congress, would probably be a first step in placing air carriers on the same basis of outright operational subsidization as shipping lines. This has been advocated over the past year by Sen. Kenneth McKellar (D., Tenn.), Sen. Guy Cordon (R., Ore.) and other members of the appropriations committees who complained against the present system of indiscernable subsidization. Earmarking would make it possible for the appropriations committees to slash allocations for subsidization.

Key subjects of the Rees Subcommittee investigation are airmail postal rates and service rates paid carriers. Rees appears convinced that the present five cents per ounce air postal rate should be boosted to seven cents or over and that the average 68 cents per ton mile paid trunk lines for mail carrying should be radically reduced.

▶ **Wants Rate Boost**—Even with the six cents postal rate proposed in legislation reported out of his committee and now awaiting Rules Committee clearance for floor action, Rees pointed out, 1947 fiscal year air mail operations would show a deficit.

Placing the average 68 cents per ton mile paid trunk lines for mail transport against the average 14 cents charged by the lines for commercial air freight, the Kansas congressman observed that "even with an allowance for the priority service given mail, this indicates an obvious subsidy. Furthermore, five of the scheduled airlines who have petitioned for increased air mail pay are also petitioning for additional reductions in commercial air freight rates—to give them greater competitive advantage over non-scheduled freight carrying lines operating without government mail subsidization."

▶ **Air Mail Increase**—Statistics furnished Rees' Subcommittee by the Post Office Department and CAB disclose that during the 1947 fiscal year there was a slight increase in air mail volume—far short, however, of Post Office's prediction of a doubled volume under a rate reduction from eight to five cents—a sharp decrease in revenue and a sharp increase in expenditure.

▶ **Volume**—Domestic originating airmail for 1947—including armed services overseas volume—amounted to 28,395,167 pounds. Excluding overseas armed services volume (carried by the services), the domestic originating poundage for the three preceding years was: 1946, 23,508,641; 1945, 30,931,004; and 1944, 34,307,348. Although domestic air mail reached a peak in June of 6,241 million pound-miles, the traffic was far short of double June, 1946, volume (4,796 million pound-miles) under the eight cent rate.

▶ **Revenues and Expenditures**—While Post Office revenues from domestic airmail dropped sharply—from $68,427,924 in 1946 to $54,257,258 in 1947 fiscal, expenditures for the service mounted from $49,011,932 to $69,116,727. A $19,415,992 profit on 1946 operations contrasted with the $14,858,469 loss in 1947. In 1945, air mail operations showed a profit of $30,300,348 (revenues, $81,237,389; expenditures, $49,937,041) and, in 1944, a profit of $21,530,917 (revenue, $79,412,510; expenditures, $49,881,593).

▶ **Carrier Payments**—Although air mail carried over the domestic system dropped from 99 billion pound-miles in 1946 to 65 billion in 1947, payments to carriers mounted from $27,489,999 in 1946 to an estimated $3,616,774 in 1947 (including $11,880,429 estimated payments to be made when certain permanent and new route rates have been fixed by CAB).

Rates paid domestic trunk lines during 1947 fiscal year ranged from an average 44.56 cents per ton mile for Eastern to $15.01 per ton mile for Northeast. Average rates paid other carriers were: American, 44.93 cents; Braniff, 59.37 cents; Chicago and Southern, $3.91; Colonial, $8.08; Continental, $3.56; Delta, 59.86 cents; Inland, $8.01; Mid-Continent, $4.37; National, 59.93 cents; Northwest, 60.48 cents; PCA, $2.39; TWA, 44.78 cents; United, 44.93 cents; and Western, $1.56.

Rates paid feeder lines, averaging $23.49 per ton mile, ranged from $14.36 paid Southwest to $51.53 paid Florida. Average per ton mile rates paid other feeders were: All American, $20.08; Challenger, $20.05; Empire, $20.65; Monarch, $32.91; Pioneer, $29.46; West Coast, $44.13.

PONTOON BERTH FOR NAVY SEAPLANES

Navy has developed this self-propelled seaplane berth. Multidirectional, the pontoon slip operates along a 600 ft. submerged cable. Its bell-mouthed entrance and three water jets on each side guide the plane to its mooring. Partly inflated plane tires act as buffers. (Press Assn. Photo)

UAL Fares To Rise

United Air Lines last week became the second domestic carrier to announce plans for another passenger fare increase. President W. A. Patteson said a tariff would be filed with CAB immediately providing for a ten percent hike to become effective Dec. 12.

Northwest Airlines' "second round" fare boost became effective Oct. 24. Other carriers are expected to follow the UAL and NWA moves. American Airlines to date has been the principal opponent of higher fares.

The first ten percent increase became effective on an industry-wide basis last April and brought the fare level to about 5 cents a plane mile. New UAL and NWA rates are about 5.5 cents a plane mile—still five percent lower than in 1941.

Fire and Downdraft Factors in DC-6 Crash

Intensive search of the Bryce Canyon area in Utah was under way last week following crash of a United Airlines DC-6 on the canyon rim killing all 52 persons aboard. It was the first accident involving the DC-6 and the second worst crash in domestic airline history.

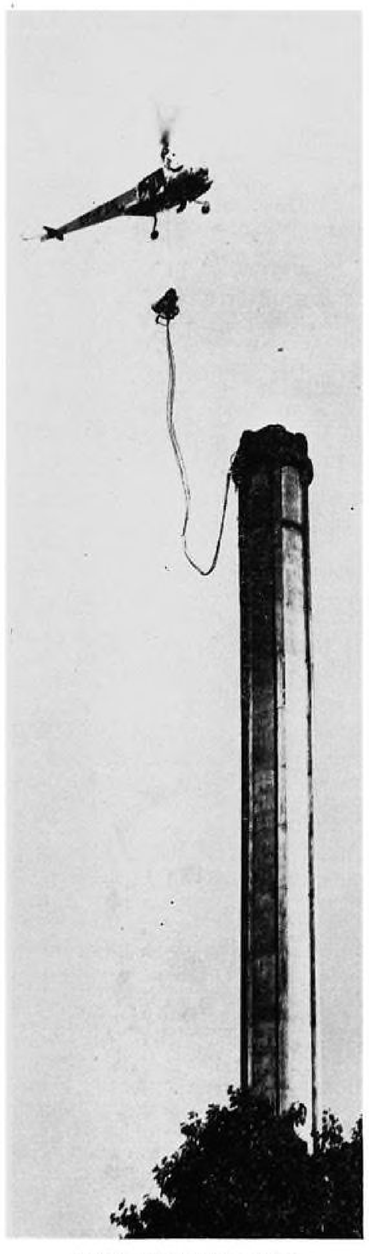
Preliminary indications are that fire was first discovered at an altitude of 19,000 ft. in the aft portion of the plane, probably the rear baggage compartment which is not accessible to the crew in flight. Discovery of parts of the fuselage, cabin interior and wings along the flight path from nine to 15 miles from the scene of the crash showed a fire of extreme intensity that burned through the rear portions of the fuselage. Radio messages from the pilot said he was attempting to make an emergency landing on the Bryce Airport at the edge of the canyon when he crashed.

▶ **Downdrafts Reported**—The aircraft struck less than 10 ft. from the top of the level mesa that tops the steep canyon wall in a position that indicated the pilot may have abandoned his attempt to reach the field and was trying to land on the flat mesa top. An AVIATION WEEK correspondent on the scene reported that a twin-engine Cessna making low altitude photographic runs over the scene only a few hours after the crash encountered severe downdrafts at the edge of the canyon. The Cessna was sucked down from 200 to 300 ft. each time it crossed the edge in the opposite direction that the DC-6 approached the rim. The Cessna pilot, former Air Force Major Ed Mays of Salt Lake City, described the downdraft caused by a strong west wind as the "most vicious sinking air mass I have ever encountered close to the ground." Although his Cessna has been specially modified for high altitude mountain flying and has a 1,500 fpm. rate of climb he was forced to fly down the canyon for several miles before regaining sufficient altitude to clear the mesa top. Mays estimated the downdraft to be about 500 fpm. in an abrupt channeled flow over the edge of the mesa.

▶ **Meets Latest CAR**—The DC-6 is equipped with smoke detectors and carbon dioxide 15 lb. two-shot fire extinguishers in both forward and rear baggage compartments. Extinguishers are controllable from the cockpit. The compartments are lined with fireproof material and comply in all respects with the revised Civil Air Regulations on fire prevention that do not become

YB-49 HEADS FOR MUROC AND ARMY FLIGHT TESTS

The world's only jet propelled flying wing bomber yet to take the air, the YB-49 trails smoke from its eight GE J-35 engines as it leaves Northrop Field, Hawthorne, Calif., on its first flight. The huge plane was flown to Muroc Army Base by Max Stanley, Northrop test pilot, who declared later that the craft landed in flyaway condition and could have been taken up again immediately, without the ground reworking to iron out the "bugs" that usually appear after a first flight.



NEW 'COPTER JOB

Builders of this 159-ft. chimney at New Westminster, British Columbia had neglected to equip it with ladder or climbing cable.

So, it simply got dirtier, and dirtier, and dirtier until James Sampson, former RCAF bomber pilot, and George Hastings of Aero Surveys, appeared with a helicopter and a proposal by Reg Bristowe of Art Cummings Co. Ltd., who wanted the job of cleaning it.

After eight passes over the top, the helicopter crew saddled the rim of the chimney with a scaffold hook and let drop the attached ropes for a cleaner's platform.

mandatory for all airliners until May 1, 1948.

Approximately 40 United Airlines, Douglas Aircraft, CAA and CAB engineers and safety experts headed by CAB regional Safety Bureau Chief, James Peyton, are conducting the investigation. Among Douglas personnel at the scene of the crash are Donald Douglas Jr., chief of experimental flight; E. R. Burton, chief engineer at Santa Monica and James Edwards, DC-6 project engineer.

▶ **Whitlock Paper**—Meanwhile the President's Air Policy Commission in Washington raised questions regarding American Airlines engineer Marvin Whitlock's paper on DC-6 deficiencies recently suppressed by the airline at a West Coast meeting of the Society of Automotive Engineers. The Whitlock paper—he is director of service engineering for American—charged that the DC-6 does not equal the DC-4 in mechanical performance and listed the following deficiencies:

- Inferior electrical wiring design and workmanship.
- Excessive wear on elevator rudder and tab attachments, structure noticeable in 500-700 hours compared with 5,000-8,000 hours on the DC-4.
- Carburetion and spark plugs "crowding for first place as troublemakers."
- Ineffective waste oil disposal causing a fire hazard.
- Engine cowls that can be dented with a thumb, wrecked by hail and may require replacement at $800 apiece after two engine overhauls.

▶ **Commission Queries** — Presidential Commission member E. Palmer Hoyt asked CAB Chairman James M. Landis if he thought the points raised by Whitlock, if true, represented aspersions on the officials who approve certification of new planes.

Landis answered "I do" and said that if he had been in charge of certificating the DC-6 he would have looked into Whitlock's charges before approving the plane. He pointed out that certification of new planes was the function of the Civil Aeronautics Administration. American Airlines said all the DC-6 deficiencies cited by Whitlock had since been remedied.

Meanwhile a Swedish Airlines DC-4 crashed on a mountain in Greece killing all 43 persons aboard and a Pan American DC-4 was long overdue in Alaska after radioing that it was encountering severe turbulence.

NAL Plans Layoffs

National Airlines plans to discharge about 20 percent of its 1,789 employees as soon as personnel reorganization plans can be drawn, according to George T. Baker, president.

Trans-Atlantic Mail Pay Boosts Eyed by CAB

Temporary mail payments for services performed by the three U. S. trans-Atlantic carriers between Jan. 1, 1946, and June 30, 1947, will be more than doubled under new rates proposed by CAB.

The board, in three show cause orders, suggested that the former rate of 75 cents a ton mile be lifted to 40 cents a plane mile for the 18-month period. Pan American Airways, which received $965,000 under the ton mile rate would receive an additional $3,264,000, or a total of $4,229,000 under the plane mile rate. American Overseas Airlines, which received $1,207,000, would be paid another $1,930,000 for a total of $3,137,000.

TWA would be paid a total of $3,328,000, up $1,391,000 over the former compensation of $1,937,000. In aggregate, CAB plans to increase mail pay for the three trans-Atlantic carriers from $4,109,000 under the 75 cents a ton mile rate to $10,694,000 under the 40 cents a plane mile rate.

For the period on and after July 1, 1947, CAB proposed to retain the 75 cents a ton mile rate for operations west of the gateway points which mark the line between purely trans-Atlantic services and operations on the European, African and Asiatic continents. In operations east of the gateways, where mileages are great, mail thin, and traffic light, CAB suggested mail payments of 35 cents a plane mile.

Shift in Akron Airports Favored by Examiner

American Airlines, Eastern Air Lines, Capital Airlines (PCA), and United Air Lines should be permitted to transfer their operations from Akron Municipal Airport to the new Canton-Akron Memorial Airport in the opinion of CAB Examiner F. Merritt Ruhlen. The former field is five miles from the center of Akron and the latter 17 miles.

Akron city officials asked CAB to prohibit the shift because of the distance factor, but Ruhlen pointed out that the Municipal Airport cannot handle equipment larger than DC-3s without restriction on some runways.

Republic Boosts Wages

Republic Aviation Corp. has given a voluntary wage increase to all employees except administrative and executive. Increase amounts to 10 cents per hour for production, maintenance and inspection employees, and 5 cents for indirect, office, clerical and technical employees.

Employees who are not on an hourly wage basis get a flat $2.00 per week raise.

Northrop to Redesign Pioneer

Production version will have square and longer fuselage, new tail configuration.

By SCHOLER BANGS

Redesign of fuselage and tail configurations of Northrop's Pioneer tri-motor transport, and increase of cabin floor width is contemplated as the company approaches a decision to build or not build.

Much depends upon whether the Army, expected to reach a decision within the month, places an order for Pioneers to be used in Arctic rescue service and to replace gliders previously considered for this and other tactical missions.

Should the Army order not develop, the company will be faced with the problem of obtaining from prospective commercial buyers, including Parks, TACA, and Norwegian Airlines, enough firm orders to warrant tooling up for production.

If the transport goes into production the fuselage will be lengthened from the present 60 ft. 7 in. to 66 ft. 6 in. High angular vertical fin and rudder will be given configuration similar to Black Widow fin and rudder. Round fuselage will be squared to increase by 28 in. Maximum floor width within fuselage will be 109 in. for 32 seats installed four abreast with aisle width up to 40 in.

In demonstration flights flown last week with AVIATION WEEK's Pacific Coast Editor the Pioneer was off the ground at 415 ft. at a weight of 23,000 lbs. and in landing stopped rolling 500 ft. after touchdown.

New Pioneer specifications, with the plane powered by Wright C7 engines, guarantee 700 ft. sea level takeoff at 25,500 lbs.

Test flight crews say that the guaranteed performances have been exceeded regularly in demonstration flights. Present operational estimates show the Pioneer capable of a direct flying cost of 35-40 cents per airplane mile, or 8 cents per ton mile using ATA formula. The company estimates a block speed comparable to that of the DC-3 at feeder line distances.

Court Issues Injunction Against Trans-Pacific

A permanent injunction prohibiting Trans-Pacific Airlines from operating in the Hawaiian area in violation of the Civil Aeronautics Act has been issued by a Federal court judge in Honolulu. Hawaiian Airlines, only certificated company in the territory, had charged that TPA was operating with a frequency in excess of that permitted by the non-scheduled regulations. A temporary injunction against Trans-Pacific was issued in August.

Meanwhile, a preliminary hearing on a counter-suit lodged by TPA for $1,000,000 damages from Hawaiian has been set for Dec. 11. Hawaiian and its affiliate, Inter-Island Steam Navigation Co., are charged with being a monopoly in violation of the Sherman Anti-Trust and Clayton Acts.

PAA-U. S. Lines Pact Disapproved

A Pan American Airways agreement with United States Lines Co. under which the steamship firm has acted as exclusive general traffic agent for the airline in a number of European countries has been disapproved by CAB.

The Board's action was based primarily on the premise that to entrust the solicitation of passenger traffic to a company engaged in a competing form of transportation is not in the public interest. "The arguments concerning the non-existence of competition are not persuasive," CAB declared.

"Competition exists even though the advantages offered by air travel differ from those offered by sea. Each company is seeking customers from the same market. We are convinced that solicitation of traffic and ticket sales is a function which requires a vigorous active effort stemming from undivided loyalty of the personnel involved."

At the same time, and for similar reasons, the Board denied the application of John W. Hanes for approval of his holding positions as director of PAA and director and chairman of the finance committee of U. S. Lines Co. CAB's decisions may have an important bearing on the recent Northwest Airlines-American President Lines agreement (AVIATION WEEK, Sept. 8). Under this pact, now before CAB for approval, offices and agents of both NWA and APF throughout the world will sell tickets for either air or surface travel, or a combination of both.

Domestic Lines Report Best Profits in August

The 16 domestic trunklines made their best financial record of the year during August, according to complete figures submitted to CAB. Net operating income for the month was about $2,900,000, compared with $2,301,000 in May.

Further proof that the good showing carried over into September was seen in Capital Airlines' announcement that it had an operating profit of $440,813 and a net profit of $336,931 for the month. The September net included $220,210 in retroactive mail pay for the six preceding months.

Meanwhile, Northwest Airlines reported a systemwide net operating income in September of $326,162 and a net profit of $179,973.

NACA MISSILE CENTER

Aerial view of the formerly secret NACA guided missile research station on the Atlantic coast at Chincoteague, Virginia. It has the following facilities: 1) 400 ft. launching ramp; 2) bombproof fire control station; 3) launching slap and shelter; 4) zero length rail launcher; 5) final loading station; 6) preflight test slabs and control house; 7) final assembly shop and 8) office and radio building. (NACA photo)

CAB Halts Air Cargo Rate War

Suspends certificated carriers new commodity rates and indicates new consideration for freight forwarders.

Independent carriers seeking to maintain their place in the airfreight field received new encouragement from CAB late last month when the Board issued a cease fire order in the cargo rate war and indicated willingness to reexamine its stand against granting interim rights to freight forwarders.

In a last-minute action which took the certificated carriers by surprise, CAB suspended, pending an investigation, seven new airline tariffs which would have extended reduced specific commodity rates to more points and to more commodities. Affected by the Board's order were United Air Lines, Western, Inland, Southwest, American, PCA and TWA.

▶ **Status Quo Desired**—CAB said its move is designed to maintain the freight rate situation as it now exists pending the outcome of the current probe, which extends to practically all the tariffs filed by certificated and uncertificated lines since last July. The Board declared it had no authority under the Civil Aeronautics Act to review its previous refusal to suspend the tariffs of United, American and Capital which became effective Oct. 5 (AVIATION WEEK, Oct. 13).

"We originally decided not to suspend the reduced specific commodity rates of United, American and Capital because we believed those carriers were entitled to compete ratewise with the all-cargo carriers," CAB stated. "But on the basis of the limited data now before us, we believe the competition should not be permitted to extend further.

▶ **Arbitrary Division**—"It is recognized that in thus limiting commodity rates for certificated carriers we are preventing these lines from meeting the rates of noncertificated carriers for certain commodities. For a limited period this will result in an arbitrary division of certain traffic. However, there will be price competition on the bulk of commodities that move by air. We shall also apply the principle of maintaining the status quo to any rate reductions that may be filed by the all-cargo carriers."

Meanwhile, CAB announced it has under consideration a proposed addition to the Economic Regulations (to be known as section 292.6) establishing a classification to be designed as "noncertificated indirect cargo carriers." The Board contemplates granting to these freight forwarders a temporary exemption which, unless terminated sooner, would expire 60 days after final board action in the freight forwarder case (docket 681 et al.). Seventy-nine applicants for certificates are participating in that proceeding.

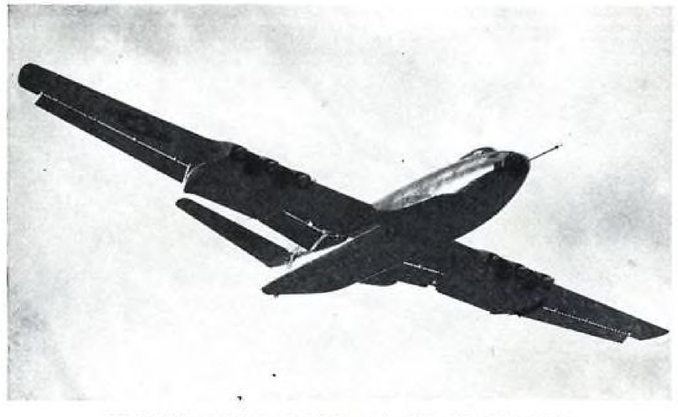
▶ **Previous Refusal**—Last May, CAB granted interim common carrier rights to qualified all-cargo airlines pending decision on their certificate applications. But at that time it refused to give exemptions to freight forwarders pending further consideration of the problem. CAB's denial of interim privileges to indirect carriers last spring was a blow to the independent cargo lines, most of whom feel they cannot develop maximum business without the forwarders.

Under proposed section 292.6, comments on which are due by Nov. 17, forwarders that receive letters of registration will be able to deliver property for transportation by air to certificated air carriers, non-certificated air carriers holding letters of registration under sections 292.1 or 292.5, Alaskan air carriers, and companies operating under foreign air carrier permits. The forwarders would be subject to considerable economic regulation and would be required to file tariffs and reports.

▶ **May Be Too Late**—Whether the proposed exemption of freight forwarders will be promulgated in time to prevent a number of specialists in air cargo from going out of business is doubtful. Some quarters believe the regulation will be of greatest benefit to indirect carriers which are affiliated with surface forwarders. Railway Express Agency, however, will not be eligible for a letter of registration under 292.6.

On the same day CAB announced its proposed regulations governing indirect carriers, National Airfreight Forwarders, Detroit, announced it would cease operations. The company, headed by Allen Dean, managed Detroit Airfreight Terminal Co. at Wayne County Airport (AVIATION WEEK, Sept. 22).

▶ **No Opportunity For Profit**—Dean also resigned as president of the Airfreight Forwarder Association, which reportedly has lost considerable membership recently. "The four-month trial period of National Airfreight Forwarders has produced more than two million pounds of traffic, but the fighting rates instituted by the passenger airlines have destroyed all opportunity to operate without a loss," Dean stated.



FLIGHT VIEW REVEALS XB-48 DESIGN

Unusual flaps down view of Martin XB-48 six-jet bomber reveals full-span flaps and tiny "feeler" ailerons at each wing tip. Spoiler panels, located within upper surface of wing, provide lateral control with control "feel" provided pilot's wheel by small aileron surfaces. Unique angle shows slotted flaps from tip to tip. Large, flat bomb bay extends between two "bicycle" landing gear wheel wells. Tiny nacelle landing gear doors are just closing in this takeoff shot.

British Aerodynamicist To Deliver Wright Lecture

Dr. Sydney Goldstein, British areodynamicist and mathematician, will deliver the eleventh annual Wright Brothers lecture of the Institute of the Aeronautical Sciences in Washington Dec. 17, commemorating the 44th anniversary of the first flight.

Dr. Goldstein, chairman of the Aeronautical Research Council (British equivalent of NACA), will speak on the subject: "Low-Drag and Suction Airfoils," British research reports on which have only recently been de-classified. He carried out extensive research on the subject during the war in the aerodynamics department of the British National Physical Laboratory.

Douglas Skystreak Hits 680 Mph.

Douglas Aircraft's world speed record holder, the D-558 "Skystreak", is being overhauled for high altitude tests that may put it in competition with the Bell XS-1 for a first attempt to go through the speed of sound.

Gene May, Douglas test pilot, recently pushed the Skystreak to an estimated 680 mph. at Muroc. This was approximately 30 mph. faster than the official world speed record flown with the plane by Marine Maj. Marion E. Carl, on Aug. 25.

May reported, following the 680 mph. run, that the plane's behavior gave no indication of "adverse" compressibility. This can be interpreted as meaning that no tendency to "tuck under" has been exhibited at speeds flown to date, and that in the very near future either May or an NACA pilot will begin flights at 35,000 ft. and make a serious attempt to reach, or exceed, the speed of sound. At that altitude speed of sound would be attained at a true ground speed of approximately 670 mph.

Should either the Navy-sponsored Skystreak or the Army-sponsored XS-1 rocket plane fail to reach the long-sought speed goal for piloted aircraft, attempts at supersonic flight will be continued with swept-wing versions of the Bell and Douglas planes. Although Bell's swept-wing XS-2 has been discussed previously, Navy has persisted in keeping under security secrecy specific details of its swept-wing Douglas experimental plane. The D-558 Mark II is expected to retain the Skystreak's slender fuselage; will have a needle-pointed nose; and will have combination power of rockets and a Westinghouse 24-C turbojet engine. The pilot will be lowered, to sit on the floor of the fuselage, and the canopy will be replaced with a flush window for forward and side vision. The plane probably will be identified officially as the Douglas Skyrocket.

Should any of these experimental planes succeed in reaching the speed of sound, the achievement will be tremendous in its engineering significance, but wholly unofficial as a recognized speed unless Federation Aeronautique International rules stipulating low-level runs in formal record attempts are revised to recognize high altitude flights calibrated by radar timers.

Research Men Clash on Program

Bush favors military control; NACA spokesmen plead for independent programs.

Conflicting views on the subject of a single coordinating agency for aeronautical research were presented the President's Air Policy Commission last week with Dr. Vannevar Bush aligned in favor of such an agency against other scientists and engineers who opposed the measure. Bush, chairman of the Research and Development Board, advocates strong military control of such a single agency and believes: "military effectiveness rests squarely upon the shoulders of the military services."

"The military services have the central responsibility for seeing to it that the entire procedure operates to produce the needed end result, all the way from fundamental research in universities and governmental laboratories through applied research, military specifications, engineering design, prototype, evaluation and final production." Bush told the Commission, "if any link in this chain is weak, it is incumbent on them to take the initiative to strengthen it."

▶ **NACA Disagrees**—Equally vehemently did opponents of such single military control state their case. Dr. Hugh L. Dryden, director of aeronautical research, National Advisory Committee for Aeronautics; John F. Victory, NACA executive secretary, and Arthur E. Raymond, vice president-engineering, Douglas Aircraft Co., Inc. pleaded strongly for the present independent nature of various research groups because:

- Over-all coordination would build up paperwork and accompanying delays in inaugurating new programs.
- Complexity of modern aeronautical science prohibits any man from keeping sufficiently informed on all phases to render competent decisions, and the job of keeping him informed would prove extremely costly and time-taking.
- Continuity of research leadership is essential and this would be impossible under the frequent changes inherent in a politically appointive committee.
- Independent research groups can report directly to the President and to Congress without the conflicts of views contained in an overall agency coordinating divergent groups.
- Ablest men in the nation can be obtained without compensation by the present NACA committee form of organization whereas an overall agency would require full-time employees falling under the present $10,000 yearly salary limitation.

▶ **Agreements Noted**—In contrast to this pointed divergence of view between Bush and his close associates (both Bush and Raymond are NACA members. Dryden and Victory NACA employees), all showed marked agreement on all other aspects of the nation's aeronautical research effort including:

- Availability of funds for a minimum of five years is essential to facilitate construction and research programs. Present two-year statutory limitation on the obligation of funds prohibits the long range planning necessary for effective research and development work.
- Extensive new facilities are vitally needed for supersonic research work and the opportunity afforded scientists by such new facilities (a billion dollar supersonic research center in the far west) would create one of the most fruitful periods in modern scientific history.
- Increased funds are required for research and development work if new findings are to be fully exploited and new questions probed quickly enough to solve present problems of high speed flight within a reasonable time.
- Shortage of skilled scientific personnel is acute and derives from short-sighted wartime selective service policies. University research contracts are essential to the rapid training of new scientific personnel.
- Present contracts for research work are excessively complex requiring unnecessarily large administrative staffs. Contracts should be simple and require merely the delivery of research results when available.

IAS Annual Meeting

Institute of the Aeronautical Sciences will hold its 16th annual meeting Jan. 26-29, 1948 at the Hotel Astor in New York City. The Honors Night dinner will be held the first evening.

As a substitute for the annual air transport meeting, usually held in October, the January assembly will devote the entire day of Jan. 27 to air transport problems, with Admiral E. S. Land, ATA head, guest speaker at lunch.

The Honors Night dinner will feature presentation of five of the most famous honors in aviation: Sylvanus Albert Reed Award for notable contributions resulting from experimental work; Robert M. Losey Award for meteorological research; Lawrence Sperry Award for contributions to aviation by young men; John Jeffries Award for medical research; and Octave Chanute Award for pilots.

Overhaul Standardization Sought by New Committee

An overhauling of aircraft engine and propeller standardization procedures is promised by a special new committee of the aeronautical board established to implement the general policy agreement reached by the joint Navy-Air Force-industry conference held recently at Wright Field. The new special committee will be made up of two Air Force, two Naval aviation and two industry representatives.

Purpose of the new committee: Determine the most effective course for granting preference to industry materials and processes in future procurement. Determine the details of armed service participation in the new standards program. Determine the most effective methods by which quality control and inspection requirements of Standards may be met. Simplify all standards for materials, processes and parts.

AVIATION CALENDAR

Nov. 3. ICAO special conference on multilateral agreement, Geneva.
Nov. 3-5. National Electronics Conference, Edgewater Beach Hotel, Chicago.
Nov. 6-7. Fuels and Lubricants meeting, Society of Automotive Engineers, Hotel Mayo, Tulsa, Oklahoma.
Nov. 7. Haire Airport Trophies Committee, Washington.
Nov. 10. Robert J. Collier Trophy Committee, Washington.
Nov. 14. Brewer Trophy Committee, Washington.
Nov. 18. National Aviation Trades Association annual meeting, Springfield, Ill.
Nov. 19-22. Fifth Annual National Aviation Clinic, Springfield, Ill.
Dec. 1-3. Air transport meeting, Society of Automotive Engineers, Hotel Continental, Kansas City.
Dec. 1-3. Fifth annual meeting, Aviation Distributors and Manufacturers Association, Hotel Adolphus, Dallas, Texas.
Dec. 3-4. Aircraft Industries Association board of governors, Los Angeles.
Dec. 4-6. Society for Experimental Stress Analysis, annual meeting, Hotel Pennsylvania, New York.
Dec. 4-7. International aviation celebration, El Paso.
Dec. 17. Annual Wright Brothers Lecture, Washington.
Jan. 9-11. All-American air maneuvers, Miami.
Jan. 13. ICAO statistics division, Montreal.
Jan. 15-18. Southeastern soaring contest, Sanford, Florida.
Jan. 26-28. CAA non-scheduled operators of region four, Fort Worth.
Mar. 22. ICAO aeronautical maps and charts division, Brussels.
Mar. 30. ICAO personnel licensing division, Montreal.
Apr. 20. ICAO rules of the air and air traffic control division, Montreal.
Apr. 27. ICAO facilitation division, Europe.
July. International Air Exposition, Idlewild Airport, New York.
July 15. Ninth annual meeting, Airline Advisory Board, Kansas City, Mo.
Sept. 3. International Aeronautic Federation, Cleveland.
Sept. 8. ICAO operations division, Montreal.
Sept. 21. ICAO airworthiness division, Montreal.

INDUSTRY OBSERVER

► **Despite Air Force denials Republic will get a substantial production order for its XF-12 Rainbow. The order will be for photo-reconnaissance, not transport version and will keep Republic busy for about a year. All XF-12's have been earmarked by the Air Force for a top secret project in the Arctic.**

► Experiments with Lockheed P-80 jet fighters indicate that the highly polished jets cannot be detected by long range search radar. Most radar reflections from conventional aircraft come from engines and propellers, not the fuselage. To handle jet fighters in the Air Force radar traffic control systems they are being equipped with special radar transponder beacons that register blips on ground radar scopes. Even at close range a jet fighter blip is so small that it is obscured by the runway extensions lines on the final approach scope.

► **Martin's XP4M-1 Navy patrol bomber has been named the Mercator. Martin now has an order for seven but will get another order for about 20 soon. The Mercator is powered by two Pratt & Whitney R-4360 reciprocating engines and two General Electric J-33 jet engines.**

► Watch for the Air Line Pilots Association and Air Transport Association to pop up with a surprise agreement on 25,200 lb. as maximum gross weight for the DC-3 at the CAB hearings beginning today on the future role of the DC-3 under the transport category regulations.

► **British work on automatic flight has been hampered by lack of an appropriate tricycle landing gear, but a De Haviland Dove, which is so equipped, has now been allocated to the Ministry of Supply for further experiments.**

► The nose of a four-engined bomber is the newest British location for a flying test-bed for performance-testing of gas turbine engines. Both the new Napier "Niaiad" and the Armstrong-Siddeley "Mamba" are being so installed for their first test flights.

► **Cessna Aircraft Co. has produced 6,500 airplanes since VJ-Day.**

► Role played by the aircraft accessory manufacturer in development of guided missiles is far more important than is generally appreciated. Bendix Aviation Corp. lists some 22 essential components and parts produced for guided missiles by accessory makers.

► **Shrinkage of aircraft accessory manufacturing facilities in this country since the end of World War II is typified by the Bendix Aviation report that approximately 70 percent of the total floor space used in the war, including five complete plants and parts of many others, have been returned to the government, along with thousands of machines.**

► General Electric Company is developing a composite airplane-helicopter capable of both vertical and horizontal flight. The craft has a wingspan of 40 ft. and a 35 ft. dia. rotor mounted in the tail. The device sits nose down on a tricycle landing gear and ascends vertically by the pull of the rotor at the tail turning 100 rpm. In the air, the craft is leveled out and flies with the rotor serving as a pusher propeller. With the rotor turning at 80 rpm., the device is said to be capable of 200 mph. in level flight.

► **Glenn L. Martin Co. and Westinghouse Electric Corp. are collaborating in the modification of a Boeing B-29 for stratovision and FM flight tests. Tests are now under way and will continue throughout this fall and winter. Major external modification is the addition of a high antenna mast atop the vertical stabilizer and a long retractable mast mounted under the nose.**

► Beech Aircraft Corp. has purchased for $94,000 government-owned facilities it used during the war. The property consists of a hangar building, lean-to and clock house on 1.3 acres adjacent to the main Beech plant and a nine-acre parking lot across the road. Beech plans to use the additional facilities in connection with its manufacture of aircraft and prefabricated houses and expects to employ an additional 65-70 persons. Sale terms provide for 20% cash and the balance in quarterly payments over 5 years at 4% interest.

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FEDERAL BALL BEARINGS

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PAC Angling For Radar Sales Rights

Pacific Airmotive Corp. last week was completing a contract with Hughes Aircraft Co. for world sales rights covering the Hughes radar obstacle warning indicator.

This will apply to Hughes' 24-volt transport model and a 12-volt personal aircraft version that has been service tested and has been installed experimentally in several personal aircraft in Southern California.

► **New Version**—Hughes also has service tested, and stands ready to produce if requested by CAA, a three-range version of the transport instrument, which currently gives warnings at ranges of 500 and 2,000 ft. A third range, for 1,000 ft. has been built into the new model. PAC's retail list price for the two-range transport model will be $400. A somewhat higher list price is expected to be quoted for the personal aircraft 15-v. unit in that a new dynamotor had to be installed.

Hughes only reservation in assignment of world sales rights to PAC was that Hughes Aircraft Co. retain sales at cost to certificated domestic airlines. This is in line with his original declaration that he would supply interested domestic airlines with the radar at cost.

► **Production 300**—To date approximately 300 of the two-range radar units have been delivered by Hughes Aircraft, including fulfillment of orders placed by Delta, TWA, Continental, Eastern and Colonial Airlines for experimental or equipment quantities.

Further sales have been delayed by CAA's pending decision to give final approval to the two-range system or demand the three-range unit for certificated carrier use. A Hughes spokesman said that existing two-range units now installed by airlines can be modified or exchanged for the three-range model should this be required.

J & H Cancels Jack's Employment Contract

In a quiet completion of the top management change that has been expected since the reorganization more than a year ago, Jack & Heintz Precision Industries Inc. has cancelled the employment contract of William S. Jack and the board of directors has elected as president Byron C. Foy who will continue as chairman.

Jack was not a candidate for re-election to the board at the annual stockholders meeting last Spring. He has recently been on leave of absence for reasons of health. His employment contract was ended by mutual consent, the company announced.

Albert A. Ricker, J&H vice-president in charge of finance, takes on additional duties as assistant to the president. He entered the company in March, 1946 when J&H was merged into Precision Products Corp.

In other personnel actions:

• **Continental Engine Corp.** appointed Thura A. Engstrom vice-president and Muskegon division factory manager. He has been with CMC for 22 years.

• **L. G. S. Spring Clutch Corp.,** a division of Curtiss-Wright Corp., named James C. Esterline general manager. He formerly was plant manager of the American Blower Corp.

• **Fairchild Engine & Airplane Corp.** appointed F. E. Newbold, jr., manager of engineering operations of the Ranger engine division. He has been assistant manager and now succeeds Andrew L. Pomeroy who has resigned to accept a position with Thompson Products, Inc.

• **McDonnell Aircraft Corp.** named Lee Hagan general factory superintendent in charge of production shop operations. He was formerly with Douglas Aircraft.

• **R. G. Wright Co.,** Buffalo, appointed Charles P. Trudeell, chief engineer. He formerly was sales engineer of Bell Aircraft Corp., and was with Curtiss-Wright Corp.

• **Aircraft Screw Products Co.** named Harry E. Sweet factory manager to succeed Eugene Lang, resigned. Sweet formerly was assistant factory manager of Aircooled Motors and factory manager of Kellett Aircraft.

• **General Electric Corp.** appointed I. F. Kinnard manager of engineering, H. L. Ross manager of manufacturing, and E. H. Howell manager of sales in the meter and instrument divisions. They have been associated with GE for more than 20 years.

BRIEFING PRODUCTION NEWS

► **Aviation Maintenance Corp.** has received a $1,900,000 supplement to its USAF overhaul contract, bringing total involved to $3,589,000 for work on 45 C-54s.

► **Canadair Ltd.** has scheduled delivery of 20 Canadair Fours to Trans-Canada Airlines no later than February, 1948. Present rate is four to six planes a month. The TCA contract amounts to about $13,500,000. Company is trying to develop an international market for the Four, which is an outgrowth of the DC-4 and DC-6.

► **Boeing Aircraft Co.** has stepped up its hiring program (AVIATION WEEK, Oct. 27) above the 150-200 per week originally set. In one week, it took on 995 employees. Payroll increased from slightly more than 12,000 better than 15,000 in about six weeks, rather than the several months planned. Goal is approximately 7,000 direct factory workers.

► **Goodyear Aircraft Corp.** has made first shipments of the corrugated steel containers it is building for the storage of 2,000 Navy reserve aircraft.

► **G. M. Giannini Co.,** Pasadena, Calif. engineering and jet engine manufacturing organization, has entered into an agreement with the radio engineering division of Raymond Rosen & Co., Philadelphia manufacturer of temetering and electronic devices, to build complete systems for transmission of signals from guided missiles and pilotless aircraft to ground observers.

► **Glenn L. Martin Co.'s** plastics plant at Painesville, Ohio, expects shortly to attain a production rate of 11,000,000 lb. of Marvinol. Ultimate capacity will be about 25,000,000 lb.

► **Solar Aircraft Co.'s** Des Moines plant is manufacturing stainless steel stands for the automatic push button coffee brewing system of the Cory Corp. of Chicago, one of the nation's largest producers of coffee-making devices.

► **Parker Appliance Co.,** Cleveland, has licensed Pacific Screw Products Corp. and Deutsch Co., both of Los Angeles, to manufacture and sell the "811" flared-tube couplings embodying Parker patents.

► **Hamilton Standard Propellers** division of United Aircraft Corp. has begun construction of a 20,000 sq. ft. addition to its East Hartford plant. The new area, plus rearrangement of production lines, will enable the East Hartford plant to house the men and machines now in its West Hartford branch.

► **Houdry Process Corp.** will pay a new cost of living bonus, its third this year, to its employees. Payable during the week ending Nov. 28, it will be equivalent to 16 percent of the basic compensation for the four-month period Sept. 1-Dec. 1, 1947.

► **McDonnell Aircraft Corp.** won the National Safety Council's Aircraft Manufacturing Safety plaque for a year's total of 6,000,000 man-hours with only 24 hours lost due to accidents.

► **Reynolds Metals Co.'s** advertising department has moved from 2500 South Third street to 2000 South Ninth street, Louisville 1, Ky.

Seibel helicopter in flight. Forward and side outriggers will be on the craft only during the preliminary flight testing period.

Movable Cabin Controls Helicopter

By shifting C. G. in flight, a simpler rotor assembly is possible.

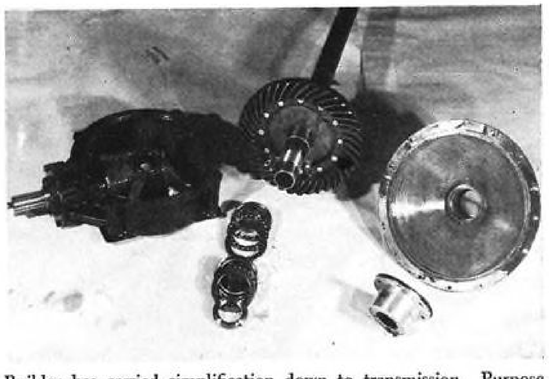
A former Bell Aircraft aerodynamics engineer and helicopter flight test manager, Charles Seibel, has built a new and apparently revolutionary helicopter at Wichita, his home.

The helicopter, encompassing numerous design changes as compared with standard types, has been flying more than a month and Seibel declares it performs easier and is more economical to fly and costs but a fraction as much as any other helicopter of the same size.

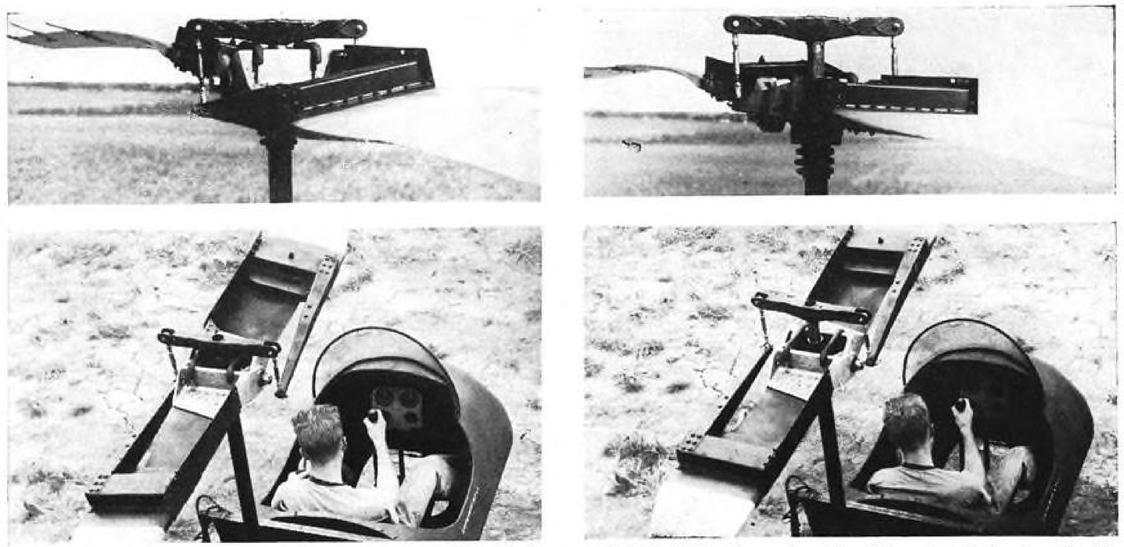
The initial experimental model uses a 65 hp. Franklin engine at 2,200 rpm. Its gross weight is 800 lb. and empty weight 540. Diameter of the single lifting rotor is 25 ft. and the auxiliary rotor diameter is five feet. It has a top speed of 90 mph. and cruises at 70 mph. Its rate of climb has been fixed at 900 fpm. and its service ceiling at 12,000 ft.

Simplification of the rotor and the controls has eliminated many costly and weighty parts. Because it is simple

Lateral and longitudinal control is obtained by moving the forward part of the fuselage which slides and pivots on trestle-like structure beneath cockpit. In this view, cabin and central control are in normal neutral position.



Builder has carried simplification down to transmission. Purpose was to obtain results with standard commercial gears, readily available. Main rotor transmission components are shown. Seibel says gears can be purchased for $35.



HIGH PITCH: Simplicity of the rotor hub of the Seibel helicopter is apparent. Movement of the blade attaching angle (dark section between lighter blade and hub) controls pitch changes.

LOW PITCH: Change in pitch of the rotor blades is noticeable when compared with blade position and change in position of the attaching angle in views at left.

of construction it took Seibel and two other men just seven months and 20 days to build the initial experimental model. Seibel, member of the engineering department of Boeing-Wichita, was assisted by George (Red) Lubben, Greenwood Lake, N. Y., an experienced helicopter mechanic, and Richard Ledwin, Kenmore, N. Y.

The main simplifying feature of the patented design is the means for obtaining lateral and longitudinal control. Control is obtained by moving the center of gravity with respect to the lift vector during flight. This is accomplished by moving the forward portion of the fuselage either forward, backward or from side to side at the pilot's will.

► **Cabin Moves**—Since the complete cabin is moved to obtain control, it is not apparent to the occupants that such movement is taking place. By careful design of the cabin suspension, the control forces required to control the machine in hovering flight have been reduced virtually to zero.

In forward flight a slight forward pressure must be exerted to maintain airspeed in a manner similar to the operation of a fixed wing aircraft. In other words, the helicopter possesses stick-free stability which gives the pilot "control feel" at all times. In addition, the proper cabin suspension provides the machine with dynamic stability in hovering flight, thereby relieving the pilot of the tiring task of constantly "flying" the ship.

This control system contrasts to the standard cyclical control used on most helicopters—constantly changing pitch of the blades. The standard system entails a great deal of mechanism, close tolerance machine parts and many costly bearings. Either irreversible or bungee-loaded controls usually are necessary to prevent the pilot from getting feed-back forces from the rotor.

► **Central Control**—With Seibel's simplified design, all the close tolerance machine parts which normally form a portion of a cyclical control system are eliminated. His design has a central control stick which is attached at the lower end with a swivel fitting to the fuselage structure. The center of the control stick is pivoted on the movable cabin portion of the helicopter. By moving the top end of the control stick forward the cabin moves forward. In like manner the cabin can be moved backward and from side to side. This simple control system cannot transmit forces from the rotor to the pilot's hand since it is in no way attached to the rotor system.

Two-bladed rotors were chosen for both lift and auxiliary. With two-bladed rotors and with the proper mounting of the rotor system on the fuselage, Seibel says, the necessity for drag hinges and blade dampeners disappears. With the simplified control system used on this helicopter, the rotor hub design must have provisions for only two types of motions between the blade and the hub, namely, coning-flapping and collective or simultaneous pitch change.

Seibel has discarded the conventional use of anti-friction bearings on the pitch-change axis of the blade attachment for further simplifications. His system of blade attachment requires no machined parts, no ball bearings and is completely free of lubrication and brinnelling problems.

The patented rotor hub consists of two intermeshing aluminum castings hinged on a common flapping and coning axis at the center of rotation. Freedom of motion is given this particular axis by using only two needle bearings. These are the only bearings used on the entire rotor assembly of this machine. Attached to each of these castings is a sheet metal angle.

The longitudinal axis of this angle is perpendicular to the flapping hinge and parallel to the longitudinal axis of the blade. The outer end of the angle is attached to the rotor blade. The angle is very flexible torsionally about the longitudinal axis and thereby sufficient blade pitch change can be accomplished by merely twisting the angle throughout the necessary angular range. The length, thickness, width and height of the angle are so constructed that the stresses resulting from the pitch change, centrifugal force, lift and drag are well below the fatigue limit.

► **Two-Bearing Shaft**—The auxiliary rotor shaft is another example of simplicity. Usually, seven or eight bearings are used in standard auxiliary rotor units to support the shaft along the complete length of the tail boom. Only two bearings are used by Seibel—one at each end of the shaft, which is constructed of aluminum tubing.

Seibel said the problem of designing a suitable transmission for the machine was approached with standard commercial gears in mind. The gears for both main rotor and tail rotor transmissions

can be purchased for $35 in any large city in the U. S. He said they have given excellent service in the experimental machine and are operating under less load and better lubrication conditions than when used in their native application. Use of this type of gear results in a weight penalty, but Seibel believes a saving of at least $500 for equivalent aircraft gears is well worth five or six pounds excess weight.

The entire main transmission, shaft, rotor blades and hub are rubber-mounted, thus isolating the rotor vibrations from the main structure and the pilot. The horizontally mounted engine also is rubber-mounted in the normal aircraft manner. The horizontal mounting eliminates lubrication problems encountered in vertical engine installations.

A centrifugal type blower is used as a cooling system. The top of the engine and blower are housed in an asbestos fabric duct which directs the air over the cylinders and around the engine oil sump, thereby providing adequate cooling for all operating conditions. A zipper is provided in this fabric duct for quick access to the eight spark plugs and to the top of the engine.

▶ **Transmission**—A further simplification will be found in the power drive design connecting the engine and the transmission of the helicopter. The normal helicopter design entails a clutch, either manually or automatically operated, a free-wheeling unit and a rotor brake. These three units contribute considerably to the weight, expense and maintenance of the helicopter. The patented drive system used in the Seibel aircraft eliminates the necessity of the free-wheeling unit and the rotor brake.

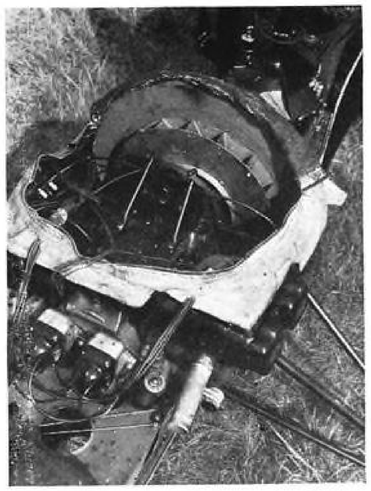
The engine drives the rotors directly through a disc clutch similar to an automotive clutch. This clutch may be disengaged by means of a clutch throw-out bearing supported on a fork in the normal manner. The fork is connected with the auxiliary rotor pitch change control. For normal powered flight conditions, the clutch remains engaged as the pitch of the auxiliary rotor is varied from low positive to high positive pitch.

In event of engine failure, the pilot moves the foot pedals in such a manner as to place the auxiliary rotor in zero pitch and thereby prevent the ship from yawing due to the sudden release of the lifting rotor torque. As the auxiliary rotor pitch passes through a range of slightly positive pitch, the clutch is disengaged due to the mechanical linking between the auxiliary rotor pitch change and the clutch.

▶ **Autorotation Control**—Further reduction of auxiliary rotor pitch is allowed by available over-travel in the clutch mechanism. The auxiliary rotor may be varied from low negative pitch through zero pitch to low positive pitch with complete disengagement of the clutch. In this manner the pilot is provided with adequate control in autorotation.

Following a landing, the clutch may be used to stop the rotor. The engine switch is moved to the off position as the clutch is disengaged. The engine will stop immediately due to its low inertia. By slowly engaging the clutch, the rotor will come smoothly and quickly to a halt. Very rapid braking can be effected without causing the engine to turn over.

The lifting rotor speed is 360 rpm. and the auxiliary rotor speed is 1700 rpm.



Looking down on the engine installation, ease of access is noteworthy. Centrifugal-type blower provides cooling. Top of engine and blower are housed in asbestos fabric duct to direct air around cylinders. This duct is zippered to furnish quick access.

Heated Glass

NESA, a new glass sandwich material developed by the Pittsburgh Plate Glass Co., is being used by Boeing engineers in pilot clear vision panels of the Stratocruiser and Stratofreighter, and is claimed to prevent ice and fog from blocking the pilot's view even under extreme icing conditions.

The sandwich consists of two pieces of plate glass with a layer of vinyl plastic between. On the inner side of one glass plate is a coating (3 molecules thick) of a special electrically-conductive material.

By passing a current through the special coating, regulated heat can be applied to the glass at all times, keeping it free from ice and fog and at a temperature at which the glass is strongest. Thermistor elements control the flow of current.

Lockheed Six Month Loss Totals $4,890,694

Drastic cuts in expedited production of the Constellation may be expected at Lockheed Aircraft Corp. as a cost-reduction step toward reducing the company's persistent net losses.

For six months ending June 30, Lockheed has shown a net loss of $4,890,694 after the sale of unused factory buildings that brought a capital gains credit of $6,482,488.

▶ **Slow Connie Line**—Robert E. Gross, president, says that as rapidly as conditions permit, the Constellation line will be slowed appreciably to allow "discontinuance of the highly expedited and expensive methods which the company had been forced to employ in the past to meet airline demands."

An interim report to stockholders listed six months sales totaling $48,597,128 as compared with $44,395,916 for the preceding six months.

A degree of aid will be given the company by federal income tax carry forward provisions which will relieve Lockheed of payment of income taxes on any 1947-48 earnings up to $6,600,000.

▶ **Backlog Large**—Lockheed's current backlog of unfilled orders, amounting to $144,200,000, of which 81 percent is represented by Army and Navy contracts for military aircraft, is indicative of a definite slowdown of commercial sales during the past six months.

This gross blames upon airlines difficulty in absorbing new fleets of planes for their routes, and upon the problems encountered by foreign carriers in obtaining dollar exchange for purchase of U. S. equipment.

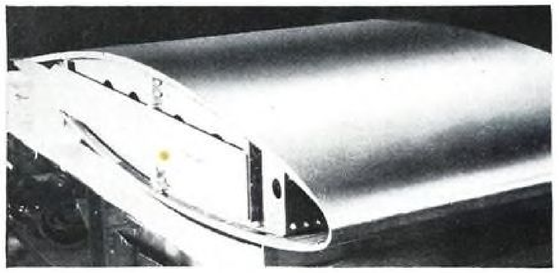
Although losses in its basic aircraft manufacturing business may be expected to continue under present conditions, Lockheed should continue to realize a profit from four subsidiary companies now in the black. These are Pacific Finance Corp., which for the first half of the year showed a net profit equivalent to $1.06 per share of its common stock; Lockheed Aircraft Service Corp., which has a backlog of Army, Navy and civilian orders amounting to $7,700,000 for bases in California, New York and Ireland; Airquipment Co., making ground handling equipment and specialized aircraft tools; and Lockheed Air Terminal, Inc.

Stratocruiser Dives

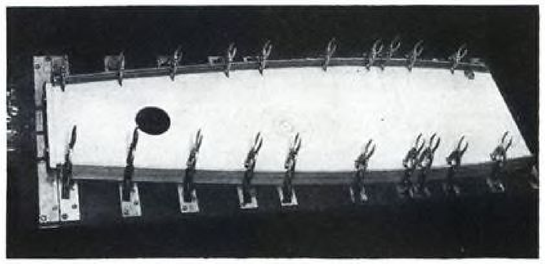
Speeds in excess of 400 mph. have been reached by the Boeing Stratocruiser in shallow dive tests from 12,000 ft. during checks for propeller flutter.

The 67½ ton plane, powered by four P & W Wasp Majors, has a cruising speed of 340 mph. verified during evaluation tests.

Sandwich Structures for Aircraft



Illustrating sandwich structural material is this wind tunnel model of a Metalite airfoil section—duplicating XF6U-1 construction.



Simple landing gear attachment rib for XF5U-1, with reinforcement at center of sandwich panel for distribution of drag link load.

What Research Promises

By ROBERT McLARREN

The critical necessity for light-weight structure in aircraft design demands high structural efficiencies, which create complex problems of stress analysis and fabrication techniques. These efficiencies are gained by stressing aircraft parts far closer to their allowable limits than in nearly all other structural fields.

Because aircraft air and ground loads are comparatively light, extremely thin metal sheets are used in a monocoque shell, a form noted for its structural efficiency.

The stressing of these thin sheets in tension produces the high efficiencies desired but difficulties begin when it becomes necessary for these members to carry compression loads. Because these sheets are thin, they have a tendency to buckle long before their maximum compression strength can be developed, resulting in extremely poor efficiency. One of the major structural problems of the aeronautical engineer is to provide suitable stiffness in thin sheets at a minimum cost in weight.

Maximum stresses occur in planes farthest from the neutral axis of a structural member:[1] $f = My/I$ in which f = unit normal stress in pounds per sq. in.; M = bending moment on the section in inch-pounds; I = moment of inertia of the section about its neutral axis in inches; y = distance, parallel to the plane of bending, between the point under consideration and the neutral axis.

The distance, y, of a thin aluminum alloy sheet is extremely small and, therefore, the maximum allowable stress of the sheet is small. However, if two aluminum sheets, supported by a low-density material between them, are spaced a given distance apart, the value of y will be proportionately increased and the strength of the member increased.

This is the principle of the structural "sandwich," which may be defined as two high-strength, high-density sheets separated by a single sheet of a low-strength, low-density material.

▶ **Early Development**—The earliest reported use of sandwich structure in aircraft was used on the Sundstedt seaplane, a large twin-float biplane designed in 1919.

The first designed-for-the-purpose sandwich aircraft structure was patented by Dr. Theodore von Karman on July 21, 1924.[2] The first actual use of sandwich materials for the construction of an airplane was made in the De Havilland D.H. 91 "Albatross," a 22-30 passenger, four-engined airliner produced in England in 1937-38.[3]

The DeHavilland system was developed in the famed wartime D.H. "Mosquito" light bomber and subsequently in the D.H. "Hornet".[4]

What Practice Shows

By IRVING STONE

A gamble that aerodynamic benefits could be obtained from the near-exclusive use in an aircraft of sandwich material, as exemplified in the Chance Vought XF6U-1 Pirate, apparently has paid off. The Navy is awarding the company a contract for a production model of the airplane which will contain almost as many parts made of sandwich material as the prototype.

Use of such material in the XF6U-1 was a pioneering endeavor backed by the Navy. The material employed was developed by Chance Vought division of United Aircraft Corp., and is known as Metalite. Composed of high-strength aluminum alloy faces and a low-density balsa core, it competes with conventional metal construction on a basis of strength, stiffness and weight.

Although its existence was announced a year ago, details of its features and fabrication have been disclosed heretofore only before a meeting of the Society of Automotive Engineers by H. B. Gibbons, chief of structures of Chance Vought.

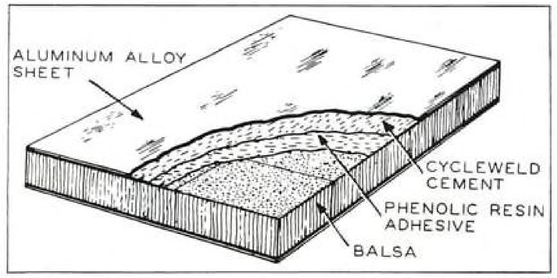
The wood core is bonded with its grain normal to the metal faces by a two-stage process. Initially, a cement—Chrysler Corp's Cycleweld C-3—is sprayed on the face material, and then oven-cured to provide a tough elastic priming film. Bonding of faces to the core (first resin-sized) is via a medium-temperature phenolic resin adhesive (Durez).

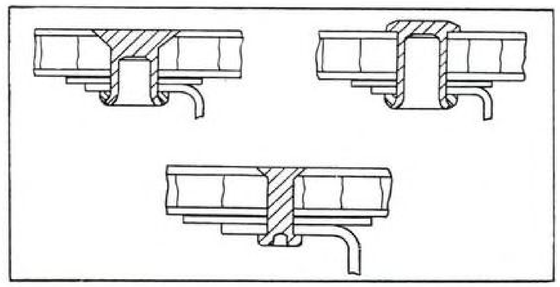
▶ **Structural applications**—This sandwich material has been incorporated as the major portion of airframes in two Navy experimental high speed fighters, and in a stabilizer of another Navy aircraft.

• **Use in XF5U-1**—First major structural application has been in Chance Vought's XF5U-1—the unconventional high and low speed Flying Pancake—to extent of over 75 percent of airfoil surface and almost all of the internal shear webs.

Composed of individual panels bolted to internal framework, the external surface has double curvature. Almost all of these panels were fabricated by molding, without the necessity of preforming the aluminum alloy faces.

With this sandwich construction, tip-panel frames and ribs are arranged in accordance with design considerations other than those of skin support. This permitted use of large panels with a minimum of internal structure. Thus, the ½-in.-thick panel is 34 × 72 in. Although heavily loaded, the sandwich structure is almost entirely fabricated with 24ST81 in .012 minimum gage. Aluminum alloy edge strips provide bearing area for flush attaching bolts. Use of a narrow strip of end-grain mahogany (instead of balsa) around the edge prevents core-crushing by over-tightened bolts.





Makeup of the Metalite sandwich panel is typical of such construction. Grain of the core is normal to metal faces. Three methods of rivet installation are shown, right. Conventional riveting practices require extreme care.

Research.....

the Sundstedt seaplane was an aileron fabricated by Skydyne, Inc. of Port Jervis, New York.

▶ **Current Methods**—Although sandwich structural progress is still largely in the development stage a number of systems have been isolated. The Chance Vought Division of United Aircraft Corp. has developed Metalite, a sandwich material of two aluminum alloy faces bonded to a balsa wood core. The Glenn L. Martin Co. has developed a "honeycomb" sandwich material made up of two aluminum alloy faces bonded to a resin-impregnated paper formed into a honeycomb mounted normal to the faces.

The Aluminum Company of America is developing a similar system but using an aluminum foil honeycomb core. North American is experimenting with a corrugated all-metal sandwich material. Hughes Aircraft Co. is doing extensive research work on a number of systems using combinations of woods and metals.

▶ **Materials**—Because the strength properties of facing materials suitable for sandwich structures are well known, the major problems center about the core materials and adhesives for bonding these materials to the faces. Prominent core materials are:[5]

• **Balsa:** An extremely light, porous and inexpensive wood grown in Ecuador. On the basis of specific gravity, balsa has the highest strength and elastic properties of the major core materials. However, it has the poorest weight and dimensional stability of any of those now under test.

• **Plywood:** The great strength of plywood, together with the tremendous quantity of data assembled during its use for many decades, makes it a highly desirable core material. However, its comparatively great weight together with the fact that high strength is not a primary consideration of core materials (since the core of the sandwich carries little or no load) renders it comparatively undesirable for metal-faced core structures.

• **Paper:** Oddly enough, this familiar product holds an important promise in aircraft structure through its inherent solubility with other materials. Douglas Aircraft Co. has done extensive development work on "Papreg," a paper-base laminate bonded to plywood.[6] Ordinary kraft paper is impregnated with 10 percent phenolic resin thinned with alcohol and water and cured at 125 degrees C. for 5-6 hr. By forming it into honeycomb shapes and bonding its edges to aluminum, a strong, atmospheric-resistant core is produced.

• **Glass-cloth:** This spun material shows promise both as core and facing material. A successful experiment was performed by the Army Air Forces Materiel Command during the war when a Vultee BT-15 training plane fuselage was fabricated from this material.[7] This system consists of laminated glass-cloth faces separated by a balsa wood core, the whole molded into the desired shape.

• **Other materials:** Sandwich core and face materials which

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No stiffeners are required for the ¾-in. sandwich panel in the landing gear rib, which has an average depth of over 30 in. and .012 faces.

The fitting in the rib center is capable of sustaining a landing gear drag link load of 31,000 lb. through the exceedingly simple device of bonding two concentric doublers (.012 ten-inch and .025 five-inch units) to the rib face and then bolting on a flanged bushing. A rib access hole cut in the panel does not require the usual flange stiffening or reinforcing.

• **XF6U-1 Details**—Practically the entire structure of the Pirate jet fighter features Metalite construction. Only vital details embodying conventional makeup are the control surfaces.

Aerodynamic cleanliness attained in this craft through the high smoothness of the sandwich construction has given low drag and reduced fuel consumption—affording higher speeds and longer range. Wind tunnel tests on a 3-ft.-span 7-ft.-chord model of the Pirate's wing showed excellent low-drag without use of any filler or finish. With little finish, true low-drag properties were obtained even up to Reynolds numbers of 30×10^6.

• **Corsair Stabilizer**—Fabricated of sandwich construction, the horizontal tail of the Corsair afforded, by comparison with the standard all-metal design, a weight-saving of 5-10 percent, and in the most critical loading aspect, a strength increase of 65 percent. Comparative values of strength and weight for the conventional and sandwich-material stabilizers are:

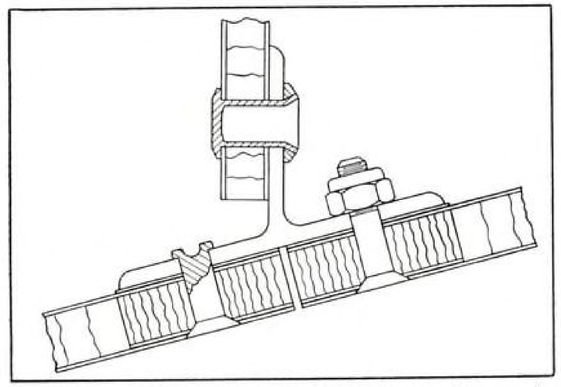
	Metal	Sandwich
Weight (lb.)	39.5	37.5
Strength (%)	100	165
Strength/Weight	1.00	1.74

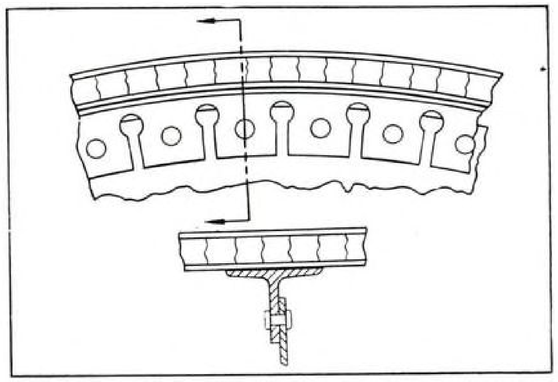
At the attachment of the inboard end of the beam and shell of the sandwich stabilizer, no gusset or other reinforcement of the shell (24ST81) is required despite very high stresses in the 75ST beam flange; whereas in the conventional metal construction, much gusseting and tapering are required.

The sandwich makeup also greatly increased the stabilizer's surface smoothness.

In another successful Corsair application, a 1 × 3-ft. Metalite panel—subjected to considerable vibration and elevated temperatures—carries hydraulic equipment and control brackets in the engine accessory compartment.

▶ **Sandwich Design Factors**—Major considerations controlling the division of the Metalite structure are assembly procedures and size of parts conveniently handled in production. In general, practical design is governed by reasonable balance of limitations resulting from assembly practices, joint loads, sheet sizes, and mold and autoclave capacities.





Details of the use of Metalite by Chance Vought: left, attachment of removable (bolted) and fixed (riveted) skin panel to internal structure; and right, Tee-section rib capstrip bonded to skin of sandwich panel. Slots in Tee leg give uniform pressure in joint.

Research . . . . .

have been, or are undergoing investigation, include cotton-cloth honeycomb, cellular hard rubber, cellular cellulose-acetate, pulp board, calcium alginate and many others.[8]

▶ **Adhesive Problem**—Another problem in the sandwich material field is the development of suitable adhesives and bonding techniques, both from the point of view of good strength qualities and low fabrication costs. Among the important bonding systems are Redux, Cycleweld, Cordo, Reanite, Bostik and Araldit.[9]

All of these systems are thermosetting plastic systems, that is, they bond adjacent surfaces through the combination of heat and pressure, and may be used for metal-to-metal adhesion. For wood-to-wood and wood-to-metal adhesion, both casein-latex and resin adhesives (phenolic, resorcinol, urea and melamine) are undergoing.

The critical item in the application of adhesives is the pressure, which must be carefully controlled to produce only a thin, even layer of adhesion between the surfaces. The metal must be carefully degreased and slightly roughened to provide a good bonding surface. The core must be pre-treated to provide a comparatively insolvent surface to prevent excessive absorption of the adhesive.

▶ **Strength Properties**—Although research data and test results presently available are extremely limited, sandwich materials in their present state of development have not proved superior to conventional stiffened aluminum panel structures for use as major load-carrying members of an aircraft. In most cases, their strength-weight ratio is considerably inferior to all-metal structure in large sizes. However, applications in very thin gages made to date indicate a superiority over metal.

It is generally impractical to use aluminum alloy for aircraft structures of less than about 0.020 in. due to difficulty in fabrication techniques, the thin skin buckling and warping during riveting operations.[10] But there are numerous members which carry loads only light enough to warrant this thin material and it is these applications where sandwich materials are considerably superior on a strength-weight basis. Structures requiring fairly low stresses but a high degree of stiffness are more economically fabricated of sandwich materials.

▶ **Applications**—Sandwich materials have found wide application in aircraft sub-assemblies such as floors,[11] seats, tail surfaces,[12] ailerons, flaps, landing gear doors, etc. Most promising future for sandwich materials is seen in large aircraft, such as transports and flying boats, where unit loads are comparatively low. Training and personal planes have

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Since the thin gage aluminum alloy face sheets are limited as to width, bonded splices are frequently employed by routing the balsa core and inserting a metal strip beneath the butt joint of the adjacent faces.

• **Spacing**—Rib and frame spacing are determined by a balance between core weight and frame weight needed for minimum strength and stiffness requirements. Thus, in the Corsair stabilizer, a ¼-in. shell supported by four ribs was stronger than a thicker shell using less ribs.

For low drag wings, skin deflection between ribs must be minimized to maintain laminar flow; hence, best rib spacing in considerably less than that needed for strength requirements.

For conventional wings, a pure monocoque shell is less efficient, structurally, than a thinner shell with some internal bracing.

Conventional riveting on metalite is not considered a practical shop procedure, since too much care is required for driving. An alternate method utilizes a high strength insert —mahogany, phenolic, or aluminum alloy—to take the driving forces. Although affording a satisfactory joint, this procedure involves an increased weight factor. Use of Bluid or hollow rivets reduces driving forces considerably. Almost all blind types have been satisfactorily applied, but, in general, several types of hollow rivets have been employed to obtain low-weight good-strength joints.

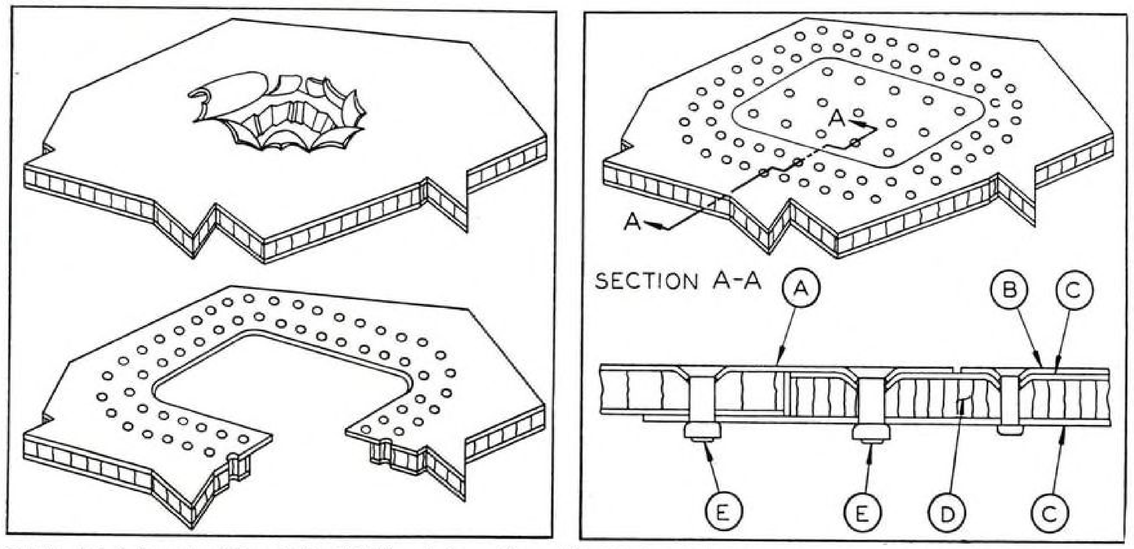
Bearing strength is increased by bonding doublers to the faces at the joint, thus permitting use of larger hollow rivets and bolts, wider spacing, and net saving in weight.

Where permanent attachment is permissible, bonded joints are desirable between a skin panel and supporting structure. This is done by bonding an aluminum alloy tee-extrusion to the skin and riveting the outstanding leg to the rib or web frame.

To obtain uniform pressure during the bonding, slots are provided in the leg of the tee in areas of moderate curvature. This type of joint is used in the Corsair stabilizer, between the shell and four ribs.

▶ **Repair Details**—Metalite panels may be cut in the field with fine-tooth coping or hack saws. When coarser-teeth blades are used, a block of wood is held firmly against the panel undersurface to prevent tearing of ace from core.

When flush type rivets are used for attachment, the face sheet may be countersunk, or dimpled if the metal is sufficiently thin by inserting a standard rivet into the rivet hole and tapping the head until proper depression is obtained. Dimpling for flush bolts may be done similarly.



Details of typical mechanical repair for Metalite exterior surfaces: (A) original shell; (B) filter plate, (C) patch plate; (D) wood, plywood, or phenolic filler; and (E) blind rivet.

Research.....

made use of sandwich materials and afford a broad field for exploitation of this new material.

Engineers are divided on the merits of sandwich structure in high-speed fighter planes, particularly in sonic and supersonic designs requiring extremely thin, high-strength wings and control surfaces. Generally, the tremendous strength required for a supersonic wing combined with its thin profile (6 percent and less) will demand super-strength aluminum or steel alloys and sandwich materials quite probably cannot compete in this field.

The major promise of sandwich materials for high speed aircraft lies in their smooth exterior finish, gained through the elimination of riveting and through their being continuously supported throughout their exterior surface. In addition, they may be formed into smooth compound curves, a difficult and expensive fabrication problem in all-metal structures.

Since tests have shown that merely the oil of a fingerprint on a wing may create turbulence with accompanying drag increase,[15] it is evident that the smooth exterior of sandwich structures holds an important future for high speed.

▶ **Future Research**—An important concern with sandwich materials is the unprecedent stress analysis problems it creates.[14, 15, 16] Because of its lack of homogeniety, sandwich structures cannot be analyzed according to presently available methods.

Current installations have been analyzed largely on the basis of empirical formulae created by assumption from test results and must, therefore, be considered subject to future refinement. To accomplish this, the National Advisory Committee for Aeronautics is currently administering research contracts at Massachusetts Institute of Technology and Brooklyn Polytechnic Institute to develop rational stress formulae and to develop mathematical aids for the accurate analysis of sandwich structures.

The Forest Products Laboratory of the U. S. Department of Agriculture is well advanced on an extremely broad research program investigating the mechanical and chemical properties of a large variety of materials and sandwich combinations. The U. S. Bureau of Standards is engaged in a continuing research program on adhesives, resins and plastic materials. This combined program is aimed at solving the present major problems of sandwich construction: stress analysis methods, materials and adhesives.

REFERENCES

1. Niles, A. S. and Newell, J. S.: Airplane Structures, Vol. I. John Wiley & Sons, 1938.

2. Karman, Th. vor., and Stock, P.: British Patent No. 235,884. See also: Dornier, C., British Patent No. 515,267, Alien Property Custodian Serial No. 212,074, June 6, 1938.

3. Jane, Fred T.: All The World's Aircraft. Sampson Low, 1938.

4. Anon: The D.H. Hornet. Flight, Jan. 24, 1946.

5. Anon: Durability of Low-Density Core Materials and Sandwich Panels of the Aircraft Type as Determined by Laboratory Tests and Exposure to the Weather. Forest Products Laboratory Report No. 1573.

6. Considine, R. J.: See Promise in Papreg for Aircraft Structures. Aviation, April, 1945.

7. Rheinfrank, G. B., and Norman, W. A.: Molded Glass Fiber Sandwich Fuselage for BT-15 Airplane. Army Air Forces Technical Report No 5159.

8. Anon: Preliminary Report on the Strength of Flat Sandwich Plates in Edgewise Compression. Forest Products Laboratory Report No. 1561.

9. Perry, T. D.: Wood-to-Metal Adhesives. Mechanical Engineering, December, 1946.

10. Rawdon, H.: Wood vs. Metal Construction in Aircraft. S.A.E. Journal, December, 1945.

11. Anon: Metal Plus Plastic Makes New Aircraft Flooring. Aviation, April, 1944.

12. Anon: Static Tests of Vought F4U-4 Sandwich and Fiberglass Horizontal Tail Surfaces. Bureau of Aeronautics, Naval Air Experimental Station, Philadelphia AML NAM 2452.

13. Abbott, I. H., von Doenhoff, A. E., and Stivers, L. S., Jr.: Summary of Airfoil Data, NACA Wartime Report L-560.

14. Hoff, N. J., and Mautner, S. E.: The Buckling of Sandwich-Type Parcels, Jour. Inst. Aero. Sc., July, 1945.

15. Troxell, W. W., and Engel, H. C.: Column Characteristics of Sandwich Panels Having Honeycomb Cores. Jour. Inst. Aeor. Sc., July, 1947.

16. Gough, G. S., Elam, C. F., and De Bruyne, N. A.: The Stabilization of a Thin Sheet by a Continuous Supporting Medium. Jour. R. Ae. S., January, 1940.

NEW AVIATION PRODUCTS

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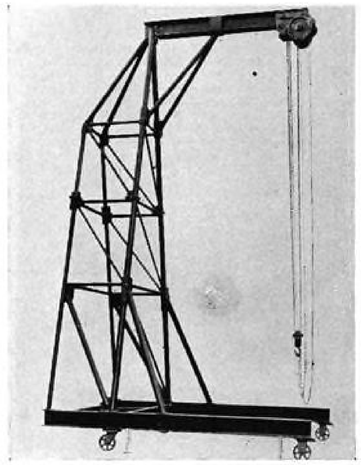
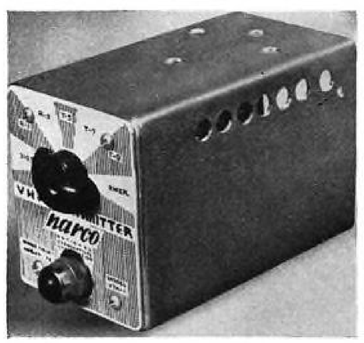
Particularly adaptable for handling of heavy aircraft engines, 4-ton capacity mobile crane offered by **Airquipment Co.**, 2820 Ontario St., Burbank, Cal., has overall height of 23 ft. 11 in., base



width of 9 ft. 7 in., and base length of 13 ft. 9 in. Chain hoist lifts loads a maximum of 15 ft. and has in and out travel of 3 ft. Entire structure is mounted on heavy-duty steel casters, and sturdy tow is included. When in use, friction ground locks hold crane in place when it is in use. Moreover, it is demountable in sections to simply shipping.

VHF Unit for Lightplanes

Compactness is a prime feature of 11.oz. Narco VTA-1 transmitter unit designed to be attached to regular lightplane transmitter to give static-free VHF transmission, reaching many times farther than is possible with 3105 kc.



Size comparison with pack of cigarets is shown in illustration of this set, which is being marketed by **National Aeronautical Corp.**, Wings Field, Ambler, Pa. Standard private flying channels of 122.1 and 122.5 mc. are provided, and four additional crystals can be installed to give maximum VHF utility. Using selector switch, pilot may choose any of six VHF channels or standard 3105 kc. Unit is mounted behind instrument panel by means of four small bolts, leaving only selector switch, indicator lamp, and face plate visible.

Curved Lines Made Easy

Seen as handy time-saver for aviation draftsmen is Infinarc, device for drawing curves. Desired curve is obtained with specially tempered wire forms

whose shapes are altered by moving either or both of two adjustment screws along slots in foot-long base of instrument. Using four pre-formed wire curves supplied with kit, it is possible to produce almost any curved line required. Maker is **Cook Specialty Co.**, Green Lane, Pa.

Cleaner Kits for Personal Craft

Whiz line of aircraft cleaning products is now provided in two kit assortments for personal plane flyers. Maker, **Aviation Chemicals Div. of R. M. Hollingshead Corp.**, Camden, N. J., states its No. 1 kit (illustrated) is especially for aluminum-clad ships and contains ½ gal. Klad polish, ½ pt. Klad wax, 1 pt. cleaner & wax, 1 pt. "C" windshield cleaner, ½ pt. plane wash, 5 oz. handy

spot remover, ½ pt. wing walk black, and brush and cloths. For fabric-covered and painted planes, No. 2 kit includes 1 qt. cleaner & wax, 1 pt. "C" windshield cleaner, ½ pt. plane wash, 5 oz. handy spot remover, and wiping and polishing cloths. Assortments are stated to fill every essential need for one complete cleaning operation, with sufficient materials remaining to maintain ship spic-and-span for a considerable time. Kits are marketed through company's distributors and dealers.

Information Tips

Wheel-Tipped Gage for Blueprint Work

Minerva Curvimeter, a Swiss import, is linear measuring device intended for draftsmen, engineers, and estimators. Leaflet issued by **Herman H. Sticht Co.**, 27 Park Place, New York City, states wheel-tipped device eliminates slow pencil figuring and mental calculation by accurately reading distances when rolled along lines of blueprints or plans. Three scales are incorporated: ¼ in. equals 1 ft., ¼ in. equals 1 ft., and ½ in. equals 1 ft. Most commonly used ¼-in. scale registers up to 1,200 ft., while ¼-in. scale goes to 2,400 ft. Hands can be reset by push button. Feature of device is that if certain distance has been erroneously measured, mistake can be checked by simply reversing along line, in which case hand on dial moves backward. Contract wheel of instrument ultilizes two jewels.

Cleaning and Anti-Freeze Oil

Gas tank and oil line anti-freeze properties of aviation grade Motor Fizik penetrating oil is publicized by manufacturer, **Curran Ordnance Chemical Laboratory**, South Canal St., Lawrence, Mass. Product is described as vapor phase oil especially adapted for washing gums and carbonaceous tars from inside of gasoline engines by action of condensing vapors. Added to tank, product is stated to cause any moisture in gas line to go into colloidal dispersion or into solution with gasoline and be burned up, thus dehydrating fuel system and preventing costly frozen-line trouble. Meanwhile, company states it is investigating possible use of vibrations—ultra high frequency sound waves—to speed up decarbonizing process of its self-emulsifying solvents. It is said function of vibrations is to shake loose tenacious dirt particles and allow more complete peptization dispersion and emulsification of difficult-to-eradicate soil.

Direction Indicator Back in Production

Autoflight direction indicator Model 2221, similar to Army B-20, is reported by maker, **G. M. Giannini & Co.**, 285 W. Colorado St., Pasadena 1, Cal., to again be in commercial production. This compass instrument has 360-deg. dial face and is equipped with course lines, with knob on front allowing pilot to set reference lines. Operation is by magnetic float, which is spring mounted and gives constant readings regardless of rough air. Entire mechanism, including dial and pointer, is submerged in compass fluid. Protected against temperature and altitude changes by bellows chamber in lower part of compass case, accuracy is stated to be ½ deg. on four headings, with friction error of but 1 deg. without tapping. Compass employs small, conventional-type compensator system capable of total compensations up to 50 deg. This system is adjustable from front of instrument.

Alloy Casting Handbook

"Manual of Aluminum Casting Alloys," based on research sponsored at Case Institute of Technology, has been published by **Aluminum Research Institute**, 111 W. Washington St., Chicago 2. Intended to be of assistance to design engineers, foundrymen, and users of castings generally, book contains tabular data on physical and mechanical properties of various sand and permanent-mold aluminum alloys most commonly used, general metallurgy of aluminum alloys, properties of specific alloys, foundry practice, and heat treatment. This 78-page illustrated work is being mailed gratis to applicants writing in on company letterheads.

GCA-Team Records

Record of three technical teams in "talking down" 4,403 aircraft via Ground Controlled Approach systems installed at Haneda, Honshu, Japan; Kimpo, Korea; and at Iwo Jima is briefed in special four-page color folder sent out by **Phileo Corp.**, Philadelphia 34. Included is mention of other specialized company services.

Aviation Group Move to Push Better Airports Operations

NATA, AOPA and NAA making simultaneous efforts to focus attention on fields with good and bad procedures.

By ALEXANDER McSURELY

Parallel and simultaneous efforts by three principal aviation organizations to bring about higher standards of airport operating practice are focusing attention of the industry and aviation consumers on good airports where high standards prevail and on sub-standard fields where there is plenty of room for improvement.

• National Aviation Trades Association announces that a new code of recommended practices covering student instruction, aircraft sales, taxiing, aircraft and airport maintenance, rental and charter of aircraft, was distributed to members of the Pennsylvania Aviation Trades Association at the State Autumn Air Cruise in the Poconos, and after a trial period in that state will be used by other state operators' groups if successful.

• Aircraft Owners' and Pilots Association reports that a recent spot check survey at 1,557 airports shows that since mid-summer the number of above-average airports in North America, as rated by AOPA members has increased approximately 50 percent, and now stands at an estimated 627, in addition to which there are approximately 60 other airports which merit a rating of superior.

• National Aeronautic Association, which launched a campaign more than a year ago for better airport operating practices, is continuing its spot check of airports and preparing certificates of award for airport operators who measure up to its standards. Jerome Lederer, NAA vice president, safety division, has also worked with Harold Swank, PATA president, in preparing the new recommended practices code sponsored by PATA and NATA.

Copies of the new code also are being sent out to the 31 state aviation trades association secretaries and to members of the national board of state delegates of NATA. Eventually it is probable that the code will be circulated, either by state associations or the national office, to all of the more than 2,500 NATA operator members.

"Constant and competent" supervision of the fixed base operation is defined as the most essential requirement for success. This requires:

• Instructing each employee in his job and responsibility, spot checking his work, letting him know that he is being checked.

• Continuous presence of the operator or a competent, trustworthy supervisor on the airport during active hours.

• A cost accounting system, establishing control checks on all departments and organizing the various sources of expense and revenue for a clear, financial picture.

Space here does not permit a complete listing of the recommendations, but the most important may be summarized as follows:

• **Student Instruction**—See that instructors give student pilots full value in time and attention for the money paid. Spot check students at various stages to be sure they are being adequately trained. Be sure instructors are not guilty of careless flying or practices they should not permit in a student. Set up definite rules, for students and instructors, and remind both, of these rules and that they must be followed. Make notes of mistakes observed and hold weekly staff meetings with instructors to discuss them.

• **Flight Procedures**—Supervise flight operations from the field. Standard cockpit procedures should be constantly followed for takeoff and landing, in all planes. So-called "power off" maneuvers should be performed with minimum of 1200 to 1500 rpm. Any simulated forced landings should be dual and terminated above 200 ft. or up to the approach leg for a regular landing if necessary. Students should have a minimum of two dual and two solo landings at at least two different strange airports and should have check outs including stalls in at least one different type of plane. Students should not leave an assigned flight area without permission, making possible better supervision and eliminating possibility of dangerous "buzz jobs". Be sure every student solo flight starts with a full gas tank. Instruct students, if lost, not to land any place except an airport, unless lack of gas, bad weather or darkness requires immediate forced landing. Make instructor responsible for a definite plane, and for log books of his students. Keep track of student attendance at flight and ground schools and be sure you have well-qualified ground school instructors.

• **Selling**—Don't oversell simplicity of flying to the extent that it encourages careless flying. If prospect is already a conventional lightplane pilot, checking him out in a new plane "with hot performance and lots of gadgets" normally will require at least five hours supervised checktime.

• **Ground Handling**—Establish definite parking line and insist that planes taxi parallel to and on field side of line, at least 100 ft. from hangar or other obstacle. Aircraft should be started from the line only when headed toward the field. Planes should be pushed into the line, rather than taxiied. Moderate taxi speeds at all times. Unless an aircraft stops for service or gas, only, it should be tied down immediately after it stops taxiing.

• **Plane Rentals**—Use approved rental form, which fixes responsibility for operation and requires plane renter's pilot certificate and a check ride. Check weather, gas and oil for renter, in his presence. Rent only to people in whom you have absolute confidence and whose qualifications you know. Indicate an alternate airport which is sure to remain contact, before rental flight begins. Apply penalties for violation of rental contract, to keep rentals on a business basis.

• **Airport Maintenance**—Assign an employee to supervise maintenance of the field, keep grass cut, look for holes, check fire hazards, buildings, fences, etc. and check the airport yourself at least weekly. Watch especially night flying lights, runways, and mark danger spots with bright red flags until repaired. Be sure spectators are separated from the flying field.

• **Plane Maintenance**—Put shop department on bookkeeping basis. Credit shop for maintenance of aircraft used in flight operations and debit the operations branch. Unless a minimum of six planes are in use it may be cheaper to farm out shop work but not line maintenance. One good mechanic and a helper can take care of 8 to 10 light planes including 100 hour periodic checks, if proper schedules are followed.

HAT Abandons Stock Sale Plan

Plans to finance operations of Helicopter Air Transport, Inc., Camden, N. J., through sale of $945,000 of stock have been abandoned, the company has announced in a notice filed with the Securities and Exchange Commission at Philadelphia.

The firm, which presently operates six helicopters from its base at Central Airport, Camden, asked SEC permission to withdraw its registration statement covering 270,000 shares of capital stock. HAT, in registering the stock last March 14, said it planned to make a public offering at $3.50 a share and use the money to finance operations in the helicopter transport field.

The company told the SEC, however, that since registering the stock "substantial changes have occurred in the condition of the corporation, arising from various causes, including CAA's grounding of all Bell helicopters for 15 days last May." HAT said it operates three Bell helicopters.

A company spokesman disclosed that its transport business has fallen off and that its principal source of income now is derived from training pilots and mechanics.

He said, however, that HAT still hopes to obtain contracts to ferry mail from airports to post offices. Tests on the adaptability of the helicopter to this work were conducted last fall when HAT carried the mails daily on schedule between the roof of 30th Street Post Office and Philadelphia's Southwest Airport.

At the time the Bell helicopters were grounded last May, the company was working on an oil exploration contract over swamp lands near Houma, La. He said this was HAT's biggest contract since the company was organized in September of 1945, but because of the expense of maintaining the crews and helicopters during the grounded period there was little profit.

HAT now has 15 students taking helicopter flight training. Tuition ranges from $1,500 to $2,000 for 20 hours, depending on whether Bell or Sikorsky helicopters are used. A majority of students are from foreign countries, sent here by their governments for special flight instruction in helicopters.

Enlarge Cleveland Strip

Cleveland's lake front air strip eventually may become a full-size air terminal large enough for transport planes, according to Maj. Jack Berry, airport commissioner.

Maj. Berry said construction on runway extension to 6,000 ft. would begin when airline planes are fitted with castering undercarriages permitting crosswind landings. The present 2,200-ft. strip is two-directional.

Work began this week on a fill to extend the runway to 3,000 ft. early next year.

Durham Expands Facilities

Fifth expansion in less than two years was announced recently by Durham Aircraft Service, Inc., when the firm moved into its new headquarters at Woodside, L. I. The new two-story building, comprises executive offices, new instrument and accessory overhaul departments and nearly 25,000 additional sq. ft. for bulk storage.

Operating expenses of the company, stocking 30,000 aircraft parts and accessories, will be cut an estimated 30 percent by the move. Additional space will provide more efficient in-line production methods for receiving, inspecting, stocking, packaging and shipping material. Enlarged inspection facilities will exert constant control over all instruments and accessories.

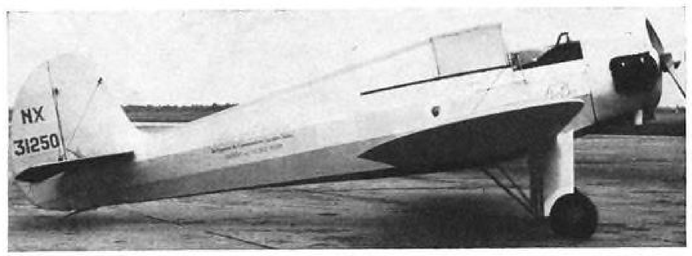
Robert M. Durham, president, announced that Frank T. Fisher, who joined the company in May, 1946, has been named a vice president of the aircraft parts and accessories company. His office will be in the new building.

Spartan Buys Palmetto

Spartan Aviation Co. has purchased Palmetto Air School at Spartanburg, S. C., from the estate of Robert F. Turner, veteran pilot and head of the school, who was killed when his plane crashed near Spartanburg. With the addition of Palmetto's 14 planes, office, hangar, and shop, the Spartan Company now has 22 planes, light and twin-engined, for charter service and flight school. The company also maintains and services aircraft and has a plane sales agency. Between 75 and 80 World War II veterans are enrolled in a GI flight program in addition to a number of other flight students. The company has moved its operation to the northwest end of Memorial Airport, where it will continue to act as a Navy contractor, to supply 100 octane gasoline. Lewis Clayton is president of Spartan Aviation.

Recognizes Non-Spin Planes

Civil aviation branch of Canadian Department of Transport, Ottawa, has dropped the spin test from requirements of pilots using non-spinnable aircraft. Applicants for private pilot licenses, however, will be required to demonstrate recovery from the stall and ability to maneuver the aircraft safely under all flight conditions. Certificates without the spin test will be so marked, and pilots carrying such certificates will be able to use only non-spinnable aircraft.



"LITTLE GEE BEE"

Latest in the crop of experimental single seaters designed for the minimum plane market and for airport flying is "Little Gee Bee" which recently made a cross-country flight from its home in Troutdale, Ore., to New York and Washington. Its pilot, and designer, George Bogardus, heads the American Airman's Association, a group of sportsman pilots who build their own airplanes. The 65 hp. Continental powered plane carries a 6 gal. auxiliary tank in addition to its regular 13 gal. to increase range to 500 mi. Plane cruises at 108, lands at 32 mph. Construction is conventional tubing fabric covered. Bogardus stopped in Washington to ask CAA to consider a new category of home-built personal planes, to be licensed with NP numbers, (N for United States and P for Personal Aircraft.) On his west east trip, he burned 110 gal. fuel, and total fuel and oil cost amounted to $28.

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WORLD OVER

SIOUX CITY, IOWA, U.S.A.

Flat Rate Offered For Maintenance Work

Flat rate charges on regular repair and maintenance service are being offered by the Sacramento Sky Ranch, Sacramento, Cal., in an effort to allow the plane owner to know the exact cost of his repairs in advance.

Citing the fact that private plane owners should have predetermined costs for most overhaul work, John E. Schwaner, president, states that he hopes to extend the flat rate system to many other jobs as more experience is gained.

Prices quoted in a recently distributed brochure announcing the service include flat rate for 100 hour periodic inspection including minor adjustments and replacements on light craft, for $20.

Wings at Southwest

Wings Field, Inc., aircraft sales and service group, has taken over all non-scheduled flying activities at Southwest Airport, Philadelphia. The Wings group also operates at Central Airport, Camden, N. J., and at Ambler, Pa. In addition to Beechcraft sales and service, Wings now also offers a "fly yourself" plan, charter service, 24-hour maintenance and service facilities.

State Revocation

On the unusual premise that a flight school is responsible for the actions of its students, the Minnesota department of Aeronautics has revoked the license of one school and temporarily suspended the license of another as the result of two recent crashes.

Revoked was the license of American Aviation, Inc., at University airport near Minneapolis, as the result of a crash near Buffalo, Minn., which took the lives of a student pilot and his wife last Aug. 2. Also in the plane were an American Aviation instructor and his wife, both of whom survived.

A license suspension was meted out to Twin City Aviation School, Fleming Field, South St. Paul, resulting from the death of a student pilot Oct. 1. Minnesota Dept. of Aeronautics officials state the suspension will not be lifted until a thorough investigation.

Stinson Appointments

Stinson Division of Convair has appointed Joseph P. Shaw, veteran pilot, assistant sales manager and James C. Everett, former assistant contracts manager, distribution manager. Stinson has inaugurated a new distributor-dealer round table program with meetings scheduled three or four times annually.

BRIEFING FOR DEALERS AND DISTRIBUTORS

DEDICATION FLIGHT—Saturday and Sunday, April 24 and 25, 1948 are set as new dates for the postponed mass flight of private flyers over the transcontinental Skyway No. 1, originally scheduled to converge at Oklahoma City on Nov. 8 and 9. Stanley Draper, Oklahoma City chamber of commerce managing director, told AVIATION WEEK that his city is making elaborate plans to play host to all flyers from both ends of the skyway and points enroute who reach Oklahoma City in the flight. Other cities along the Los Angeles-Washington skyway also are being asked to plan special observances. Route sponsors are hopeful that virtually all of the more than 5,000 communities along the way will have their airmarkers in, and be prepared to provide proper service to the touring private flyers. The new dates were chosen at a time of year when reasonably good flying weather could be expected all along the route.

FIVE-TO-ONE—Theory that the good private airplane should have a ratio of five-to-one between landing speed and top speed if it is to become useful enough to attract a mass market, is not a new one but it is gaining new advocates among analysts of the personal plane slump. Competent engineers assert that such an airplane is entirely feasible to construct today, with the present state of aeronautical knowledge. Few of today's personal planes have a ratio of more than three-to-one and many are nearer to a two-to-one ratio. A plane with a landing speed of 25 mph. and a top speed of 125 mph. or perhaps a ratio of 30 mph. to 150 mph. would be able to utilize safely, small areas now open to only the most skillful pilots. Ground handling difficulties would be greatly lessened. Advocates of the slow-landing speed airplane, among them, Prof. Otto Koppen, MIT engineer and designer of the Skyfarer, see a sharp clevage in the near future between the personal planes which are confined to conventional size airports by their relatively fast landing speeds and the other type which can be dropped in safely and flown out of areas which the hotter planes wouldn't dare to try.

FLIGHT COURSE GUINEA PIG—Nineteen-year-old Donald Shaffer, who lives at Flat Rock (near Sandusky), Ohio, has been the first guinea pig for the experimental flight training curriculum at Ohio University, Athens, Ohio (AVIATION WEEK, Sept. 29) under direction of H. T. Olson, flight training director, and Ralph Smeck, director of aviation at the University. In Shaffer's first 17 hours, he had 14 with an instructor and three solo, and had flown from seven different airports, including hard-surface runway fields and short runway fields. He soloed after the normal eight hour dual instruction period. Ohio's state director of Aviation, C. E. A. Brown, is given a large share of the credit for developing the new type of course and for getting it started at the state-supported university. John Geisse, CAA personal flying consultant, predicted in a recent speech that the techniques used at Ohio university would spread rapidly over the entire country despite opposition to the change from present local airport flying training techniques.

EMBRY RIDDLE MOVES—Embry Riddle School of Aviation, has moved its entire operation to Opa Loca airport, former naval air base, 10 miles north of Miami, Fla. The consolidation removes the flight division and hangar operations from Chapman Field, the technical school from the Coral Gables Coliseum, and the administrative offices, accounting department and bachelor dormitories for students, from the company-owned Aviation Building. The operations are being consolidated in a Navy-built hangar, with 27,000 sq. ft. office and shop space and more than 30,000 sq. ft. of hangar space. The operation will also occupy a large utility building and have barracks facilities accommodating more than 300 bachelor students. The space has been leased by John G. McKay, Embry Riddle president, from Dade County which now owns the field.

AVIATION INSURANCE CONFERENCE—As a result of an article in AVIATION WEEK, Oct. 6, referring to insurance company losses in the personal plane market, National Aviation Trades Association has called a conference of insurance interests serving fixed-base operators, to meet with the national headquarters NATA committee Thursday, Nov. 6, at the Wings Club, Biltmore Hotel, New York. The conference will seek to develop ways in which NATA members and other fixed base operators can cooperate with the insurance companies in operating practices which will reduce losses and improve conditions. Beverly Howard, Charleston, S. C., president of NATA, is chairman of the headquarters committee, which also includes Frank W. Hulse, Birmingham; Sydney Nesbitt, Teterboro, N. J.; F. Leslie Marsden, Buffalo, all NATA vice presidents, and Harry Meixell, NATA executive director.

ALEXANDER McSURELY

Monocoupe Reopens At Melbourne, Fla.

Purchase of Monocoupe Airplane & Engine Corp., Orlando, Fla., by a group of West Virginia investors, and moving the plant to Melbourne, Fla., has been announced.

Officers of the reorganized corporation are Robert G. Sessler, Melbourne; Roy E. Pyles, Beckley, W. Va., vice president; Herbert L. Sessler, Beckley, secretary-treasurer. Additional directors are A. G. Wilcox and Charles Lilly, Beckley.

Purchase includes machinery, raw materials, finished and partly finished aircraft, world manufacturing rights for all models of the Monocoupe, and the 90 hp. Lambert five-cylinder radial engine and all copyrights, patents, and trademarks.

Production will start soon on a 100 hp. 1948 model of the two-place high-wing fabric-covered plane, basically the same in design as the pre-war Monocoupe from the engine firewall back.

Two-place Monocoupe performance is reported as: 146 mph. top speed, 130 mph. cruising speed, 1,100 ft./min. rate of climb. Company claims plane will takeoff or land with 100 ft. run, with use of half-flaps. Plane is now reported undergoing final CAA tests for type certification with the 100 hp. powerplant.

Establishment of a dealer and distributor organization for Monocoupe is now in progress, with applications being received at Melbourne.

Company traces its beginning back to 1925 at Moline, Ill. Clare Bunch, former head of the company, left the business to enter the Army after the factory moved to Orlando shortly before World War II. The Orlando plant has not been in plane production since the war started. Recognized as one of the finest and fastest sport planes of the middle '30s, the Monocoupe won a long list of speed and performance competitions and clipped-wing Monocoupes were widely used for stunting and racing.

Prototype five-placer under development for some time at Orlando, is reported flying at a cruising speed of 130 mph. with 40 mph. landing speed, 500 mi. range and 12 gal./hr. fuel consumption, carrying five persons, and powered with the 90 hp. engines. Target pricetag is $10,000 to $12,000.

The two-place Monocoupe has steel tube fuselage, and strut-braced wood construction wing, both fabric-covered. Examination of the prototype 100 hp. version at Orlando, showed a roomy (for two) cabin, and deluxe interior fittings. Construction of plane appeared to be not too-well adapted to mass production methods.

AVIATION WORLD NEWS

Marauder to Carry French Jet Engine

PARIS—France's first jet engine, the Rateau SRA axial-flow turbojet, will be mounted on a B-26 Marauder to test how yield might be increased. It is not yet certain how exactly it will be mounted, but the two piston engines will be retained probably and the jet will serve only as auxiliary.

Two SRAs have now been completed, though not tried in flight. They are stated to have a thrust of 2200 lb. or 3080 lb. with supplemental injection. Fuel consumption is given at 1.05 lb./hr./lb. thrust. (Aviation, April 1947) The SRA has actually gone as high as 2300 lb. of thrust on the test stand, though during the official tests it was held for one hour at an average of no more than 1650 lb. thrust at 6200 rpm. and an average temperature of 550° C.

Rateau engineers now have on their drawing boards a new axial-flow jet which it is hoped will surpass 4400 lb. thrust, with the combustion chambers no longer lodged around the compressor. Now the combustion chambers are behind it.

Hispano-Suiza meanwhile has finished construction of a R-R Nene under license. Both the SRA and the Nene are designed for mounting on the SO-6000 (Aviation, Jan. 1947), France's first jet plane. Second prototype of the SO-6000 is now nearing completion. The first prototype has been completed and powered by a German Jumo-004 engine for a number of months. Landing gear troubles are reported to have prevented any full dress test flights of the aircraft.

▶ **Other Jets**—Several other companies in France have also produced new jet engines, though none of them has so far been unveiled to public view. A turbojet, the ATAR 101, has been produced by German technicians formerly of the Bayerische Motoren Werke and now employed in France by the government-owned company Societe Nationale d'Etudes et de Construction de Moteurs d'Avions (SNECMA). An axial flow jet with seven stage compressor followed by an annular combustion chamber around the axis of the rotor and several flame tubes, the ATAR 101 is reportedly a development of BMW's wartime work.

Compagnie Electro-Mecanique has

(Turn to Page 47)

Buenos Aires Letter

U. S. Loses Plane Sales

BUENOS AIRES—Top military aviation planners in Argentina were in some confusion this month over what course their future air force will follow.

A Boeing salesman came down from the U. S. hoping to connect for sales of some Boeing-made military craft. What type and how many depended upon what the U. S. State Department would permit.

After reaching some top level military people and the huge war department building (which approaches if not equals the Pentagon in its domination over other capital buildings), the Boeing man finally was told he could make a big sale if he could deliver certain planes of types used during the war by the United States.

More out of routine than hope, he went back to the U. S. Embassy in Buenos Aires, whence a routine cable was sent the State Department asking approval of the sale. Both the Boeing man and the Embassy officials were slightly aghast to receive a favorable answer immediately. A check proved it to be correct.

Hurrying back to the Argentine War department, to give them the good news that the deal could be put over, the Boeing man was told that Argentina was no longer interested. He has since returned without putting over the deal and considerably bitter over it.

What happened in between:

The reason that the State Department suddenly and unexpectedly approved the deal was that a top level decision to sell planes to all Latin American nations, including Argentina, had been reached just about the time of the Rio conference. Argentina had made other concessions in return toward hemispheric cooperation.

The reason that Argentina hastily pulled out of the deal despite the Washington clearance is said to be the simultaneous conclusions of negotiations in London to buy $68,000,000 (U. S.) worth of Britain's latest type planes.

These include, it is believed, 100 Gloster Meteor jet-fighters, and 30 Lincoln bombers, the British counterport of our B-29's. The contracts have been placed and delivery secured on one Lincoln already.

Argentina evidently decided that the British were willing to sell later type planes, plus the fact that they could be paid for in pounds sterling —an important matter, but not an over-riding one for the well-heeled military arm.

* * *

The Aero-Institute, which is building the first of 250 "Calquins" at Cordoba, Argentina, is scheduled to install Pratt & Whitney engines in them. It is said that these engines, either through bad purchasing from surplus stocks, or through the faults of Argentine port authorities, have been damaged by being left in the open.

Another instance affecting American prestige was called to the attention of Ambassador Bruce at a press conference. He was asked why so few and so poorly displayed American planes were on display at the huge National Air Show here. The planes on display, featuring the British Gloster Meteors, Lincoln Bombers, and the Argentine "Pulque" jet-fighter, give the impression that U. S. plane manufacturers just don't exist outside of the lone DC-3 on display.

"What happened?" the press wanted to know, "that we didn't send in some B-29s and late passenger craft, if not a few P-80's, etc?"

The Ambassador, after asking an aide, said that terms of the show called for rental of space, etc., and that U. S. manufacturers were informed, but showed no interest.

This is a most damaging thing to U. S. prestige throughout Latin America, and particularly in Argentina where hemispheric solidarity is being stressed. Maybe some manufacturers if not the department of Inter-American Affairs, can explain.

—John Wilhelm

been working on a prop-jet (TGA-1 bis), with a fifteen-stage axial compressor, which is designed to give 2900 hp. at sealevel at 310 mph, of which 2600 hp. will be furnished by the propeller and the rest by reaction. C.E.M. engineers are also making plans for a turbo jet with eight-stage axial compressor to yield a total of 4200 lb. thrust (TGAR-1008).

Finally, the small Societe Turbomeca has reportedly completed an axial-flow turbojet which it is hoped will reach seven tons of thrust.

Scheduled Route Mileage Increases 42% in India

NEW DELHI–Scheduled route mileage jumped 42 percent during the first six months of this year, according to statistics released recently by the Indian Directorate General of Civil Aviation.

As of June 30, nine operating companies were flying 22 scheduled services over 21 air routes totalling 15,020 miles, compared with 15 services over 14 routes totalling 10,517 miles at the start of the year. Included in the latest figure is India's only present external service: Orient Airway's run from Calcutta to Rangoon.

The airlines, including several not yet in scheduled operation, owned 161 of the 165 registered civil multi-engined aircraft in the country, accounting for the major share of increase in the total civil aircraft registrations, which rose from 403 to 482.

Passenger travel almost doubled, shooting up from 67,554 in the last half of 1946 to 112,069 through June of this year.

Although there were 33 accidents during the six-month period, only three persons were killed–two pilots and a mechanic.

Hangar Bids Asked By Argentine Ministry

BUENOS AIRES–The Ministry of Public Works of Argentina has called for bids on six new hangars at the $7,750,000 Ezeiza airport now under construction south of Buenos Aires. The hangars will use 90-meter span reinforced concrete arches. Full plans and details on bid submission are available at Argentine missions in New York and Washington. Bids are due by Dec. 31.

The hangars are part of a $125,000,000 (U. S.) general construction program which also includes a tunnel, coastal canal, aqueducts and the purchase of dredging equipment.

FINANCIAL

Convair Holdings Segregated In Corporate Financial Twist

Details analyzed of plan placing non-aviation properties in new Nashville Corp.; stockholders to vote Nov. 6.

The final details of one of the most intricate deals in aviation corporate finance have now been released to the stockholders of Consolidated Vultee Aircraft Corp. The prime purpose is to accomplish the segregation of the non-aviation properties of Convair by centering them in a new company to be known as the Nashville Corp. At the same time, new management interests represented by the Atlas Corp. will assume control of Convair while the Nashville Corp. will remain under the direction and control of the Avco Manufacturing Corp.

Underlying this segregation of properties is the evident deviation of philosophies regarding the outlook of the aircraft manufacturing industry. Avco, which now owns some 26 percent of Convair, by its impending action appears to favor the non-aviation activity and proposes to concentrate in the manufacture of consumer goods industries. On the other hand, the Atlas Corp. is placing its chips on the future of the aircraft builders through its entrance in the management of Convair.

▶ **Special Meeting Vote**—At a special meeting to be held on Nov. 6, Convair stockholders will vote on the segregation plan. The proxy statement released for this meeting discloses some interesting information, revealed for the first time. The full extent of the losses attending the Convair Liner project are disclosed. A write down of $12,900,000 in work-in-process as of July 31, 1947, was effected. In addition, a reserve of $6,200,000 was provided for development costs during the subsequent four months. Moreover, based on orders received to date, the management estimates that additional losses of $4,000,000 may be entailed. Not to be excluded is the development and experimental expense aggregating some $5,184,270 which was previously charged to current operations. All told, the known projected loss on the Convair Liner program is placed at $28,248,270.

If cancellations occur on the Convair Liner project or if it is sold in whole or in part, the indicated losses may be increased further. It is most interesting that one of the footnotes calls attention to the possibility that the company may sell some of its plants, machinery or the entire Convair Liner project.

▶ **Warrant Issue**—If the proposed segregation plan is approved, each Convair stockholder will be issued a subscription warrant entitling him to make a firm subscription for two shares of Nashville stock for each four shares of Convair owned. The subscription price of these two shares of Nashville stock will be one share of Convair and $18 in cash. With this as the basic rate of exchange it becomes possible to evaluate the properties involved.

It is proposed that a total of 820,834 shares of stock will be issued comprising the original capitalization of the Nashville Corp. After various adjustments, the total net assets at July 31, 1947, were valued at $15,740,418 or $19.17 per share. On the other hand, the July 31, 1947, valuation of Convair's net assets, prior to the segregation was estimated at $43,623,060 or $27.78 per share on a total of 1,570,266 shares outstanding. After the proposed transaction, net assets would be $35,080,148 or $30.25 per share on only 1,159,849 shares to be outstanding. The Convair asset values should be reduced by at least $4,000,000 representing the estimated loss on the Convair Liner for the four months ending Nov. 30, 1947. Even further losses, as previously indicated, may be involved. This $4,000,000 will amount to $2.55 per share on Convair before segregation and about $3.53 per share after distribution of the Nashville holdings.

Reduced to per share asset valuations, the Convair stockholder is faced with the choice of remaining in the aircraft manufacturing phase or to follow the lead of the Avco Manufacturing interests. A share of Convair stock currently has a market value of around $14. Hence, the addition of $18 per share would bring to $32 the current price to be paid for Nashville assets valued at $38.34. However, by the same token, in remaining with the Convair picture and not subscribing to buy Nashville, a stockholder will have a net equity of about $25.23 in the Convair company.

In either event, the stockholder appears to be receiving a premium in asset values whether the exchange is made or not. The answer to this phenomenon is that discount assets values are characteristic of the entire aircraft industry at the present time.

▶ **Novel Methods**—The methods used in effecting these transfers are very novel. In addition to having the right to make a firm subsciption, each warrant will entitle the holder to make a contingent subscription for the Nashville stock, among those shares, if any, which are subject to purchase but are not so acquired pursuant to the exercise of firm subscription rights. The Avco Manufacturing Corp. has indicated that it will exercise its firm rights for its holdings. The Atlas Corp. which now owns 117,200 shares of Convair will not subscribe to any of the Nashville stock. Through this expedient, effective transfer of control of Convair will be transferred from Avco to Atlas. At the same time, after all firm and contingent rights have been exercised, the Avco interests will subscribe to any of the Nashville shares remaining. The warrants will not be listed on any exchange and their ultimate value is difficult to determine. Should there be a heavy demand for Nashville stock, it is conceivable that some value will accrue to the warrants.

As of Oct. 14, 1947, Convair had outstanding bank loans in the amount of $12,000,000. In the transfer of stock and cash, Convair estimates it will receive approximately $7,277,506 from the sale of 820,834 shares of Nashville stock. After allowance for various adjustments, such proceeds will be reduced to about $5,529,434 which in turn will be applied in partial payment of outstanding bank loans.

▶ **Assets Acquired**—Among the assets being acquired by the Nashville Corp. are emergency plant facilities acquired under certificates of necessity. These facilities, originally having a cost of $5,691,988, have been completely amortized, largely on war production orders. The total such emergency plant facilities, including those of the Nashville division, and now part of the Convair organization, aggregated in original cost the total amount of $22,237,358.

In the final analysis, the success of the revamped Convair company and the newly formed Nashville Corp. will be determined by the earning power each company is able to develop under its separate managements.

—Selig Altschul

CAB Sees Excessive Costs In Creating Transport Reserve

Landis statement before Air Policy Commission denies Board has fostered uneconomic competition: route case moratorium hit.

By CHARLES ADAMS

A vigorous challenge to allegations that it has fostered uneconomic competition among the airlines and a warning that conservatism must mark the nation's approach toward creating an air transport reserve for defense purposes highlighted the Civil Aeronautics Board appearance before the President's Air Policy Commission last week.

Chairman James M. Landis said CAB has grave doubts concerning the wisdom of setting up a transport aircraft reserve. He said he could foresee no possibility that a reserve of the 3,000-5,000 dimensions suggested in previous testimony before the Commission can find employment in commercial aviation.

▶ **Route Freeze Opposed**—Turning to an economic appraisal of the air transport industry, Landis told the Commission that there appeared to be no necessity for even a temporary freezing of route cases—a proposal that has received considerable backing from airline executives. "The character of this industry is too dynamic to permit such a method of administration."

A route case moratorium, Landis declared, presumably would preclude the Board from adapting the air transport pattern to technological changes in planes and other equipment. "It would prevent such changes as our recent consolidation of routes which permitted the carriers to obtain great benefits from use of the increased range of planes through authorization of large numbers of new nonstop operations.

▶ **Airfreight Needs**—"Presumably a moratorium would prevent our making necessary authorizations that may be required for the development of the airfreight business or the establishment of helicopter service. It would appear inconsistent with the current proposal of some that there should be a program of mergers or acquistions to improve the economic soundness of the air transportation system."

The moratorium proposal, Landis observed, appears to have been made by the large carriers and is, essentially, a defensive action by the "haves" against the "have nots." CAB member Harlee Branch disagreed, stating that he could see considerable advantage in having a period in which route expansion could be shelved.

▶ **Branch Position**—"We have a great deal of unassimilated mileage outstanding," Branch declared. "A moratorium of a few months would give the Board an opportunity for a better perspective."

Landis and Branch agreed that CAB, under the Civil Aeronautics Act, is required to handle all cases as quickly as possible. Branch said he would like to see Congress grant the Board discretionary powers in this respect.

Differences of opinion between Landis and Branch developed on two other points. Landis recommended that Congress give CAB power to revoke certificates as a means of confirming the route pattern with proven experience and technological advancement. Branch said he would be afraid of giving CAB that power and indicated it would be a continual threat to stockholders' investments.

Landis told the President's Commission that there is no cause for concern over a competitive threat by nonscheduled services to certificated carriers. Branch contested the statement.

▶ **Management Hit**—The unsatisfactory earnings position of the air transport industry is closely related to the costs of postwar expansion, Landis emphasized. During the two year period between July 1, 1945, and July 1, 1947, the 16 domestic trunklines spent about $235,000,000 for capital assets (largely planes), a total eight times the aggregate investment of these same companies in property and equipment at the start of 1945.

Evidence of over-expansion, bad management, poor planning and extravagant expenditures appeared in a large part of the industry, according to Landis. Inadequate or inprudent financial provision in many cases has been made for the costs of the expansion program, he said. "To a certain extent, a spirit of speculation rather than sound managerial planning tended to control the rate of expansion and the level of commitments made by the industry."

▶ **Policy Defended**—CAB denied it had ever followed a doctrine of "competition for competition's sake." When weak carriers have been given additional links, the controlling factor has been the public's need for the service, not the need of the airline for the route, the Board emphasized.

The Air Policy Commission was given figures to show that traffic between 1940 and 1946 increased considerably faster over route segments where competition was increased than over links where competition was not broadened.

▶ **Defense Problem**—Switching to civil aviation's relationship to national defense, Landis said a subcommittee of the Air Coordinating Committee has been working since last spring on the reserve transport question. "Yet to date it has not been furnished with any firm figures on what requirements exist in war plans for transport planes. Currently there are two air lift requirements before the subcommittee which are almost 800 percent apart."

Government support for transport aircraft development or establishment of a transport reserve will at best prove extremely costly, Landis warned. "At worst, if they involve ill-advised attempts to expand the commercial air transportation system without regard to basic economic considerations, they could wreck the industry financially and create serious dislocations."

▶ **Cost Estimated**—"If each plane in the proposed transport reserve operated at 300 mph, was utilized 8 hours daily, had a 10-ton capacity and showed an average load factor of 66 percent, it would fly 875,000 miles during a year and produce 5¾ million ton miles of air transportation. Taking a very conservative cost figure of $1 a plane mile, the minimum expense of operating a 1,000-plane fleet would be $875,000,000 annually.

"That is over 10 times what the Federal Government is spending this year on all mail payments to U. S. domestic and overseas carriers. Unless the fleet, or a portion of it, can fill an economic demand, the cost of maintaining and operating an air transport reserve is virtually prohibitive."

▶ **Uses Listed**—Landis said carrying all first-class non-local mail by air, establishing low-cost air parcel post, and expanding air cargo would contribute to building a transport reserve, but added that the importance of these suggestions has been greatly exaggerated. He pointed out that carrying all non-local first class mail by air would require only 20 planes of 10-ton capacity (DC4 size) devoted solely to this purpose.

Potential volume of air parcel post, moving at about 14 cents a ton mile, could be handled in an additional six planes of 10-ton capacity. In order for air cargo to provide economic employment for 1,000 transports of DC-4 size, the volume would have to increase 4,700 times over 1946 levels.

▶ **Maximum Size**—Landis declared that above the level of 250 aircraft of the size now in operation, or a smaller number of large, modern planes, these appear to be no fully justified economic requirement for equipment which could be classified as an air transport reserve in the next three to five years. He added that a realistic appraisal of the costs of storing aircraft against operation of the planes makes it difficult to conclude other than that "cocooning" must be used to provide at least a portion of the reserve.

CAB said it believes the government should accept at least the temporary responsibility for assuring a minimum level of transport plane development work as an investment in national defense.

The board also declared:

• **It would be a mistake** to merge all government agencies dealing with transportation into a single regulatory body or department of transportation . . . creation of a department of civil aeronautics is not now favored.

• **The airlines should own** the planes they operate rather than lease them from a government agency . . . development of new transport aircraft should be the joint responsibility of military and civil aviation interests, with financial aid extended to manufacturers subject to a recapture plan which would limit permanent government expenditures to reasonable proportions.

• **CAB's statutory jurisdiction** should be extended over contract carriers and over the rates and charges of international air services . . . it should be given full jurisdiction over the security issues and capitalization of air carriers.

• **Federal legislation** should be enacted providing for avoidance of multiple taxation of carriers by the states and providing for termination of state taxation on aviation fuel used in interstate operations.

TWA Route Ruling

In a supplemental opinion in the Cincinnati-New York case, CAB last month amended TWA's AM 2 certificate to provide that Columbus or Dayton, O., be served on all flights which serve Cincinnati and Washington. At the same time the Board denied all other petitions for rehearing and reargument.

CAB SCHEDULE

Nov. 3. Hearing in Boston-Bermuda service case. (Docket 1650 et al.)
Nov. 10. Hearing on foreign air carrier permit application of Airlinte Eireann Teoranta for Ireland-U. S. service. (Docket 3092.)
Nov. 10. Oral argument on IWA-Delta equipment interchange agreement. Postponed from Oct. 23. (Docket 2346.)
Nov. 13. Oral argument in Pacific Northwest-Hawaii service case. (Docket 2537 et al.)
Nov. 15. Hearing on Board's investigation of Consolidated Air-freight Tariff Agreement. (Docket 2719.)
Nov. 17. Prehearing conference on additional service in Hawaiian Islands. (Docket 2390 et al.)
Nov. 24. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans route. (Docket 1956.)
Nov. 25. Hearing on TACA, S.A., foreign air carrier permit renewal and amendment case. (Dockets 3016 and 3017.)
Dec. 1. Hearing on PCA's application for unrestricted service from Chicago to Cleveland, Akron, Youngstown and Pittsburgh. (Dockets 1789 and 1790.)
Dec. 8. Hearing on Mid-Continent's proposed service between Minot, N. D., and Regina, Saskatchewan. (Docket 628.)

Pilot Error Seen In Two Accidents

CAB reports on PAA's New Orleans mishap, EAL-Universal mid-air collision.

Two accidents in which 130 passengers and crewmen aboard three transport planes escaped injury despite a mid-air collision and a swoop through treetops have been blamed by CAB on pilot error.

One of the mishaps involved an Eastern Air Lines DC-4 and a Universal Airlines DC-3 over Aberdeen, Md., Dec. 19, 1946. The second occurred the same day when a Pan American Airways DC-4 made an unsuccessful landing attempt at Moisant Airport, New Orleans.

▶ **Slick Mishap**—Meanwhile, a CAB hearing has been completed on the circumstances surrounding a third hairsbreath escape Sept. 17, 1947. Pilot error also may have contributed to this accident, which saw a Slick Airways C-46 land at Lockheed Air Terminal, Burbank, Cal., with bone dry fuel tanks.

Lack of vigilance on the part of the pilots on both aircraft probably caused the mid-air accident in which the Eastern DC-4, carrying 56 passengers and a four-man crew, collided with the Universal Airlines DC-3, bearing 22 passengers and a crew of three. Both planes were headed from Newark to Miami, the DC-4 overtaking the smaller plane near Aberdeen just after dark.

▶ **Damage Described**—The ships came together at an angle of 74 degrees. Extensive damage was sustained on the forward top portion of the DC-3's fuselage above the right side of the cockpit; and the top skin covering of the radio compartment was torn off. Parts of the hydraulic system and radio components were strewn about the forward compartments of the Universal plane.

Examination of the Eastern DC-4 revealed the portion of the fuselage below and in front of the horizontal stabilizer had been damaged extensively, with the tail skid carried away. The DC-3 made an emergency landing at Aberdeen, while the DC-4 continued to Washington.

▶ **Blame Placed**—Neither pilot of the DC-3 saw the DC-4. The captain of the DC-4 failed to see the DC-3, but the co-pilot saw the lights of the smaller plane immediately before the impact and banked to the right, pulling the nose up.

CAB said each plane should have been visible to the other before the collision. While blaming both crews, the Board said "greater laxity must be charged to the Eastern DC-4 flight crew." As a result of the accident, Universal, which has gone into bankruptcy, filed a $500,000 suit against Eastern.

▶ **New Orleans Accident**—The Pan American Airways accident at Moisant airport occurred when the DC-4, northbound from Balboa, Canal Zone, to New Orleans, made an unsuccessful third pass at the field in steadily deteriorating weather conditions. An hour before the plane first approached the field, the ceiling was 2,700 ft., visibility 4 miles. At the time of the second approach, there was overcast at 400 ft., rain, light fog, and 2½ miles visibility.

On the third missed approach, when the DC-4 struck the trees, ceiling was 300 ft. broken, visibility 2 miles, with light rain and fog. The plane, carrying 45 persons, finally landed at Mobile, Ala.

▶ **Moss in Nacelles**—Investigation disclosed Spanish moss and wood particles in No. 1 and 2 engine nacelles and in each of the three landing gear struts. Propellers No. 1 and 2 were out of track; a three-inch tear was found in the left de-icer boot, and a four-inch hole in the left flap.

The wheel nacelle doors were dented and damaged; and left main landing gear dungee system was broken. Oil cooler cowlings for No. 1, 2 and 3 engines were dented and choked with Spanish moss. The right inboard fuel tank was ruptured; the right landing

light assembly was missing, and the right horizontal stabilizer damaged.

► **Weather Conditions**—CAB said the first two approaches were made with weather better than minimums for the field. But the third approach, with a 300 ft. ceiling or less and 2-mile visibility, was made below minimums and after the Pan American dispatcher had advised to proceed to Memphis, Tenn.

"The pilot knew the ceiling was below minimum before making his third approach," the Board said. "Probable cause of this accident was the pilot's deliberate descent through an overcast to a dangerously low altitude in an attempt to land despite his knowledge that ceilings and visibility were below minimums authorized by CAA."

► **Engines Dead**—The Slick Airways C-46, bound from Denver and loaded with 9,615 lb. of cargo, landed at Burbank with both engines dead from fuel starvation. Headwinds with unexpected velocities of 40 to 50 mph. had been encountered on the 881-mile trip, resulting in flight time of 6 hr. 8 min. instead of the 4 hr. 40 min. estimated.

The pilots told CAB safety examiners that their gauges led them to believe about 200 gal. of gasoline were in the tanks as they approached Burbank. Thus, when the left engine quit between Newhall and Palmdale, Cal., they investigated for a fuel leak.

► **Poor Weather**—The left engine was started again, but quit a second time while the Slick plane was holding in preparation for the Burbank landing. During the letdown, the left engine quit frequently, and the right engine stopped at 1,000 ft. while the plane was running in and out of squalls with forward visibility poor.

While planning to set the plane down on a highway, the pilot spotted a Lockheed air terminal hangar. Unable to pick out a runway, he landed on a taxi strip after missing Lockheed's parked "Constitution" transport by about 50 ft. Brakes failed to hold on the wet strip, the plane running off the south end of the field, through the boundary fence, across a highway, over a railroad embankment, across a second highway, and into a vacant lot. It came to rest right-side up although the landing gear had been wiped off.

CAB questioning indicated that the pilots may have been at fault for not landing and refueling at Las Vegas, Nev., after encountering strong headwinds on that part of the flight from Denver, or for not landing at Palmdale, Cal., (where weather was clear) after the left engine quit. Testimony disclosed evidence that the pilots may have relied almost entirely on their gauges after passing Las Vegas and may not have made proper calculations of fuel consumed.

SHORTLINES

► **American** has petitioned CAB to reconsider the portion of the Great Lakes area decision which denied, by a three to two vote, AA's application to provide direct service between Cleveland, Indianapolis and St. Louis.

► **American Overseas** carried 53,435 trans-Atlantic passengers during the first nine months of 1947. Company states its total exceeds that of any other airline flying the North Atlantic.

► **Braniff** is slated to begin daily service from Houston and San Antonio to Chicago with DC-6s on Nov. 5.

► **Empire** during its first year of certificated feeder operations carried 10,911 passengers, 142,250 lb. of airmail and 29,590 lb. of air express. Company inaugurated service over its routes in Idaho, Oregon and Washington on Sept. 28, 1946, and flew 1,500,437 plane miles in the next 12 months, completing 92.8 percent of its scheduled trips.

► **Monarch** has been denied immediate CAB hearing on an application to extend its feeder network to Phoenix, Ariz.

► **National** recent petition for reconsideration of the CAB decision granting a foreign air carrier permit to Peruvian International Airways has been denied.

► **Northwest** has begun using Martin 2-0-2s as second sections on runs between Minneapolis-St. Paul and New York. Company late in October had five 2-0-2s and hoped to have 10 on hand early this month. . . . First service over the newly-authorized link between the Twin Cities and Washington is slated to begin by Jan. 1.

► **Pan American** celebrated the 20th anniversary of its first scheduled flight last month. Cuban and U. S. officials participated in ceremonies at Key West and Havana, the two cities linked by the inaugural clipper run on Oct. 28, 1927.

► **Robinson Airlines** has announced "temporary suspension" of service between Albany and the southern tier of New York state. C. S. Robinson, president of the intrastate carrier, said the company would continue to provide charter flights between Albany and the Binghamton area.

► **TWA** has lowered its international air express rates to 25 percent.

► **United** recently took delivery on the last of its order for 35 DC-6s. . . . Service to Mansfield and Zanesville, O., and Richmond, Ind., was to be inaugurated on AM 2 early this month.

Southeast Feeder Battle Reopened

Whether Piedmont Aviation, Winston-Salem, N. C., or State Airlines, Charlotte, N. C., should be selected to operate feeder services in North Carolina, Virginia, West Virginia and Kentucky will be reexamined by CAB.

The Board, in its Southeastern States area decision last April, designated Piedmont for certification contingent on a showing of adequate airports. But CAB has now granted State Airlines' petition for reargument and reconsideration. State contends the Board exceeded its jurisdiction in awarding Piedmont routes not applied for and asserts the public interest requires the selection of State over Piedmont.

▶ **Reaffirms Stand**—In its supplemental opinion in the Southeastern States case, CAB reaffirmed its refusal to authorize a separate feeder system in Kentucky and Tennessee "since the prospect of financial success was not demonstrated on the record." The Board said it is entirely possible that after operations are commenced over various other feeder systems it might be found desirable to extend one or more of them to provide additional service for the Kentucky-Tennessee area.

Meanwhile, the certificate designated for Piedmont was amended to include Middlesboro-Harlan and London-Corbin as intermediate points in southeastern Kentucky. Eastern Air Lines' Route 10 certificate was amended to include Bowling Green, Ky., as an intermediate point between Nashville, Tenn., and Louisville, Ky.

▶ **Lee Dissents**—CAB Member Josh Lee, in a partial dissent, said rail and highway transportation in the Kentucky-Tennessee area are inadequate and that further air transportation is necessary. One possibility for such additional local service would be to reopen the Great Lakes area case with a view to extending either Parks Air Transport or Roscoe Turner Aeronautical Corp. into the region, Lee declared in his dissent.

In other parts of the supplemental opinion, CAB amended PCA's Route 51 certificate to include Charlotte, N. C., as an intermediate point between Hickory and Winston-Salem, N. C. Eastern Air Lines' Route 5 certificate was amended to include Augusta, Ga., as an intermediate point between Anderson, S. C., and Atlanta, Ga.; and Dothan, Ala., as an intermediate point between Montgomery, Ala., and Pensacola, Fla. EAL's Route 10 certificate was amended to include Columbus, Ga., and Macon, Ga., as intermediate points on the Atlanta-Tallahassee leg.

Cohu Expects Smaller Losses This Winter

TWA's transcontinental and international divisions probably will lose money this winter but at a considerably slower rate than in the same period last year, according to Pres. LaMotte T. Cohu.

Meanwhile, the carrier is chopping away at 1947 operating deficits that stood at $3,541,000 on the transcontinental division on Aug. 31 and $1,457,000 on the international division for the seven months ended July 31. Domestic operations were from $300,000 to $500,000 in the black in September, and overseas service also were in the black for the month.

Cohu said TWA saved $253,000 a year rent when it moved its international division offices from 521 Fifth Ave., New York, to Wilmington, Del., adding that total economies resulting from the shift probably aggregated between $500,000 and $600,000.

When asked why TWA is proceeding slowly in requesting passenger fare increases, Cohu declared the industry must show a united front. "I think we are selling service too cheaply, considering the higher price level. But we have one airline that does not feel that way about it. That carrier is getting a taste of red ink. When we can get together on this thing (the fare increase) we're going after it."

Two Feeders Prepare To Start Operations

Wisconsin Central Airlines, which was designated for certification in CAB's North Central area decision last December contingent on a showing of adequate airports along its routes, has been granted permission to start service.

CAB said the feeder had reported suitable fields available at 16 of the 34 points on the system. Operations with Lockheed Electras are expected to begin around Jan. 1.

Meanwhile, Trans-Texas Airways, Houston, is preparing to inaugurate service on its feeder routes this month with DC-3s. The carrier, which was certificated nearly a year ago as Aviation Enterprises, Inc., had expected to start flights in September (AVIATION WEEK, Aug. 18).

Braniff Expands Hotel Reservations Service

Braniff Airways is now securing hotel reservations for passengers bound to any point on its domestic system. By arrangement with 62 hotels, the carrier has expanded the service previously made available only to Chicago-bound travelers (AVIATION WEEK, Sept. 8).

42 Nonscheduled Services Suspended

Forty-two nonscheduled operators using transport-type aircraft lost their letters of registration late last month for failure to comply with CAB regulations governing irregular air carriers.

The 42 companies were among 65 uncertificated lines which were warned by the Board Oct. 2 that their permits would be suspended if proper compliance with section 292.1 of the Economic Regulations was not made within 15 days (AVIATION WEEK Oct. 13). Twenty-one of the 65 filed necessary tariffs and other data in the 15-day period, while two companies were reclassified as carriers using small-type equipment.

► **Suspension Lifted**—International Air Freight, Inc., West Palm Beach, Fla., one of the 42 carriers hit by CAB's action, had its suspension lifted soon after it was instituted. Similar reinstatement of other carriers was being speeded last week.

Operators, excluding international air freight, whose letters of registration were suspended included:

Airline Transport Carriers, Inc., Burbank, Calif.; American International Airways, Inc., New York; Artic-Pacific, Inc., Seattle; Arnold Air Service, Inc., Anchorage, Alaska; Aviation Maintenance Corp., Van Nuys, Cal.; Barnes Aircraft, Lumberton, N. C.; Calasia Air Transport, San Francisco; Capitol Airways, Inc., Nashville, Tenn.; Caribbean American Lines, Inc., Miami; Central Flying Service, St. Louis; Chesapeake Airways, Inc., Salisbury, Md.; Coastal Cargo Co., Inc., Teterboro, N. J.; Consumers Airlines, Inc., Champaign, Ill.; Davis Airways, Inc., East Boston, Mass.; A. Dieterle, Chula Vista, Calif.

• Eastern Aviation, Inc., Beverly, Mass.; Gulf Airways, Inc., New Orleans; Gulf & Western Airlines, Inc., Houston, Tex.; Johnson Flying Service, Inc., Missoula, Mont.; Magnolia Airlines, New Orleans; Maine Air Transport Co., Inc., Rockland, Me.; Paul Mantz Air services, Burbank, Calif.; Mercury Airlines, Inc., Columbus, O.; Mercury World Airways, Lincoln, Neb.; Meteor Air Transport, Inc., Teterboro, N. J.; Moon Flying Service, Inc., South Bend, Ind.; Oxnard Sky Freight, Inc., Oxnard, Calif.; Pacific National Airlines, Inc., San Francisco.

Puerto Rico World Airways, San Juan, P. R.; Remmert-Werner, Inc., St. Louis; Nu-way Air Express, New York; Reg Robbins, Houston; Sabihon Aviation, Ltd., Wahiawa, Oahu, Hawaii; Skyways International Trading & Transport Co., Miami; Southern Air Transport, Montgomery, Ala.; Standard Air Cargo, Seattle; Trans-Mississippi Airways, Inc., Omaha, Neb.; Transocean Air Lines, Oakland, Calif.; Twentieth Century Air Lines, Inc., Charlotte, N. C.; Viking Airliners, Burbank, Calif., and Western Skyways Service, Troutdale, Ore.

Airline Expenses

Wages and salaries accounted for 46 cents of each dollar spent by U. S. domestic and international airlines during the second quarter of 1947.

An Air Transport Association survey shows each dollar of operating expense divided as follows: payroll for flying personnel, 11.3 cents; payroll for all other workers, 34.7 cents; rent, food for passengers, passenger supplies, and miscellaneous, 21.6 cents; taxes, insurance, and depreciation, 14.7 cents; gasoline and oil, 8.8 cents; repairs and materials, 6.7 cents; advertising and publicity, 2.2 cents.

Total operating expense of domestic and international airlines in 1947 is expected to aggregate $550,000,000, more than 100 percent above the 1945 figure of $241,622,488.

Food Conservation

Continental Air Lines hopes to save 1,000 meals a month under a new plan for gauging its passengers' requirements. In the past, it has been general airline practice to "board" enough meals to serve all passengers booked on a flight. CAL now is contacting its passengers several hours before flight time to determine how many will have eaten prior to plane departure or prefer to wait until arrival at their destination for their next meal.

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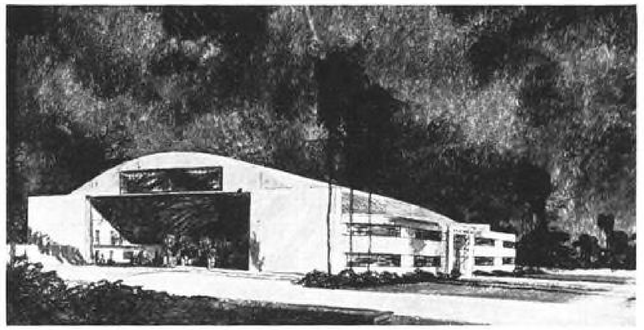

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AVIATION WEEK
Nov. 3, 1947

SEARCHLIGHT SECTION

(Classified Advertising)

EDITORIAL

The Army Shows Us How

Harrassed airline operations and sales executives who are cultivating their winter crop of ulcers as bad weather approaches should drop in at the sleepy little southern Ohio town of Wilmington, home of the Air Force All-Weather Flying Center.

At 2:55 every weekday afternoon the Dayton-Hillsboro commercial bus pulls up to the airport operations office. At 3 o'clock a red nosed C-54 lands and taxies up to the ramp. Twenty to 30 gobs, airmen, Wacs and Waves on leave orders pile out carrying their own baggage and board the bus. By 3:05 the bus has loaded and is vanishing down the road to Dayton.

This is no mere fair weather scene. It has been repeated 678 times in the last 14 months by the Air Force's all weather experimental airline operating between Wilmington and Washington, 375 miles, six round trips a week on a precision schedule.

Nor is this a plains or "water level" route. It is over bad flying country covering the Blue Ridge and Allegheny mountain territory, scene of some of the worst airline crashes in history. The All-Weather Skymaster has landed at Andrews Field in 50-ft. ceilings, in one-eighth mile visibility.

All flights are conducted under instrument conditions regardless of weather. A combination of GCA and beam system is used for landing at both terminals, and radar traffic control is used in the 40 mile approach zone at both ends to avoid the characteristic stacks and delays inherent in CAA's traffic control and radio range approach procedures. This equipment is available to commercial airlines and CAA, but CAA has made no efforts to radar traffic control either at New York or Washington where the equipment has been operated by the Air Forces and Airborne Instruments Laboratory.

Only two of the 680 schedules have been missed since Aug. 1, 1946. In the early days CAA refused to clear a flight into Washington because of weather. The other cancellation was due to hydraulic failure of the landing gear. Conferences with CAA finally resulted in that agency's acknowledgment that the Air Force was—believe it or not—operating an All-Weather Airline, and gave assurance of future Washington clearance, regardless of weather.

It is interesting to note that the all-weather airline has rejected the CAA type of ILS landing system as operationally unreliable and it now uses Sperry Microwave Landing System at both Andrews Field and Wilmington, combined with GCA for making approaches.

The radar traffic control system avoids stacking technique, permits straight-in approaches, and has landed up to 45 planes an hour in saturation tests, compared with the rate of 6 to 10 per hour under present range approaches out of the stack.

The all weather line was originally established by the Air Force to determine whether all-weather transport flying is possible. After more than a solid year of such performance, as described above, the answer appears to be not only that it is possible, but that CAA and the airlines should quit alibi-ing and get wheeling on applying these techniques to their own outmoded systems that are so costly in time and money, and are giving the airlines such a bad reputation for unreliability.

ROBERT H. WOOD

Shop Talk By The Editor

Staff Changes

John Foster, Jr., formerly executive editor, has left AVIATION WEEK for the bigger job of news editor of McGraw-Hill's Washington bureau, effective Nov. 1. He had been executive editor of Aviation Magazine, and retained this title with AVIATION WEEK. This publication maintains its own staffs in both Washington and New York.

Merlin Mickel, managing editor, was transferred from Washington to New York several months ago. **William Kroger**, manufacturing editor, will move from Washington to New York about Nov. 15.

Robert McLarren has joined the Washington staff as engineering writer. He comes from National Advisory Committee for Aeronautics where he was head of the office of research analysis. Before a stint as an aviation editor in New York, he was an aeronautical engineer at Douglas, North American, Vultee and Northrop. Others remaining in Washington are **Robert Hotz**, news editor; **Alex McSurely**, associate editor; **Charles Adams**, transport editor; **Marie Adams**, editorial assistant, and **Katherine Johnsen**, special congressional correspondent.

Albert E. Smyser, Jr., engineering writer, has joined AVIATION WEEK in New York. He was chief pilot of Veterans Air Express. His wartime record included duties as instructor-writer for Air Transport Auxiliary in London, and as chief instructor-writer at Pittsburgh Institute of Aeronautics. During his U. S. Navy career he was an engineering officer, public relations officer, and served as a NATS pilot on the North Atlantic. Smyser succeeded Erwin Bulban, who resigned because of health.

Stanley L. Colbert becomes production editor, in charge of makeup, production and printer liaison at Williams Press, Albany, N. Y., where AVIATION WEEK is published. He was discharged from the AAF last summer. He edited Air Force newspapers from public relations offices. Earlier, he was editor of campus publications at University of North Carolina.

Irving Stone, technical editor, rounds out the New York writers staff. **Herbert Powell**, promoted to managing editor of Air Transport magazine, will discontinue his special assignments for AVIATION WEEK. **Robert H. Wood**, chief editor, divides his time between the McGraw-Hill Bldg. in New York and the National Press Bldg., in Washington.

R. H. W.

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