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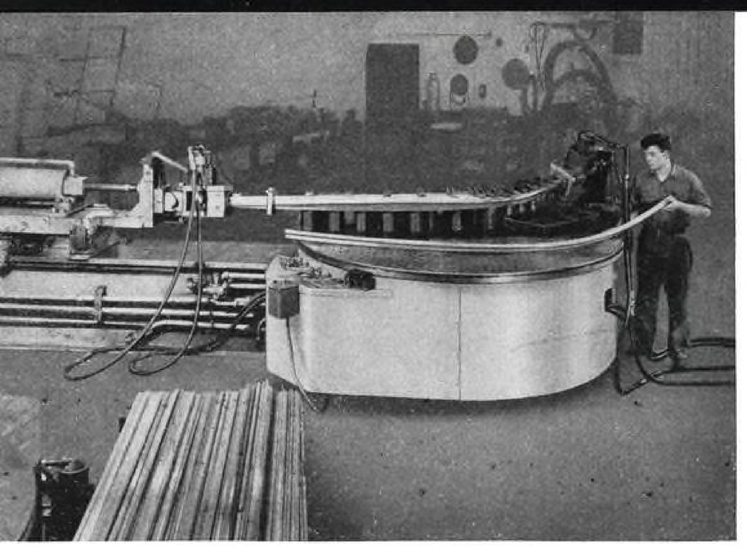
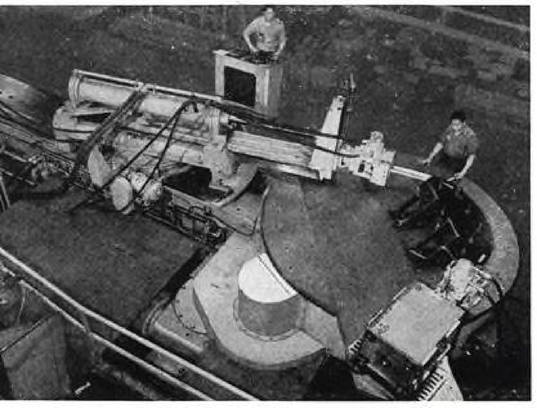
BATH the machine that forms ALL the shapes

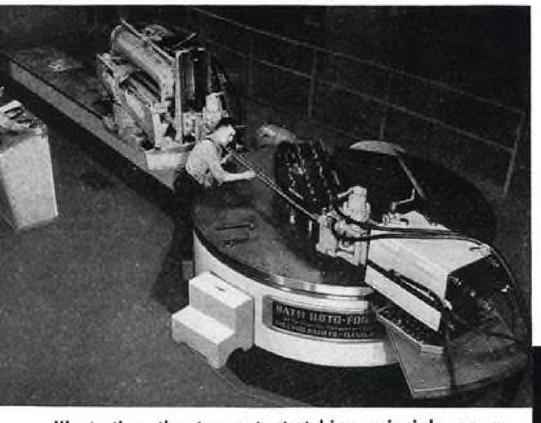
SHEETS, EXTRUSIONS, TUBING, ROLLED AND FORMED SHAPES



Above: Stretch-forming and twisting around a compound curve in a multiplicity of planes.



Showing finished stretch-forming after shaping and heat treating at Boeing. Pull in either direction is exerted by both ram and table cylinders.



Illustrating the tangent stretching principle on a light section at Boeing. Same machine will handle from 1,000-lb. to 100,000-lb. pull.

Aluminum gun turret rings accurately formed to complete circle for various aircraft.

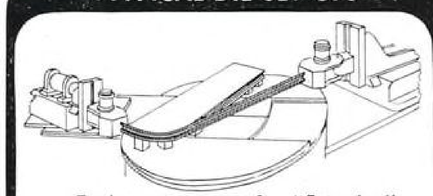
Large corrugated aluminum sheets accurately formed on the BATH machine.

Four More Leading Aircraft Manufacturers Have Chosen BATH Contour Forming Machines

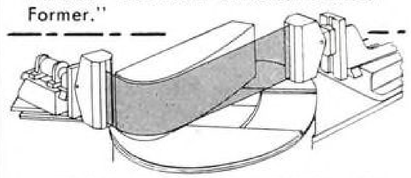
The BATH machine provides the 14 essentials of a UNIVERSAL Contour Former. It is the only machine that can form virtually all the shapes that will be required in future aircraft design.

Hundreds of shapes, with compound curves and varying radii in many planes, are being formed on BATH exclusively because no other machine can produce them. Read the 14 essentials listed below and you too will choose BATH —for only BATH provides them all.

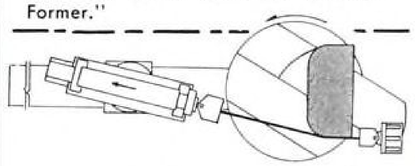
TYPICAL DIE SET-UPS



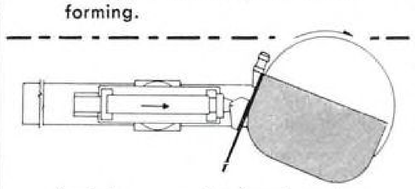
Tool arrangement for "Extrusion" work on "The BATH Universal Contour Former."



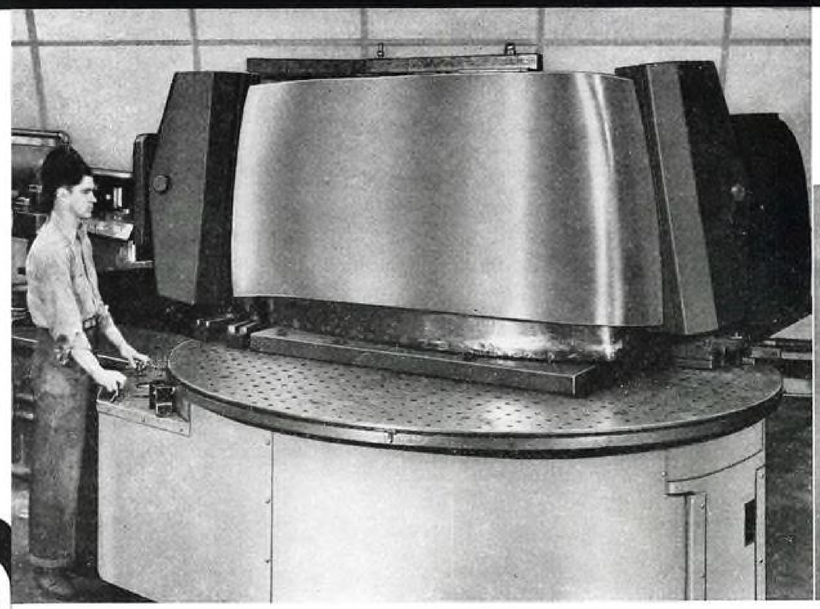
Tool arrangement for "Skin" work on "The BATH Universal Contour Former."



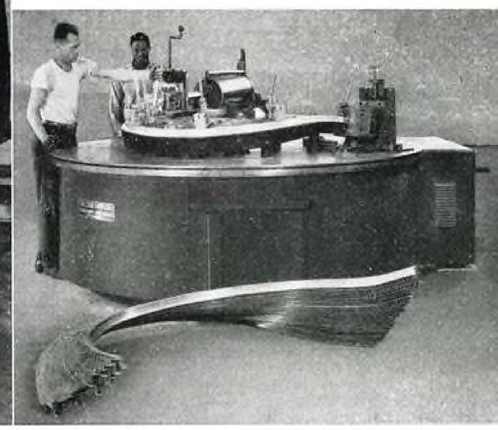
Typical die set-up for stretch forming.



Typical compression forming set-up.



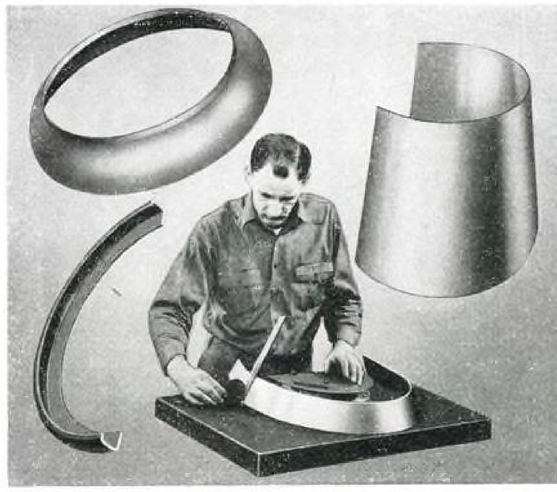
Left: Photo illustrates how typical outer-skin section is stretch-formed on the BATH Contour Former. Rotating table construction permits forming sheets with most any combination of curves.



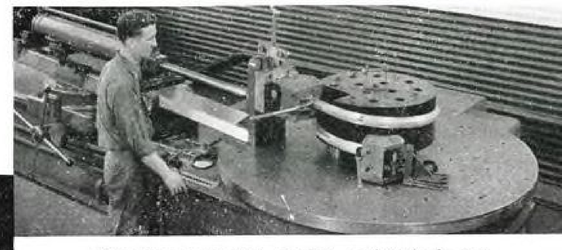
Showing aluminum "Z" extrusion being formed in both horizontal and vertical curves.

Only BATH Provides ALL These Features

1. **Stretch and compress forming on one machine.** Two-way acting cylinders and reversible table allows choice of forming method best suited to part.
2. **Either sheets or extrusions are formed on the same machine.** Jaw members are movable and adaptable to any cross section.
3. **Tangential, progressive, line by line, forming** on a rotating table permits small capacity machine to do the work of a heavier one.
4. **Heavy sections and parts** that cannot be stretched, may be wipe or roll formed.
5. **Full circles or spirals** are formed in one setting for most any alloy.
6. **Long parts up to 25 feet or more,** can be stretch-formed without re-setting jaws or dies.
7. **Designed to stretch-form reverse bends** without releasing tension on material.
8. **Concentrated application of full tonnage** over small area, at a time, permits angularity change on extrusions while contours are being formed.
9. **Fast Set-Up:** Die is mounted on table and stretch heads, wiper shoe or roll assembly, can then be easily adjusted to height desired.
10. **Forms or Rolls in Two Planes:** Produces parts with both horizontal and vertical curves simultaneously.
11. **Material can be twisted while being formed** in varying horizontal and vertical planes.
12. **Safety:** Over 10 years of operation have resulted in no known accident to an operator. Machine damage is prevented by shear pins at critical points.
13. **Built to Machine Tool Standards:** Deep sections, eliminating machine deflection, assures constant precise part duplication.
14. **Faster production per hour** with very low scrap loss, rarely running 1%.



Above: Jet flange rings, shrouds, cases, flame tubes, stiffeners and casings are formed in either full circles or segments.



Showing how full circles and spirals are formed on BATH machine.

THE CYRIL BATH COMPANY

7045 MACHINERY AVENUE • CLEVELAND 3, OHIO

NEWS DIGEST

DOMESTIC

Defense Production Administration has granted CAA's appeal for more steel to continue essential airport construction the first quarter of 1952. Steel for these projects earlier was reported tentatively cut by DPA (AVIATION WEEK Nov. 12, p. 18).

Lt. Gen. James Doolittle presided at the unveiling of a 15-ft. stone memorial bearing a bronze plaque image of the late Walter H. Beech at the Beech Aircraft Corp. plant at Wichita Nov. 11. Doolittle paid tribute to Beech's "courage and faith in himself" in founding the company in 1932, at the bottom of the depression. Beech's widow, Olive Ann, now president of the corporation, and their two daughters were present for the unveiling ceremony.

Military Air Transport Service has been awarded the USAF Daedalian Trophy for Air Safety. MATS had lowest aircraft accident rate in AF during 1950.

Shipments of 170 civil planes valued at $5.5 million, and 391 civil aircraft engines during August was reported by Census Bureau. Totals compare with 207 planes and 350 engines shipped during July. Total aircraft employment, in airframe and engine plants (civil and military) in August was 393,361.

Kill Devil Hills Memorial Society has been organized to form a nationwide memorial in honor of the Wright Brothers' first flight at Kill Devil Hills, N. C. Group is planning Golden Anniversary observance of flight in 1953. Plans also underway for annual observance Dec. 17.

Chicago and Southern Air Lines has contracted for eight 44-passenger Convair-Liner 340s, with an option to purchase two more. Deliveries will start in June 1953. Company is tenth scheduled airline to order 340s.

Electronics research laboratory will be built by USAF for $20 million on 100 acres adjoining Major Hanscomb Airport, Bedford, Mass. Facility will house the electronics research program handled by Massachusetts Institute of Technology, the Air Force lab at Cambridge, and the geophysics laboratory temporarily located at Watertown Arsenal.

Transocean Air Lines' 2-0-2 crash at Tucumcari, N. M., Nov. 5, occurred when the left wing tip of plane hit the ground during a turn into the final approach, states a TAL official. Preliminary investigation by the airline indicates that the plane was not at fault and was functioning normally up to the time of impact. Of 26 Army personnel aboard and crew of three, one passenger died. (AVIATION WEEK Nov. 12, p. 7).

Kenneth R. Ferguson was named by Undersecretary of Commerce for Transportation Delos W. Rentzel to replace him as a member of the Aircraft Production Board of DPA. Ferguson formerly was vice president-operations and engineering for Northwest Airlines, will represent civil aviation in the coordination of aircraft production in the defense program.

FINANCIAL

Jack & Heintz, Inc., Cleveland, reports $496,560 net income on sales of $5,598,325 for the three months ended Sept. 30, with earnings for the nine months at that date being $1,505,144 on net sales of $15,753,157. J&H's unfilled backlog as of Oct. 25 was $42 million.

Mid-Continent Airlines, Inc., had a net system profit of $35,293 for September after provision for income taxes at the 1950 rates. Net profit for the first nine months of this year is given as $165,586, with operating revenues being $7,224,390 for the period.

INTERNATIONAL

First Canadian-built aircraft to be furnished to the USAF was formally delivered Nov. 13. Plane was a de Havilland L-20A Beaver reconnaissance and ambulance plane.

Canadian government orders for aircraft parts, overhaul and runway repairs Sept. 16-30 totaled $7.5 million, with $3,475,000 going to McDonald Bros., Aircraft Ltd., Winnipeg, for aircraft modification. About $100 million was spent on aircraft production during the first half of the current Canadian fiscal year, Apr. 1-Sept. 30.

Foreign nationals receiving special aviation training in the U. S. numbered 84 under government grants made in fiscal 1951. Most (66) of the trainees were handled by CAA, learning air traffic control, air navigation maintenance, radio aids, airport management, airport design and construction, safety and communications.

AVIATION CALENDAR

Nov. 22-24—Snowbird Soaring Meet, sponsored by the Elmira Area Soaring Corporation, Elmira, N. Y.

Nov. 27-30—Aviation Distributors and Manufacturers Assn. meeting, Waldorf-Astoria Hotel, New York.

Nov. 28-30—National convention of the American Rocket Society, Atlantic City, N. J.

Nov. 30-Dec. 5—Meeting of the American Society of Mechanical Engineers, Chalfonte Haddon Hall, Atlantic City, N. J. For information write: Ernest Hartfort, 49 W. 39 St., N. Y., 18, N. Y.

Dec. 4-5—Transport aircraft hydraulic accessory and system conference, sponsored by Vickers Incorporated, Hotel Sheraton, Detroit.

Dec. 6-7—Feedback Controls System, Chalfonte Haddon Hall, Atlantic City, N. J.

Dec. 17—Wright Brothers Lecture, sponsored by the Institute of the Aeronautical Sciences, U. S. Chamber of Commerce Auditorium, Washington, D. C.

Jan. 5-6, 1952—Annual Miami Air Show, sponsored by the Florida Air Pilots Assn., Opa Locka Airport, Florida.

Jan. 6-8—Annual Cessna Distributors Meeting, Allis Hotel, Wichita, Kansas.

Jan. 28-Feb. 1—20th Annual Meeting, the Institute of the Aeronautical Sciences, Astor Hotel, New York.

Jan. 29-31—114th National Meeting of the American Meteorological Society, Roosevelt Hotel, New York.

March 3-6—Institute of Radio Engineers, Waldorf-Astoria Hotel & Grand Central Palace, New York.

March 17-19—Second Midwestern Conference on Fluid Mechanics, to be held at Ohio State University.

March 17-22—American Society of Tool Engineers, International Amphitheater, Chicago, Ill.

PICTURE CREDITS

9—(Cutlass) USN; (Douglas AD-4L) Howard Levy; (Douglas F3D-1) USN; 16—USAF; 17—Douglas; 19—Combine Photos; 23—Combine; 31—(bottom) David Anderton; 54-55—Martin Kotrba.

WHO'S WHERE

In the Front Office

Ray O. Ryan, division manager of Convair-Ft. Worth since 1948, has been promoted to vice president-manufacturing and will transfer to the company's general offices in San Diego. Before coming to the Ft. Worth division in 1944, Ryan for six years was with the firm at Vultee Field, Downey, Calif. In other Convair moves, **August C. Esenwein** has moved up to become division manager at Ft. Worth, and **Frank W. Davis** has been designated assistant chief engineer in charge of research and development at San Diego.

Murray B. Jones has been appointed vice president-sales for Consultants and Designers, Inc., management consultants, industrial designers and draftsmen, of New York City. In the late '30s Jones joined Glenn L. Martin Co. and rose to the position there of emergency controls administrator.

Richard B. Mock, president of Lear, Inc., **Kenneth MacGrath,** a Lear director and vice president of Whirlpool Corp., and **Paul Moore,** Lear executive vice president and general manager of Lear, comprise the firm's new executive committee. Mr. Moore was also elected as treasurer of the committee.

Changes

Sol Levine has been named chief engineer of Edo Corp.'s Electronics division. Levine has been with Edo five years and been connected with development of new sonar and underwater detection devices.

Bernard Goldman has joined Stanley Aviation Corp., Buffalo, as technical editor and will direct all of the firm's publications.

Jack Melton has been named superintendent of materials for Texas Engineering & Mfg. Co., Dallas. He previously was assistant superintendent-materials.

William L. Mustard has been designated manager of Link Aviation, Inc.'s Dayton office. He previously was CO of the Naval Reserve Carrier Squadron at Grosse Ile Air Station.

Edward F. Houston, formerly sales manager with Wright Aeronautical Corp., has been appointed to the same post with Revere Corp. of America, Wallingford, Conn., and **James F. Luby** has been made personnel manager.

Fred E. Myers, previously with CAA, has joined Ozark Air Lines as operations manager.

Fred A. Brown has been made assistant general manager-passenger service with United Air Lines and will be based in Denver.

Honors and Elections

Ernest H. Werner, with the International Region of CAA, has received the Al Merito decoration from the president of Ecuador for his work during a two-year mission in that country helping to improve civil aviation.

INDUSTRY OBSERVER

Following industry notes were made by an Aviation Week *editor during a recent visit in the Detroit area.*

▷ If Ford completes negotiations now in progress to produce a considerable part of the Pratt & Whitney J-57 turbojet, the Dearborn company will have an inside track on three of the most important engines in the national defense program. Ford is already hard at work at Chicago in preliminary production stages on the biggest piston engine in the defense program, the Pratt & Whitney R-4360. And Ford's Lincoln-Mercury division is waiting for Navy go-ahead on a plant to build Westinghouse J-40 engines, the Navy's top jet powerplant, order-wise. Ford's J-57 negotiations don't call for building the complete engine, but that can come later.

▶ Here's another interesting but little-known aspect of the Air Force's razzle-dazzle decision on the four-engine Boeing B-47C last summer. One of the major results of the decision to shelve mass production of the C and concentrate on the B was that Chevrolet division, General Motors Corp., pulled out of the program to build the Allison J-35-A-23 (recently redesignated J-71). Instead of building the Allison jet engine, Chevrolet got a contract to produce the Wright R-3350 piston engine at Tonawanda, N. Y. But that meant taking the R-3350 contract away from Hudson Motor Co. It now is learned that just before Hudson found out it had lost the R-3350 contract, Kaiser-Frazer Co. offered Hudson a fat subcontract to build assemblies of the Fairchild C-119. But Hudson wouldn't go for it because of its R-3350 commitment. By the time Hudson learned it had lost the R-3350 business, the K-F subcontracts had been placed elsewhere, and Hudson was left virtually empty-handed for awhile. Since then, Hudson has won substantial airframe subcontracts for B-47B and Canberra B-57 assemblies.

▶ General Motors expects to be in volume production on a Grumman Navy fighter, possibly the new sweptwing F9F-6, at its new Arlington, Tex., plant site, about mid-1953. Meanwhile, the Buick-Oldsmobile-Pontiac Assembly division is moving down machinery, to be stored in a building at Grand Prairie Airport, until ready for use at Arlington.

▶ Ford is going to put the inside "plumbing" into the B-47 wings which it will build for Boeing, Douglas and Lockheed, resulting in considerable expansion of contract over the original program. This called for the three prime manufacturers to install the fittings after they got the wings from Ford. Plant where this work will be done is near Kansas City.

▶ Some Detroit observers see a new cause for labor union dissension building up: plant dispersal. The Detroit locals are reported unhappy about losing their members, many of whom are being transferred to other auto company aircraft and defense plants, thus making smaller and less powerful local Detroit unions out of big ones. Local leadership is pushing for national union leadership to swing its very considerable political weight to prevent further membership fee losses, just as they blocked the Boeing migration from Seattle to Wichita.

▶ There is some thought being given, at least from the Ford side of the picture, to Ford eventually becoming the sole producer of Pratt & Whitney's R-4360 piston engines at the huge Chicago engine plant now elaborately tooling up. This could happen if Pratt & Whitney gets loaded up to expectations on its jet engine programs. An important factor in such future planning will be how Ford's production turns out, since the R-4360 is a complicated piece of machinery to make and full production at Chicago is probably a year and a half away.

▶ General Motors production of the Republic F-84F at Kansas City will get its first Sapphire engines from Curtiss-Wright Corp., but eventually will depend on the J-65 Sapphire production of the Buick division at Flint and Chicago. Delay on the F-84F program at Republic, due to wing spar forging capacity problems, is expected to be solved before it hurts GM's production schedule.

Washington Roundup

All-Out For Air Power

"Balanced forces" remains the policy of the top U. S. military command—but it doesn't mean what it used to mean.

Formerly it meant three co-equal services. These were the years when service prestige was taken more seriously than the threat of war, years in which the hope for peace was bright enough to keep military spending down to $13 billion a year.

Now "balanced forces" means forces balanced to meet the threat of war. And that means major emphasis on air power—to win control of the air and deliver atomic bombs of "various sizes" on enemy armies, as well as on strategic targets.

Chairman of the Joint Chiefs of Staff, Gen. Omar Bradley, who backed the pre-Korea skeletonizing of the Air Force and Naval aviation, made the new concept of "balanced forces" official in a recent speech.

He explained:

- "When we speak of balanced forces, we mean effective forces equal to the task that modern warfare may thrust upon us. . . ."
- "To meet the proper balance in our forces . . . we must buy substantially more air power. . . ."
- "In spite of the fact that air power alone can never be decisive in total war, the air battle must be won if a war is to be won. In spite of all the new developments in the field of atomic energy and the various military applications, the airplane continues to be the best method of projecting the power of the atom to the battlefield, and to the heart of any large land-mass nation."
- He added caution against over-reliance on air power, though: "There are many military targets against which an atomic bomb would be ineffective or wastefully applied. If an enemy wanted to disperse his forces so that soldiers walked 100 yards apart, they could march across Europe tomorrow in the face of the greatest atomic power on earth—unless men were there to stop them. However, if we have the means to make an enemy concentrate his forces, there are many methods available to destroy his military offensive power."

Strategic Air: Major USAF Arm

Although USAF's build-up from 95 to 143 wings as now planned would be predominantly in tactical strength, strategic air power would still dominate in USAF's composition.

The reason: USAF will largely fill the strategic air mission in the collective defense plan against the Russian bloc, but make only a minor contribution to the tactical air mission. Air forces of the European nations, Turkey and others that may be brought into the plan will be heavily relied upon for the tactical mission.

USAF's wing composition is secret, but this is a reasonable estimate of how the 143-wing USAF would be divided:

- **52 strategic** air wings, all based in the U. S., with units periodically stationed at points around the globe under a rotation system.
- **40 tactical** air wings, permanently based at points ringing Russia.
- **32 air defense** groups, deployed in squadrons.
- **19 transport** groups for airlift of ground forces to theaters of action.

Holding Down Army Aviation

Army's proposed $500-million program for "super" transport helicopters will be delayed for a long while.

In competition with Marine Corps for procurement from inadequate production facilities, Army has put its program, involving large-scale purchase of the three-ton capacity (Piasecki XH-16) copter still in development, on the shelf.

Army's present goals:

- **To boost** its airplane procurement program from approximately $130 million this year to $200 million next fiscal year, which starts in July. But the outlook is the Administration will hold it down to $130 million—or less.
- **Increase** aircraft purchases by another 50%, to around $250 million the following year.

By June, Army hopes to have:

- **Each of its 18** divisions manned with 26 to 28 aircraft —16 fixed-wing, 10 utility helicopters. Helicopters are being put to new uses and won't replace less costly fixed-wing craft for artillery spotting, message and supply dropping, general reconnaissance, hunting targets for tactical air.
- **Five transportation** helicopter companies manned with 21 one-ton and two-ton copters. But the program is lagging. The two companies that have been organized are in training with smaller utility helicopters. First deliveries of the transport copters haven't been made. Companies probably will be quickly dispatched to Korea for evacuation and other special airlift tasks as soon as they're organized and equipped.
- **In addition,** "hundreds" of light planes attached to non-divisional units.

Navy plans a bomb-carrying helicopter for anti-sub action, but Army writes off use of the copter for weapon-firing. One Army aviator commented: "They're too fragile, too vulnerable to anti-aircraft fire, even artillery. The reason losses have been low is that they're usually kept safely out of distance from enemy firing."

Here and there

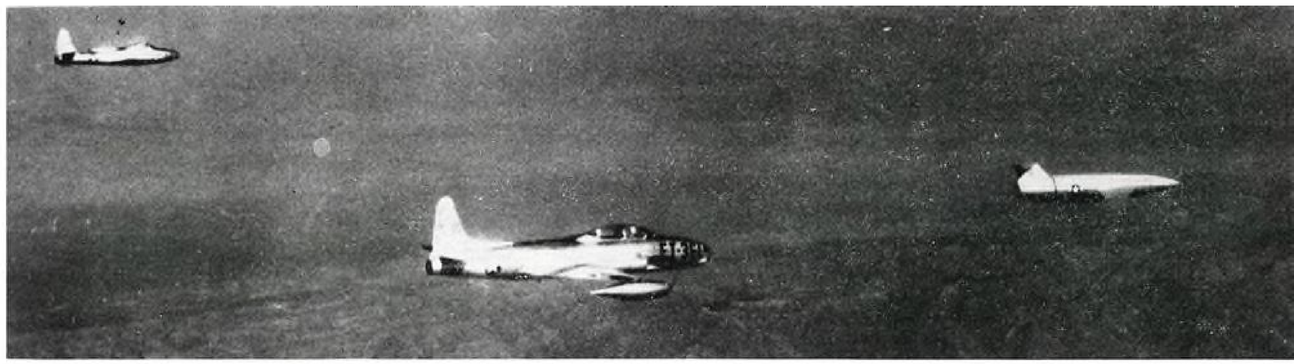
▶ **Rep. Robert Crosser,** chairman of House Interstate and Foreign Commerce Committee, will fight five-year mail pay contracts for international airlines, as provided in legislation passed by the Senate. Crosser also objects that the Senate measure doesn't set tough enough standards for fixing either domestic or international mail rates.

▶ **Contract Termination**—General Accounting Office is waging a hot battle for authority to review all termination settlements by the military, but is expected to lose. In World War II, the military had authority to make final settlements, with GAO limited to post-audits for "fraud" only.

▶ **Aluminum Hoarding**—Over-stocking of supplies by major aircraft companies probably will be charged by the Senate Small Business Committee in a report due in a few weeks. Members of the staff have completed field investigations.

Committee now is looking into construction of a new $8-million plant by General Motors Corp. for production of aircraft landing gear struts. Claim has been made that present idle plant capacity could be used for production with a big saving in steel and machine tools.

—Katherine Johnsen



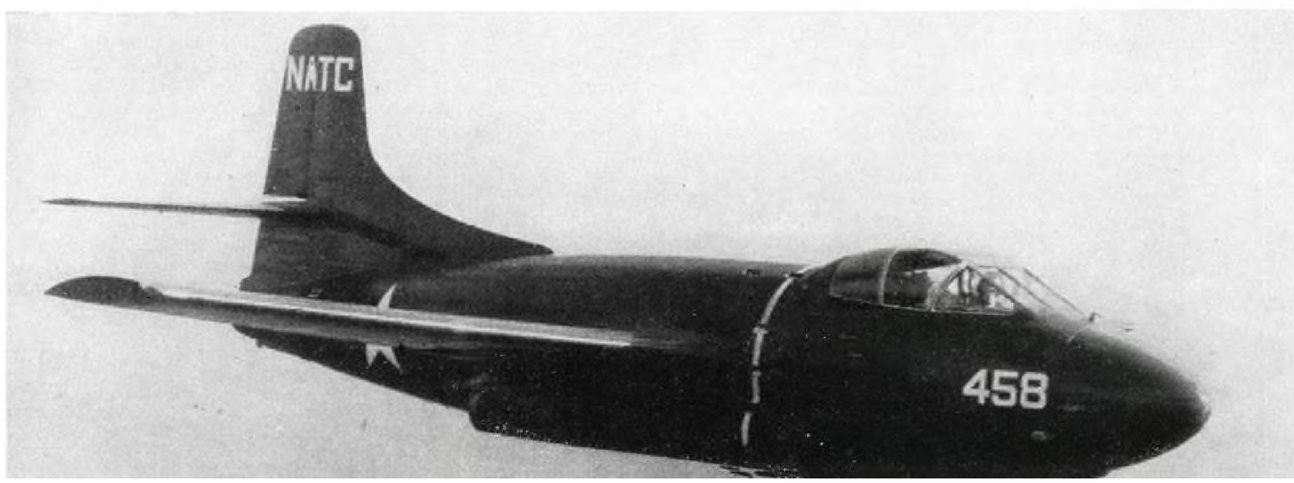
ESCORTING THE MATADOR—Martin B-61 Matador missile No. 5 (right) is followed by Republic F-84 and T-33 chase planes following takeoff from Holloman AFB, N. M., during trials. Having dropped its assisted-takeoff rocket bottle, the free-flying Matador is telemetering data back to the base for engineering study and is tracked by ground radars. This photo, just released, was taken July 19, 1949.

Picture Highlights of the Week

CUTLASS SCORES TOUCHDOWN—Still nose-high, a Patuxent-based Vought F7U-1 Cutlass (left) twin-jet Navy fighter drops onto the deck of the USS Midway during carrier evaluation trials, its hook picking up an arresting wire early in the landing (the 31,540th landing on the big CVB carrier). The novel, 700-mph.-class F7U is now in production for service use, has two Westinghouse J-34s fitted with afterburners for extra speed during combat and in emergencies.

ALL-WEATHER RAIDER — Douglas AD-4L Skyraider (right) has radar, de-icers and heaters, making it suitable for operations day-and-night in all types of weather. Plane shown here is armed with four wing-guns, large and small rocket projectiles. AD's ability to carry heavy, varied armament loads has made it popular for ground support in Korea.

BIG NIGHTBIRD — New Douglas F3D-1 Skyknight (below) is one of Navy's big planes for future carrier operations. Heavily armed, it carries various radars for all-weather work. It is powered by two Westinghouse J-34s.



AVIATION WEEK VOL. 55, NO. 21 NOVEMBER 19, 1951

What Vandenberg Found in Korea

Better Planes Needed to Match MiGs

- **Chief of Staff feels Air Force defense concept still sound in light of latest fighting experiences.**
- **But increased Communist air activity emphasizes immediate need for long-range jet bombers.**
- **Call expected soon for faster high altitude fighters and better interdiction and support aircraft.**

By Alpheus W. Jessup
(*Chief, Tokyo Bureau, McGraw-Hill World News*)

Tokyo—Gen. Hoyt S. Vandenberg, USAF Chief of Staff, left Far East Air Force headquarters last week carrying a firm conviction that the Air Force concept of its role in American defense is sound and has not been changed by its experience in the Korean war.

He also carried to Washington after his latest inspection trip to Korea a packet of serious problems involving American air power—problems ranging from the immediate question of more fighters and bombers to longer-range considerations of faster high-altitude fighters and improved interdiction and close support planes.

▶**Pressing Problem**—An immediate problem is the extent to which it is necessary and possible to reinforce FEAF with additional jet fighters and jet bombers.

Until now, only two or three reconnaissance-type jet bombers have been assigned here, but the current air situation, resulting from the recent rapid increase in Communist MiG-15 strength and improvement in Red pilotage and tactics, leads toward the conclusion that jet bombers are desirable.

B-29 Superforts are now unable to undertake daylight raids against potential MiG bases in the aerial "no man's land" between Sinanju and the Yalu River without an escort of the entire Far East jet fighter strength. Even then, losses are high.

But it is essential to prevent the MiGs from using bases near Sinanju—bases that would extend MiG range over the battle line and threaten the Air Force's continual interdiction of all Red roads and railroads running from the front through Sinanju to Communist supply sources toward Manchuria.

Also, it is obviously prohibitive to consider bombing the Antung MiG nest with B-29s. Only a small portion of United Nation jet fighters are able to reach Antung with enough fighting time to make an escort effective.

▶**Jet Bombers Answer**—The best answer is jet bombers capable of keeping "no man's land" airstrips bombed out with daylight hit-run attacks. These also would maintain a threat of retaliation against Manchurian centers for any Communist bombing foray against U. N. bases.

Superior piloting kept U. N. Sabrejets, Thunderjets and Meteors ahead of the MiGs, even though outnumbered several times, but American flyers now report that Communist pilots have "graduated" and are beginning to level up.

It is now apparent that more even numbers are required if the United Nations are going to maintain air-to-air victories.

▶**Questions for Future**—First and foremost among the longer term problems is the speedier development of a high-altitude fighter with considerably greater speed than the F-86 Sabre. The plain, ordinary MiG appears faster than the Sabre at altitudes above 30,000 ft. Recently one MiG, apparently souped-up, pulled away from Sabres on the level around 26,000 ft., where Sabres usually gain.

With Communist piloting improving, Vandenberg obviously will put the heat on fighter development when he returns. That's the only way the United States can keep ahead at high altitudes.

Another long-term problem concerns an adequate fighter-bomber for interdiction and close support missions. The F-84s are showing up fairly well against predicted characteristics but Korea has pointed out a couple of deficiencies.

▶**Thunderjet Limits**—The Thunderjet is still a "9,000-ft." airplane and it is apparent that tactical aviation must operate from runways less than 6,000 ft. long. Greater thrust may answer the Thunderjet's present limitations.

There also is a growing feeling that the Thunderjet may not be the best answer to the requirement for interdiction and close support aircraft.

(Queried in New York, Republic comments: The F-84 has done an outstanding job in Korea; both AF and Republic realize it is not the final answer; the airplane is continually improved, with superior versions now in production.)

Vandenberg emphatically restated that Air Force primary misisons are still strategic and that priority must go toward perfecting the ability to deliver the atomic bomb. The second priority goes for air-to-air defense and interdiction. Close support is last, but he indicated that the Air Force's expansion would increase close support training.

Berlin Airlift Chief Assigned to AMC

Announcement that Maj. William H. Tunner, Deputy Commander of MATS, had been reassigned as deputy commanding general of the Air Materiel Command indicates that AMC is due for a general administrative reorganization.

Tunner, who commanded the joint USAF-RAF Berlin airlift in 1948 and 1949, is best known in the Air Force for his ability as an organizer and administrator.

General situation at Wright-Patterson AFB, home of AMC, an Air Force spokesman said, is one of considerably lowered morale. Organization of AMC is confused as a result of removal of research and development responsibilities and the much publicized irregularities in AF procurement there.

Said an AF spokesman, "Tunner is not going to Wright-Patterson on a nuts and bolts assignment—just organization."

He will succeed Maj. Gen. St. Claire Streett, who has been in ill health for some time. Streett will complete 35 years service in December.

U.S. Jet Liners

- **Government set to start transport development.**
- **Rentzel resigns job after getting project approved.**

A government-sponsored program of jet air transport development is expected to get underway at an early date in an effort to offset the two-year advantage which the British now hold in the field.

Report that federal funds would be used came from associates of Delos Rentzel, who resigned last week as Undersecretary of Commerce for Transportation. They said Rentzel delayed his resignation until an agreement had been reached whereby the government would sponsor the project.

▶**To Oil Industry**—The President accepted Rentzel's resignation and Philip Hollar, deputy to Rentzel in Commerce, this week becomes Acting Undersecretary.

After a two-month vacation, Rentzel plans to enter private business, probably the oil industry. He had served six months in the Undersecretary's post, which was created before the outbreak in Korea by a Presidential reorganization plan to work out "a national transportation program."

The project had dwindled with mobilization well under way until today it is merely a controversial position. Members of Congress and transportation interests oppose the idea of a political appointee with power to interfere with the workings of Interstate Commerce Commission and Civil Aeronautics Board. The opposition is to the project and the post that goes along with it. Rentzel has been generally popular with both ICC and CAB organizations.

▶**Former CAB Chief**—The attraction of a higher salary in private business was Rentzel's primary reason for leaving.

Rentzel was Administrator of Civil Aeronautics from June, 1948, to October of last year, leaving to become Chairman of CAB following the resignation of Joseph O'Connell. Before entering government, Rentzel was president of Aeronautical Radio, Inc., organized at the request of Federal Communications Commission to furnish aeronautical communication service to the airlines.

Hollar was formerly an assistant to Defense Transportation Administrator James K. Knudson, and, previous to that, vice president of American Car and Foundry Co. He has also been an official of Association of American Railroads and the Pennsylvania Railroad.

Leslie E. Neville

Neville Takes Over Armed Services Post

Leslie E. Neville, the recently appointed director of the new Armed Services Technical Intelligence Agency, is organizing the various information collecting services of the military departments into a coordinated service for engineers and scientists of all three of the departments and their contractors.

Services such as CADO (Central Air Documents Office) at Wright-Patterson AFB, and other information-gathering offices will be under his direction. Operating ASTIA staff will be at Baltimore at Air Research and Development Command headquarters. Neville will divide his time between Baltimore and his office in the Pentagon.

He was chief editor of Aviation magazine prior to 1947, and organized the first unified system for classification of technical information for the Institute of the Aeronautical Sciences. He was public relations director of Curtiss-Wright Corp. before resigning to accept the ASTIA directorship.

Oerlikon Selects North Carolina Site

Oerlikon Tool and Arms Corp. of America is finalizing negotiations for purchase of a 1,300-acre site near Asheville, N. C., where it plans construction of a major explosives facility and research laboratory, K. B. Wolfe, president, disclosed last week.

Although the site has been agreed upon by Oerlikon officials, he said, there are still some complex problems connected with the last purchase which are yet to be ironed out locally. Establishment of the American subsidiary of the Swiss armament organization was disclosed in AVIATION WEEK Nov. 5.

PAA vs TWA

- **CAB tells lines to present united ocean coach front.**
- **But argument on top fare only gets hotter.**

The cold war between Pan American and TWA over how low to price the proposed trans-Atlantic air coach service blazed into hostilities last week as the Nov. 27 international airline conference at Nice, France, drew near.

• **TWA announced** that the U. S. government had instructed the American carriers to settle for a $477 roundtrip fare New York-London.

• **PanAm then asserted** that this TWA publicity forewarned and armed the foreign airlines with full information on the American carriers' instructions from Civil Aeronautics Board.

PanAm officials said that TWA, by revealing the U. S. maximum fare instructions, made it easier for foreign proponents of higher fares to bargain with the U. S. carriers from a floor of $477 instead of to a ceiling of $477.

And Pan American told AVIATION WEEK that it had specific CAB encouragement to work toward the lower PanAm-advocated fare range of $405 to $450. High PanAm officials said they were told by the Board to try for the lower rate and retreat, if necessary, "dollar-by-dollar to a maximum of $477."

▶**Bid—Counter-Bid**—Meanwhile, following the British election switch to Tory government, British Overseas Airways had called for a fare of $266 one way. With a 10% discount, a round-trip would be $479. TWA then bid $477, only $2 less than BOAC, but $75 more than Pan American.

Following the TWA press release and PanAm's counter-charges, the Board last week issued a press release of its own, detailing highlights of its instructions.

▶**CAB's Comment**—The formal CAB letter to the two carriers said the service should start before the 1952 summer season and that a roundtrip fare of $477 on-season and $397 off-season with one-way fare of $265 all the time "is a sound fare structure."

The Board went on to say: "This fare structure will meet the break-even need and provide a reasonable element of profit for coach operations, on the basis of the representative costs of the IATA carriers . . . and an estimated year-round load factor of approximately 68%."

(IATA cost figures and description were published in AVIATION WEEK Oct. 29, p. 13.)

▶**Works Two Ways**—The Board added:

DOUGLAS AD-5 SKYRAIDER has been engineered as a one-plane air force, conversion kits adapting the basic structure to many duties.

There's a Quick-Change AD for Every Job

The AD-5, latest model in the venerable Douglas Skyraider series, takes on its broad wings the responsibilities formerly carried by all the preceding specialized versions.

Outwardly looking much like the earlier AD-1 through AD-4, the new plane has been re-engineered to incorporate a "universal chassis," which can be rapidly modified in the field by using any of a number of packaged conversion kits supplied with the craft to take on more than a dozen duties ranging from day-and-night attack bombing to serving as a troop carrier combat assault transport.

Earlier models in the well-known Skyraider line required numerous structural changes to handle special duties. Q—radar countermeasures, N—night operations, W—special search, S—anti-submarine warfare, and so forth. The AD-5 only needs to have one set of equipment removed and another installed to take on a new job. This obviously simplifies combat operations and makes planes readily available for missions as they come up.

▶ **One for All**—Kits will make the basic structure suitable for early warning radar picket duty, sub hunter-killer work, a target tow, photo missions, ambulance, radar countermeasures and other missions in addition to those mentioned.

The plane remains much the same on the exterior—although the photo indicates the vertical fin and rudder have been extended some—but a new cockpit layout permits direct communication between crew members and complete interchangeability of stations. Installations are so located that they may be inspected and adjusted in flight.

▶ **Well-Armed**—The new Skyraider retains its ability to carry a heavy and varied load of armament—ADs now in action in Korea have carried as much as 8,000 lb. In addition to four wing guns, the AD-5 can carry large and small bombs and rockets, napalm or torpedoes.

Basic powerplant is the Wright R-3350-26W which gives approximately 2,400 hp. and the prop is a steel four-blade 13½-ft. General Motors Aeroproducts.

The new AD-5 will go into production as soon as it can be fitted into the lines at El Segundo which are now turning out the AD-4.

"The proposed fare structure is therefore economically feasible, but, at the same time, low enough to provide for an adequate test of the untapped low-fare air traffic potential across the North Atlantic.

"Tourist operations . . . should be based upon the highest practical seating density. . . .

"Meal service should be provided only on a compensatory basis. . . ."

▶ **Work Together?**—One CAB admonition to the two carriers which appears unlikely to carry much weight is CAB Chairman Donald Nyrop's letter of Nov. 9 saying ". . . The Board deems it of the highest importance that the two U. S. carriers primarily involved in this area work closely together to obtain conference agreement on these issues."

PanAm last week told AVIATION WEEK: "Pan American will study the situation and talk to the Civil Aeronautics Board again before going to the Nice conference. PanAm is going to try to hold out for a top fare of $450 roundtrip, and . . . for a $405 rate."

A TWA spokesman says his airline put out its press release revealing it would pump for the $477 roundtrip because Pan American had been taking all the credit for low-fare crusading. He said PanAm in publicizing its advocacy of a $405 fare had been leading the public to believe TWA was obstructing low fares.

ADMA To Discuss Civil Air Problems

Current and future problems of the private aircraft industry will be discussed at length by aircraft manufacturers, dealers and airport operators when they convene Nov. 27-30 for the ninth annual meeting of the Aviation Distributors and Manufacturers Assn., at the Waldorf-Astoria Hotel, New York.

The immediate future of civil aviation will be the subject of CAA Administrator Charles F. Horne's talk on the last day. The closing address will be by Harvey Conover of Aviation Age magazine.

Four Honored for Safety Work

Flight Safety Foundation awards donated by AVIATION WEEK go to Gill, Cutrell, Calvert and Gunn.

For their distinguished work in the field of safety, notably in contributing towards safer airline operations, three Americans and an Englishman last week were presented with plaques by the Flight Safety Foundation during a three-day meeting of international air safety experts in Bermuda.

Three of the awards were given for aiding development of landing approach lighting systems, the other was granted in recognition of successful research in improving aircraft radio communications by elimination of weather interferences.

Plaques donated by AVIATION WEEK and awarded annually by FSF were presented to:

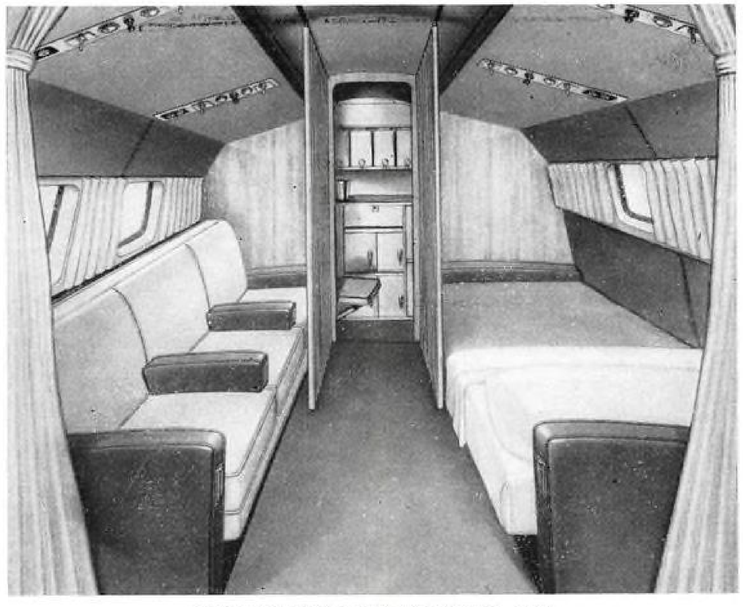
• **E. S. Calvert,** principal scientific officer of the Royal Aircraft Establishment, for his work on the center line and bar approach light pattern (known as the Calvert System) which has been adopted by a number of countries. Also cited was his "initiating research in runway day markings, taxiway lighting, measurement of slant visibility and for theories that have led to the solution of problems relating to accident causation during instrument landings."

• **E. A. Cutrell,** American Airlines captain, "working through the Air Line Pilots Assn., independently sponsored the testing and adoption of the center line approach system. He coupled this development with intelligent but increasing resistance to less efficient types . . . thus keeping his country and his organization in tune with international developments."

• **John Gill, Eastern Air Lines** captain whose interest in landing and approach aids "led him to introduce and experiment with the sequence flashing condenser discharge lights as an aid to landing in restricted visibility . . . apparent at many airports and its adoption internationally as an aid to safer landings is testimony to its practical value."

• **Dr. Ross Gunn,** of the U. S. Weather Bureau, in recognition of his "successful research in the causes of precipitation static in aircraft radio communications and for the practical solution developed under his direction which has contributed to increased safety in the air."

Flight Safety Foundation independently designates the winners of the annual awards following consultation with safety experts affiliated with government and industry.



VIP VERSION OF CONVAIR 340

This is a Convair presentation of a plush Convair-Liner 340 showing how the lounge seats (left) can be converted into Pullman sections as at right. Special jobs like this will be handled by AiResearch Aviation Service at Los Angeles Municipal Airport. Deluxe interiors will include divans, sleeperette type seats, custom color schemes, curtains and upholstery. The standard executive 340 seat 28, compared with 44 seats installed in airline versions. Convair will do interiors of airline 340s itself, will deliver first executive plane to AiResearch in May. More than 100 pressurized 340s are on order.

Martin Loss Totals Over $17.9 Million

Glenn L. Martin Co. reports net loss of $17,969,369, of which $17.5 is estimated deficit in commercial production, for nine months ended Sept. 30.

Company blames a number of factors for the loss—war in Korea, design changes, delivery delays and labor costs.

The $17.5 loss in commercial production presently on order may be higher or lower, depending on future additional sales and other developments in design cost trends, the report says. Company has 103 orders for 4-0-4 airliners and a total backlog of $425 million.

The heavy loss thus far on the 4-0-4 is largely attributed to the company's being caught with fixed-price contracts entered into prior to the outbreak of hostilities in Korea. Since then Martin has obtained contracts with flexible pricing provisions.

Higher costs are also seen as the company expands its defense production facilities. It presently owns 2,750,000 sq. ft. of facilities, will add 1,500,000 sq. ft. by next summer.

British Complete Tour of U.S. Plants

A weary delegation of British aviation industrialists has completed a month's flying tour of the major U. S. aircraft and engine plants and several important military installations and research facilities.

The British tourists, under joint sponsorship of the Society of British Aircraft Constructors and the U. S. Aircraft Industries Assn. made a total of 33 visits to various plants and installations, inspecting U. S. production techniques and new aviation developments. They wound up the U. S. tour at Seattle Nov. 4, returning to the East Coast via Canada.

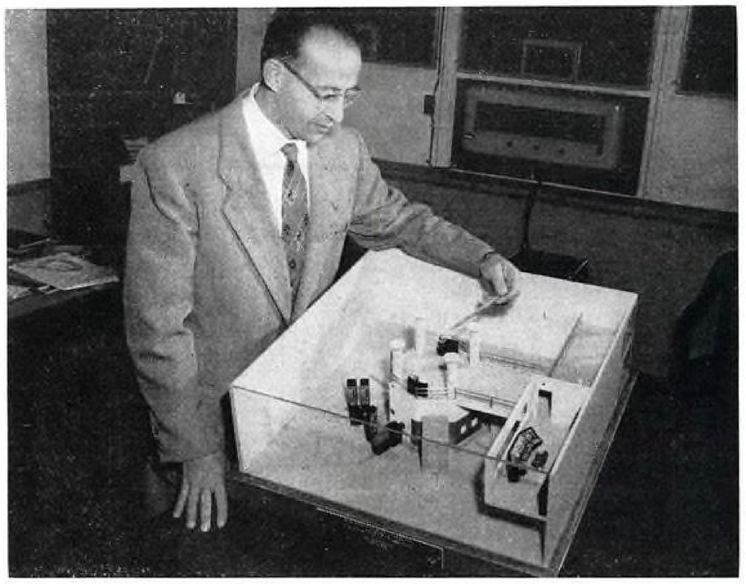
Some interesting observations, from comments of the inspection party:

• Efficiency and high morale of U. S. aircraft employes.

• High utilization of U. S. plant space, particularly the vertical jet engine assembly plan as compared to horizontal British method.

• The larger amount of sub-contracting in the U. S. industry.

• The comparative large size of the U. S. aviation industry, about 3½ times in employes that of the British.



NAA ATOMIC RESEARCH CHIEF, Dr. Chauncey Starr, with model of new low-cost reactor. The atomic furnace is housed in the octagonal structure. Control room is at right.

Atomic Reactor for $1 Million

New North American Aviation development places research within budget limits of many institutions.

An atomic research reactor—the first to be within the budget of large educational and industrial institutions—has been designed at North American Aviation, Inc., for the Atomic Energy Commission. Component development and testing are underway at the company's Atomic Energy Research Dept. at Downey, Calif., and are scheduled for completion within nine months.

NAA's atomic furnace operates at the low-power-level equivalent of 160 kilowatts. Its fuel is uranium; a single charge permits operation for ten years at 40 hr. per week. Estimated cost to build the reactor has been figured at $1 million.

► **Safety Feature**—The reactor has a built-in safety factor, said Dr. Chauncey Starr, director of NAA's atomic work. In addition to the usual automatic devices to shut down the reactor, the design of the core is such that as its temperature rises, the neutron production goes down. (Neutron production is necessary to sustain any chain reaction—without neutrons there is no atomic fire or explosion.)

Dr. Starr pointed out that a lot of important research could be done on the West Coast with short-lived isotopes, the major product of this reactor. Currently such isotopes must be shipped from AEC facilities at Oak Ridge, Tenn., or Brookhaven, Long Island. In the case of having life measured in hours, much of their strength is lost by the time they arrive on the coast.

Two classes of experiments are possible with the NAA reactor. The "in pile" type uses the neutron flow within the reactor; in the second class, a neutron beam is led through a port in the shield and used to irradiate objects outside the reactor.

The reactor can also be employed for general experiments in development and in the operational training of scientific personnel. Shape of the reactor is octagonal; it is 11 ft. high, 19 ft. wide, and grosses about 450 tons.

Burden Expected To Get AF Post

William A. M. Burden, former Assistant Secretary of Commerce for Air, probably will become the Assistant Secretary of the Air Force soon, succeeding Roswell A. Gilpatric, who has advanced to Undersecretary. Burden, a New York investment banker and long-time student of international and civil aviation, is a former president of the Institute of the Aeronautical Sciences. He has been acting as a special consultant to the Secretary of the Air Force in recent months.

C-W Merges WAC

Following purchase of holdings of the minority (2%) stockholders in Wright Aeronautical Corp., Curtiss-Wright Corp. has merged WAC into its corporation entity and will hereafter operate it as the Wright Aeronautical division of Curtiss-Wright.

C-W, through a wholly-owned holding company, Aero Holding Corp., previously owned about 98% of WAC's stock, the remaining 11,813 shares being held by slightly more than 500 owners. This minority interest was obtained by Curtiss-Wright through payment of $115 cash for each share of WAC stock.

Plant Reactivation Costs $28 Million

What does it cost to get one of our World War II aircraft plants out of reserve and back into full production?

For a modern USAF medium jet bomber such as the Boeing B-47 Stratojet, it will cost about $28 million, not counting labor or new construction, says Douglas Aircraft Co. production expert Harry Woodhead. He is now busy getting the company's Tulsa, Okla., facility in shape to turn out the Stratojet under license from Boeing.

A new flight test runway, 10,000 ft. long, 200 ft. wide, 16 in. thick, will cost another $6 million. A new three-story electronics building is to be completed early in February.

Just cleaning up the plant and getting it in shape to take the production machinery was a tremendous job. The Tulsa factory, used by Douglas in the last war for A-26 Invader (now designated B-26) light bombers, had been relatively inactive during the postwar period, with tons of material stored there by the USAF and the offices occupied by the Corp of Engineers.

Now about 2,000 shop employes and approximately 100 Air Force personnel are getting production facilities ready. Nearly 1,000 machines have been received and wing jig piping has been located in the floors. A 7,000-ton press, scheduled for delivery, is larger than any now being used by Douglas in any of its plants.

Sometime this month Woodhead expects to start fabricating small components for the B-47. Big-scale operation will start late next year when approximately 14,000 employes will be working. The total will go up to about 20,000 when the plant finally hits its stride.

Douglas has spent about $7.5 million in Oklahoma to get the plant in shape thus far, with more than $5 million of this going to firms in the Tulsa area alone.

British Research—Quality, No Quantity

● There's not much of it, but what there is is good.

● And it's well prepared for tomorrow's weapons.

By David A. Anderton

RAE RESEARCH ROCKET mounts four fixed wings and four movable tail surfaces.

London—A look at British aeronautical research—as typified by the exhibit of the Ministry of Supply at the SBAC display—did not show anything startling or new. But it did indicate that the British are well-established in the various fields which bear on tomorrow's weapons, including guided missiles. And it conveyed that British research, like British production, while small in quantity—by U. S. standards—is high in quality.

This particular exhibit dealt only with MoS research—programs which would parallel the work of our own NACA, for example—and did not give an inkling of the work being done by aircraft manufacturers. This latter is extensive, and represents much of the applied research and some of the basic research effort in England. But the firms won't talk—research is in the category of trade secrets.

▶ **No. 1 Exhibit**—Top drawing card of the display was the bi-fuel rocket-propelled test vehicle shown by RAE, intended to investigate the problems of supersonic flight.

The vehicle is about 25 ft. long and 17 in. in diameter. Tail and nose are conical sections. Four cruciform fixed wings are mounted at about the 60%-point of the body length. Four cruciform movable surfaces are mounted at the tail and in the same planes as the wings.

Each of these eight surfaces is machined out of a solid chunk of metal (most likely an aluminum alloy). Cross-section profile is a modified (flattened) double-wedge, with the flattened portion increasing from root to tip section. In planform the wing surfaces are of constant chord; all surfaces are tapered in thickness.

Launching of the vehicle is by means of a jettisonable booster. Propellants for the rocket motor were not specified.

Telemetering equipment is carried in the vehicle.

▶ **Plastic Delta**—Another very interesting exhibit was a full-scale delta wing panel molded from a plastic material. It was built to test a constructional technique which combined an internal structure and a molded thin outer skin. The skin was molded with the complete wing, but in such a way that it could be separated for bolting of the internal structure. After bolting, the outer skin was glued into position and polished to a high gloss.

The molded material is quite porous, but can be sloshed with filling compounds which make the plastic impervious to fuels.

The wing material is claimed to have good heat and sound insulating properties, without any further definition of how good. It would certainly seem that frictional heating, even at low supersonic speeds, would soften thermosetting plastics to the point where they would flow under load.

One certain advantage of a plastic structure is that antennas can be buried completely within the contour, eliminating the drag associated with external antennas.

The suppression of antennas in many current highspeed aircraft or missiles is done in approximately this way, by molding a plastic fairing or cap around the metallic antenna.

Another, different method for suppressing antennas is to use the entire airframe as an antenna. A coil is placed near the wing root, for example, and excites the wing and fuselage. The exhibit showed one scheme for using the aircraft for a communications antenna in the 2-20 megacycle band. Associated with the coil is a remote-control system which tunes and matches circuits for any one of twelve preselected frequencies.

▶ **Transducers**—The Ministry of Supply demonstrated two types of telemetering transducers converting physical quantities to electrical ones which can be used to modulate a telemetering transmitter. The transducers on display were designed to measure pressure, linear and angular acceleration and angle of attack.

Both types—one inductive and the other resistive—are used to modulate the subcarrier frequency of a pulse-modulated transmitter.

• **Inductance type** utilizes the air gap between a coil and an armature, the armature being the moving part. Its motion is in proportion to the quantity being measured.

• **Resistance type** operates by means of a Bourdon tube. When the tube de-

flects under internal pressure, it picks off a proportionate voltage from a coil.

► **Accelerometer**—RAE has developed a counting accelerometer which is used to record gust data in flight. It records the number of times each of a series of gusts in a given direction is exceeded during flight.

Sensing element of the accelerometer is a main mass and spring coupled to a rotary inertia by a secondary spring. Damping proportional to the angular velocity of the rotary inertia is produced by magnetic eddy currents set up in a hollow aluminum cylinder.

The rotary inertia drives a pointer which operates a series of ratchet wheels connected to cyclometer-type counters. These counters read in steps of 0.1G up to 1G and in 0.2G-steps from 1G to 2G.

The accelerometer does not count frequencies above about 10 cps., but will record superimposed frequencies of a lower value.

► **Transonic Tests**—One section of the exhibit consisted of a presentation of free-flight transonic measurements made by the rocket-boosted model technique. This method has been highly developed by our NACA in repeated firings at Wallops Island; the British activity did not seem to have anything new to offer.

Typical quantities measured in flight by the RAE include drag, internal air flow, inlet drag and efficiency, control and stability parameters, and pressure distribution.

A simple demonstration of the mechanics of high-altitude combustion was given by the National Gas Turbine Establishment. Its display showed two identical gas burners in operation. One of the burners was used as the standard of comparison, and burned under normal conditions at atmospheric pressure. The other burned under pressure which was slowly reduced from atmospheric. The quality of combustion decreased of course, until the flame went out completely at a low pressure value.

The Telecommunications Research Establishment showed a step-by-step exhibit of the manufacture of a 4-tube, 38-component potted circuit.

This is a small unit, with parts (except tubes) imbedded in resin. Once buried, these parts are not recoverable, and the unit has to be built cheaply enough to throw away.

One difference from American practice is that the tubes are not buried, but left exposed. This enables replacement in the event of failure and keeps the internal temperature of the block low.

A collection of miscellaneous equipment used in various classes of avionic equipment also was shown. This included transformers, capacitors, switches and resistors displayed in a comparative form. The use of magnetic amplifiers

to replace tubes was noted in this collection.

► **Organization**—British government-sponsored aeronautical research is a responsibility of the Ministry of Supply, which also is charged with the development of aircraft for the military services and the airways corporations. In addition, MoS also is responsible for the supply of all aircraft for the services.

Under the Ministry are eight organizations in specialist fields which carry on the lion's share of MoS research.

• **Royal Aircraft Establishment.** Duties of RAE are very general; they encompass advising the industry on all technical problems concerning the aircraft and with the equipment needed to make the airplane fly, fight and find its way. Guided missile and air armament work also is done by RAE.

• **National Gas Turbine Establishment.** This organization absorbed Power Jets Ltd. and the RAE's Pyestock laboratory. Its duties, generally, are to increase the knowledge of gas turbines in all applications. Five departments of the NGTE specialize in aerodynamics; combustion; performance and projects; metallurgy, and test.

• **Telecommunications Research Establishment.** As the name indicates, this group does avionic research for the services and the Ministry of Civil Aviation. Four technical departments are concerned with radar, physics, engineering and aircraft.

• **Aircraft and Armament Experimental Establishment.** This unit does the flight trials of all prototype aircraft, military and civil. In addition, flight investigations of systems—armament, navigational, engine—come under this group.

• **Airborne Experimental Division.** Development work on aircraft and associated equipment for airborne units is done here. This includes transport aircraft, gliders, and parachutes for cargo and personnel. This unit also does test and experimental work on rotary-wing craft.

• **National Aeronautical Research Establishment.** This is the future home of large-scale test facilities for aerodynamic and structural work. Now under construction, the NARE will have large subsonic and supersonic windtunnels.

• **Marine Aircraft Experimental Establishment.** This unit conducts aerodynamic and hydrodynamic research on all water-based aircraft and conducts acceptance trials of seaplanes for military and civil use. Marine and air-sea rescue equipment also is the responsibility of this establishment.

• **Aeronautical Inspection Directorate.** Major concerns of this group are in the development of methods of inspection and test, maintenance of reference standards and provision of test facilities.

• **Empire Test Pilots' School.** This

unit, based at RAE Farnborough, trains test pilots for the services, the SBAC, and Dominion and foreign governments.

Three of these organizations—RAE, NGTE and TRE—contributed exhibits to the Ministry's stand at Farnborough.

► **Conclusions**—Assuming that what was shown on the stand at Farnborough was as representative of British government research as what we show is representative of NACA research, we are definitely ahead of the British.

They are just beginning to build windtunnel and structural laboratories which compare with NACA facilities.

So the generally accepted view that the British have concentrated on research and development to the exclusion of production is not valid. Instead, the British have a small research effort compared to U. S. standards, and in about the same proportion that their production compares to ours.

But though small, it is a painstaking effort, with a great amount of theoretical calculations backing up, supplementing and often replacing the limited test data. As always, mere size is not indicative of value. In research, quality is as important as quantity. And British research, following the pattern of their aircraft designs, is of high quality.

Boeing Personnel Keeps Up-to-Date

Boeing is pinpointing its design and production personnel's attention on latest manufacturing procedures with display boards and tip sheets.

The display boards — circulated through the various plant areas—are simple panels carrying easily readable design and fabrication hints. Pocketed in a corner of the board are the tip sheets which describe in greater detail the procedures and problems involved.

Subjects covered span a wide range —dimpling, brazing, forging, sealing, fasteners, bearing retention, insulation, etc.

As an example of the detail the tip sheets afford, the discussion on sealing points up the importance of the procedure and the necessity for precise and clear instructions. This is followed by design "do's" and "don'ts" and specific applications of the various types of sealant.

Another tip sheet on Hi-Shear rivets and Huck Lockbolts compares these units with the A-N bolt and covers shear and tensile strengths, installed cost, weight, removability, accessibility, and speed of installation. An illustration shows the cross-section comparisons. Design rules for the rivet and Lockbolt are detailed, hole fits are outlined, and installation procedures described and illustrated.

FLIGHT view of Auster B4 shows cargo area in boom-and-pod fuselage, featuring . . .

REAR-DOOR loading which gives it utility as ambulance, freighter or passenger plane.

Baby Boxcar Details Revealed

● Britain's new ambulance-freighter lightplane has rear-door loading in pod-and-boom fuselage

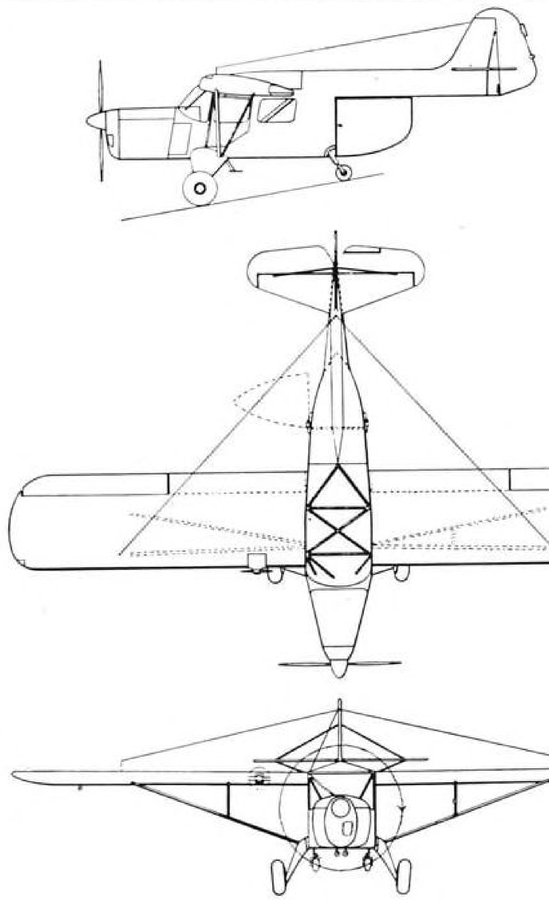
● Primarily designed for use in advance military areas, Auster's B4 is rated in 100 mph. plus class.

Britain's Auster B4 ambulance-freighter, is a baby flying boxcar, designed for rear-door loading. The craft is basically the civil 4-place Auster—similar in appearance to our Piper-Taylorcraft-Aeronca jobs—with the standard fuselage replaced by a pod-and-boom layout.

The B4 made its first public appearance at the Farnborough display of the SBAC this year, and has since then been on trial with the British army during recent maneuvers.

Primary advantage claimed by Auster for the type is the rear-loading door, which makes the aircraft a versatile performer. Although obviously aimed at military applications in forward areas, the B4 is suggested as the answer to many problems of civil operations.

▶ **Metal and Fabric**—The structure of the B4 follows the general Auster pattern of steel-tube framework with fabric-covering. The wing main spars and the rear loading door are made of wood. Many of the components are interchangeable with those of the standard Austers so that spare parts



Auster B4 Performance with Cirrus Bombardier

(at 2,600 lb. gross weight)

Payload for max. range	550 lb.
Max. range	300 mi.
Takeoff distance	200 yds.
Cruising speed	100 mph. plus
Rate of climb	600 fpm.

stocking can be kept at a minimum.

Engine on the prototype is a Cirrus Bombardier 702 of 180 hp. which is fitted with a cartridge starter. A study has been made of the performance of the B4 with a Continental E.190 engine which has 10 more hp. than the British engine. The performance figures are improved somewhat with this alternate installation.

Landing gear is a four-wheeled arrangement. The main wheels are larger than those of previous models in the Auster line, and have hydraulic brakes and shock absorbers. The castering tail wheels have dampers and bungee cord shock absorbers.

Wing and tail are covered with fabric, again being similar to the civil Austers. Each wing has a fuel tank in the inboard section.

▶ **Quick-Change Artist**—At the bottom of the B-4's costume change is a special lightweight floor behind the pilot's seat. Six bolts hold it to the structure, and these bolts can be removed rapidly. Alternate floors with specialized equipment attached can be fitted in place and secured rapidly.

As an ambulance, a single- or double-tier stretcher guide is bolted to the right side of the floor. An attendant's seat is placed behind the pilot. The stretcher cases are loaded through the rear door onto these guides.

As a freighter, the B4's floor is cleared except for the pilot's seat. The resulting cargo volume is 110 cu. ft. with a usable length of 13 ft. when the loading door is fitted.

By removing the door, longer lengths of cargo can be hauled, if they are securely lashed and C. G. limits are respected.

Handling characteristics of the B4 are not noticeably changed with the door removed, and there is no draft or discomfort for the pilot when the door is off.

Sample freighter loads quoted by Auster include:

- **Blood plasma** for 80 men.
- **11 miles** of field telephone cable.
- **80 rifles.**
- **10,000 rds.** of ammunition.
- **One day's** field rations for 120 men.

Passenger-carrying arrangement uses three seats bolted to the floor. One is next to the pilot and two are on a special floorboard aft of the pilot. In a pinch, three can sit on the two rear seats.

Wingspan of the B4 is 37 ft., length is 24 ft. 8 in., and wing area is about 190 sq. ft. Maximum gross weight is 2,600 lb. The craft is built by Auster Aircraft Ltd., Rearsby, Leicester, England.

Duplicator Traces 14 Jet Blades

A. V. Roe Canada, Ltd., is easing the fabrication of its Orenda jet with a battery of duplicating machines for turbine and compressor blades. Each 14-spindle duplicator, which was devised by Avro and Modern Tool Works Ltd. technicians, traces the contours of a master blade form on 14 workpieces simultaneously.

The tracer system head, carrying the stylus and 14 spindles, pivots on bearings at either end by hydraulic cylinder action. Spindles are driven from a common shaft by 90-deg. skew bevel gears, and can be removed for servicing.

Master blade and blade blanks are held by a special fixture on the work table which moves on precision bearings under the spindle head. As the spindle head pivots down towards the work, the stylus engages the master blade.

And while the head continues its arc of travel the worktable is actuated to and from the end, under the exacting control of the hydraulic tracer, generating the desired form.

After each cutting stroke, the spindle head raises clear and the table automatically indexes longitudinally at a preselected feed rate for the next stroke. An electro-hydraulic control system makes the machining cycle automatic. Accuracy and fine surface finish, says

Avro, reduces further finishing operations to a minimum.

The company reports that operational experience to date indicates that the machine has cut its blade output time to approximately one-quarter. With an improved type cutter, it is expected number of cuts will be reduced for further production boost.

Measuring Clearance Of Rotating Shafts

Measuring clearances between rotating shafts and bearings is a rather difficult operation—but a new method developed by M. L. Greenough and associates of the National Bureau of Standards for the Navy's Bureau of Ships appears to offer a satisfactory solution.

The new proposal utilizes a mutual-inductance type of electrical distance-measuring element. The variation of the distance of the rotating shaft from two small fixed coils results in a readily measurable variation in the coupling between the coils.

▶ **Special Problem**—The gauge was developed for a specific problem which called for measuring the film thickness in a 6-in. bearing with a radial clearance of about 0.006 in. (Radial clearance is the difference between the radii of shaft and bearing.)

Anticipated rotational speeds were above 10,000 rpm.; therefore the gauge was designed to make no physical contact with the shaft.

Another requirement was that the gauge had to operate in lubricating oil at a temperature of 200F.

Three successful variations of the device have been developed. The models differ in type and number of probes used, in sensitivity, in suitability for measuring vibratory conditions, and type of indicating device.

One model uses a cathode-ray tube to provide continuous display of shaft displacement; other models give distance indications on a dial or meter.

▶ **Two Probes**—Two types of probes are used—air-core at radio frequency and iron-core at audio frequency. Each probe consists of a pair of small coils —primary and secondary—mounted close to each other and close to, but not touching, the shaft surface.

Each type of probe has advantages and limitations. For maximum sensitivity, the iron-core probes are recommended.

Air-core probes, however, make it possible to observe high-frequency shaft vibration, an adaptation not possible with the low-frequency iron-core probes. The air-core method also is more nearly linear, i.e., the input-output ratio is more closely proportional to distance.

NACA Reports

(NACA Technical Notes are informal papers printed in limited quantities for domestic use only. They are obtainable, free of charge, only by persons having a professional interest in them. Write to Division of Research Information, NACA, 1724 F St., N. W., Washington 25, D. C.)

► Effect of Aspect Ratio and Sweepback on the Lowspeed Lateral Control Characteristics of Untapered Low-Aspect-Ratio Wings Equipped with Retractable Ailerons (TN2347)—by Jack Fischel and John R. Hagerman.

This report covers part of a general NACA investigation of the applicability of various types of lateral-control devices to wings suitable for flight at high subsonic or transonic speeds.

This particular investigation was made at low speed in the Langley 300-mph., 7x10-ft. tunnel to determine the lateral control characteristics of four untapered wings equipped with retractable ailerons (generally referred to as spoilers). Three of the wings were unswept, had aspect ratios of 1.13, 2.13 and 4.13, and were tested with 0.60-semispan retractable ailerons at the 0.70-wing-chord station. The fourth wing had 45-deg. sweepback and an aspect ratio of 2.09; this was tested with 0.60-semispan plain and stepped retractable ailerons at the 0.70-wing-chord station. Each wing was tested through an angle-of-attack range.

For equal spoiler extensions, the rolling effectiveness of the spoilers increased with increase in aspect ratio of the unswept wing; it decreased with increase in wing sweepback. For maximum aileron projection, the rolling velocities produced on the four wings are estimated to be approximately equal for a given wing area.

Moving the plain retractable aileron inboard on the 45-deg. sweptback wing generally increased its effectiveness; moving the stepped retractable ailerons outboard on the same wing generally increased the effectiveness. But the optimum configuration for the plain retractable aileron at the inboard location was usually more effective than the optimum configuration for the stepped retractable aileron at the outboard location.

The values of yawing-moment coefficient produced by the ailerons on four wings were generally favorable; they increased linearly with aileron extension except at small projections.

► Analytical Evaluation of Aerodynamic Characteristics of Turbines with Non-Twisted Rotor Blades (TN 2365)—by William R. Slizka and David H. Silvern.

Considerable thought has been given lately to the problem of cooling turbine rotor blades. Manufacturing such blades would be simplified if they could be uniform curvature and without any twist along the blade.

This technical note considers the use of nontwisted rotor blades in combination with twisted stator blades as a method of obtaining both structural simplicity and efficient aerodynamic performance.

Evaluation is based on the simplified-radia-equilibrium analysis, where the parameters of single-stage nontwisted rotor blade turbines are compared with the corresponding parameters for a single-stage free-vortex turbine.

On the basis of this analysis it is seen that the aerodynamic characteristics of the nontwisted rotor blade turbines are approximately those of free-vortex turbines intended for similar application.

► Practical Methods of Calculation Involved in the Experimental Study of an Autopilot and the Autopilot-Aircraft Combination (TN 2373)—by Louis H. Smaus and Elwood C. Stewart.

It is possible to predict the dynamic stability of an autopilot-controlled airplane from the individual frequency responses. During experimental work conducted by the NACA it was found

necessary to derive basic theories and methods for handling experimental data. The combination which was studied was typical of autopilot systems; it was of the position-control type, characterized by feedback of angular displacement and rate of angular displacement.

Four equations are derived:

- Servo-system error voltage for both displacement input signal and displacement plus rate of displacement input signal.
- Autopilot frequency response for addition of rate of displacement input signal.
- Servo-system frequency response for change of gain.
- Relation between open-loop and closed-loop frequency responses for the servo system and for the autopilot-aircraft combination.

Comparisons are made between experimental data and calculated responses where possible.

► **Effect of Fuel Immersion on Laminated Plastics (TN 2377)—by W. A. Crouse, Margie Canckhoff, and Margaret A. Fisher.**

Tests to determine the effects of cyclic and continuous immersion in fuels on the weight, dimensions, and flexural properties of 19 laminated plastic materials were made by the National Bureau of Standards. The investigation was sponsored by and conducted with financial assistance from the NACA.

Fuels used were heptane, toluene, and SR-6, a test fuel.

A glass-fabric unsaturated-polyester laminate showed the best weight and dimensional stability.

► **Torsion and Transverse Bending of Cantilever Plates (TN 2369)—by Eric Reissner and Manuel Stein.**

This study applies primarily to the analysis of thin, solid wings of low aspect ratios; such wings, as utilized in high speed airplanes, are more nearly plates than beams. Therefore, they are analyzed by plate theory.

It is not easy to obtain solutions to the partial differential equations of plate theory, especially for plates of arbitrary shapes and loading. This paper presents a method for obtaining ordinary differential equations to replace the partial differentials. It employs the minimum-potential-energy principle and the assumption that the chordwise deflection shape may be represented by terms of a power series.

Deflections of the plate are assumed to vary linearly across the chord; use of the calculus of variations leads to two ordinary linear differential equations for bending deflections and twist of the plate. The effect of constraint against axial warping in torsion is inherently included because the cantilever is ana-

lyzed as a plate rather than as a beam. The application of this method is presented for specific problems involving static deflection, vibration, and buckling.

In the static-deflection problems, taper and sweep are considered.

►An Investigation of the Effects of Jet-Outlet Cut-off Angle on Thrust Direction and Body Pitching Moment (TN 2379)—by James R. Blackaby.

The use of a beveled jet exhaust nozzle is often suggested by the fuselage belly installation of turbojet engines.

It was felt that these beveled outlets (or possibly external airflow around those outlets) might affect the direction of the thrust vector of the jet exhaust from the engine. Any deflection of the exhaust would result in a pitching moment on the body.

Beveling the outlet as much as 75 deg. from normal produced only a slight change in pitching moment on the body. This change probably was caused by external loads on the outlets.

►Three-Dimensional Unsteady Lift Problems in Highspeed Flight—the Triangular Wing (TN 2387)—by Harvard Lomax, Max. A. Heaslet, and Franklyn B. Fuller.

The purpose of this report is to determine the aerodynamic characteristics of a triangular wing in unsteady supersonic motion. Lift and pitching-moment coefficient are derived for flat plate triangular wings. The coefficients are determined for angle-of-attack distributions corresponding to sinking wings and to pitching wings. A complete analysis is presented for a wing with supersonic edges; a partial analysis is presented for the case of subsonic edges. —DAA

NYU Frosh Pick Aero Engineering

Aeronautical engineering is the top choice among the current freshman class of New York University's College of Engineering, according to Dean Thorndike Saville. And in spite of the national trend of decreased college registration, NYU has the same number of frosh this year as last.

Dean Saville also said that there is reason to expect a larger enrollment in the College of Engineering next year, judging on the basis of the number of inquiries received from high schools.

The number of registrations in the graduate school is up by nearly 7% over last year's, but the total enrollment has declined by about the same amount, in general agreement with the predicted national figure of 10%.

New Speedy Test of Material Endurance

A completely new approach has been made to the determination of endurance limits of materials by two geology professors—and their discovery promises to save months of testing time.

The new technique—which resulted from studies of stresses in rocks and minerals—was devised by Dr. Joseph L. Rosenholtz, head of geology at Rensselaer Polytechnic Institute, and Prof. Dudley T. Smith, his chief associate. Heart of their discovery is the fact that metals, when heated to moderate temperature, show linear rates of expansion which vary with the amount of prestressing. And as a corollary, a rapid change in the rate of expansion occurs at the endurance limit of the prestressed material.

▶ **Long Testing**—Usual method of determining endurance limit of any material involves vibrating specimens under load. This procedure continues until either the specimen fails or a predetermined life is reached.

It may take months to complete such tests, because primary moving parts in machines may undergo hundreds of millions of cycles during their useful life. And that life has to be duplicated in endurance-limit testing.

The R/S Dilastrain method uses a test specimen machined from a bar six in. long and ⅝ in. in dia. The central two inches of the bar is machined down to a 7/32-in. diameter.

The next step is to find the yield point of the test specimens by pulling one sample in the usual way.

Eight test specimens are then stressed over a range of values which brackets the yield point stress. These pre-stresses are in 5,000-psi. steps.

All eight test pieces are vibrated for 100,000 cycles, which puts them on a common fatigue level. An underwater jig (to keep the piece cool and eliminate any machining stresses) is used to slice off the ends of each bar to leave the central section in the shape of a spool.

A bank of eight Dilastrain multipliers is used to hold the test specimens. Each multiplier has a quartz tube 20 in. long which contains a quartz rod. One end of this rod rests against the end of the test specimen and the other bears against a steel lever. Each of the multipliers is immersed in an air bath at room temperature.

▶ **Growth Measured**—The air bath temperature is raised gradually to 212F, and the expansion of the test piece is transmitted by the quartz rod to the steel lever. Movement of the lever is recorded automatically with a 3,500-times magnification.

It takes about two hours to record the total expansion of the pieces. Then the linear values of growth are plotted against a pre-stress value.

A sharp dip in the plotted curve results at the endurance limit of the material. And the dip is so clearly defined that the endurance limit stress can be easily picked off the curve.

So far the Dilastrain method has been checked with samples of dural, magnesium, naval brass, polystyrene, and soft, medium and hard steel.

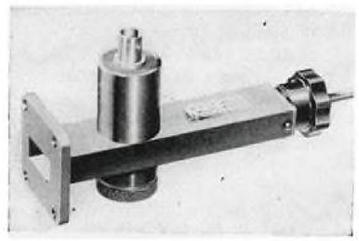
Rosenholtz and Smith are currently working on an adaptation of the method which will permit testing at very high temperatures. This work is expected to be of great value in the gas-turbine industry.

How Sharp Turns Kill Decibels

Another answer to the question of how to soundproof engine test cells was recently described by Dr. Howard C. Hardy, who heads research on acoustics and vibration for Armour Research Foundation of Illinois Institute of Technology.

Dr. Hardy, speaking before the Acoustical Society of America, said that the Foundation developed a structure which channels sound through a series of 180-deg. turns, killing some of the intensity at every turn.

AVIONICS



2 New Waveguide Instruments Offered

Hewlett-Packard Co. announces two new instruments for waveguide measurements—the -hp- 715A Klystron Power Supply and the -hp- 485 Detector Mount.

The power supply is designed for test-bench operation of all types of low-power Klystron oscillators. It provides a beam voltage which is continuously variable from 250 to 400 v. at 50 milliamps. Reflector voltage is variable from 10 to 900 v. at 5 microamps. Square wave modulation at 1,000 cps. is provided. Filament supply is 6.3 v. at 1.5 amps.

The power supply is mounted in a steel case with carrying handle. Price of the unit is $300 f.o.b. factory.

The detector mounts are intended to facilitate the measurement of power at any frequency—2.6 kmc to 19.0 kmc—in conjunction with the -hp- 430A Power Meter and a Sperry 821 barretter. It may also be used to detect rf energy or to measure the relative level using a Type 1N21 silicon crystal.

Mounts are available in various sizes; prices range from $75 to $125, f.o.b. factory.

Further information can be obtained from Hewlett-Packard Co., 395 Page Mill Road, Palo Alto, Calif.

New Potentiometer Has Tandem Units

Clarostat's Series 42A potentiometer has been further refined recently, and is now being offered in tandem assemblies made to order.

The pot—which is an essential part of electronic computing equipment—is encased in a mineral-filled bakelite housing which locks together with similar units. The tandem assembly is held together by metal endplates and threaded tierods. A common shaft slips through the tandem assembly, and the contact arm of each unit can be adjusted readily to synchronize with reference to the common shaft or with other contact arms.

Mechanical rotation may be continuous or limited. Electrical rotation is 345 deg. and can be adjusted to plus or minus one deg. For special applications, the electrical rotation can be increased to 359 deg.

There is no backlash or play in any of the tandem units, and tracking of the units is positively assured.

For linear windings, the resistance range is from 100 to 100,000 ohms. Tapered windings also are available. Linear controls are rated at 3 watts, but the rating of tapered controls depends on the type of taper. Standard overall resistance tolerance is plus or minus 5%. Ratio of voltage at any point on the pot to total impressed voltage can be within ½% of the theoretically correct value.

For further information, write the Clarostat Mfg. Co., Inc., Dover, New Hampshire.

New Miniature Selenium Unit

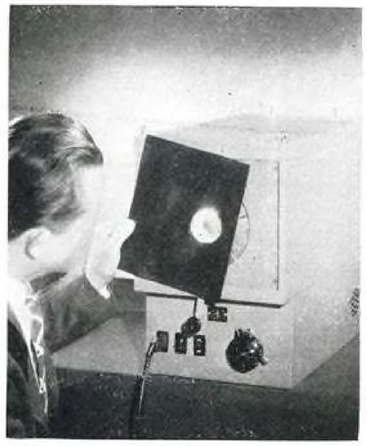
A new line of miniature electronic selenium rectifiers is being offered by Electronic Devices Inc., Precision Rectifier div., 429 12th St., Brooklyn, N. Y.

Up to a rating of 200 ma. d.c. output, the Plastisel rectifiers are all-molded construction similar to tubular condensers. The outer case is spiral-wound phenolic wax which is rock hard at 100° C. Thermal conductivity of this wax and the low-loss plate design of the rectifier compensate for loss of cooling due to molding.

In ratings from 250 ma. d.c. to 500 ma. d.c., standard open-plate construction is used.

All open and closed construction stacks are standard in 380 P.I.U. ratings; they can also be furnished in other voltage ratings and as doubler units for special applications. Rectifiers are guaranteed for 1,000 hr. or 1 year, whichever comes first.

These rectifiers are manufactured with bare or insulated tin-copper leads.



Bright Spot Sees Through Dense Film

You don't have to retake an overexposed x-ray negative, says General Electric's X-Ray Dept., if you have a GE high-intensity illuminator.

Film densities between 0.5 and 4.5 can be penetrated by the new device. Such extreme capability is made possible by two features—the lamp and

an iris diaphragm—says GE. The opening for the viewing light is an iris, which can be dilated or contracted through an infinite number of steps from a ¼-in. triangle to a 5-in. diameter circle. The light is a new lamp with a rating of 100,000 candlepower. At this rating, the lamp has a life of 1,000 hr. at 115v. Increased candlepower can be obtained by raising the line voltage, but at the expense of lamp life.

GE's X-Ray Dept. is located at 4855 Electric Ave., Milwaukee 14.

New Amplifier

A new direct-coupled amplifier designed for use in the standard 19-in. rack is available from the Brush Development Co.

The instrument, designated Model BL-962 by the manufacturer, was designed for use with Brush magnetic direct-writing oscillographs in studies of static and dynamic conditions. Among these might be measurements of strains, displacements, pressures, light intensities, temperatures and a.c. or d.c. voltages and currents.

Voltage gain is about 1,000 times, sufficient to give 1 mm. deflection on the oscillograph chart per millivolt input. Plate and heater voltage regulation are combined with "novel design features" to minimize effects of power line fluctuation. Zero signal drift is claimed to be not more than one chart millimeter per hour. When the amplifier is used with the penmotor, frequency response is essentially linear from d.c. to 100 cps.

Control panel mounts an attenuator with five factor-of-ten positions, gain control, calibrating meter and input voltage controls. A balancing potentiometer is provided for biasing the oscillograph pen to any position on the chart. Front panel and chassis rear have input jacks and output sockets.

For detailed description, write The Brush Development Co., Instrument Division 5, 3405 Perkins Ave., Cleveland 14, Ohio.

Bearing Stethoscope

An electronic stethoscope for locating friction noises in bearings and other mechanisms is being offered by Anco Instrument div., 4254 W. Arthington St., Chicago 24.

The gadget, named Elec-Detec, uses a metal probe as a microphone; received noise is heard in earphones.

The manufacturer says that the device can detect sounds at low-speed running that would otherwise be heard only at high speed. Airborne sounds do not register.

The unit is furnished with high-impedance headphones, batteries and leather carrying case.

ACTION OVERSEAS...
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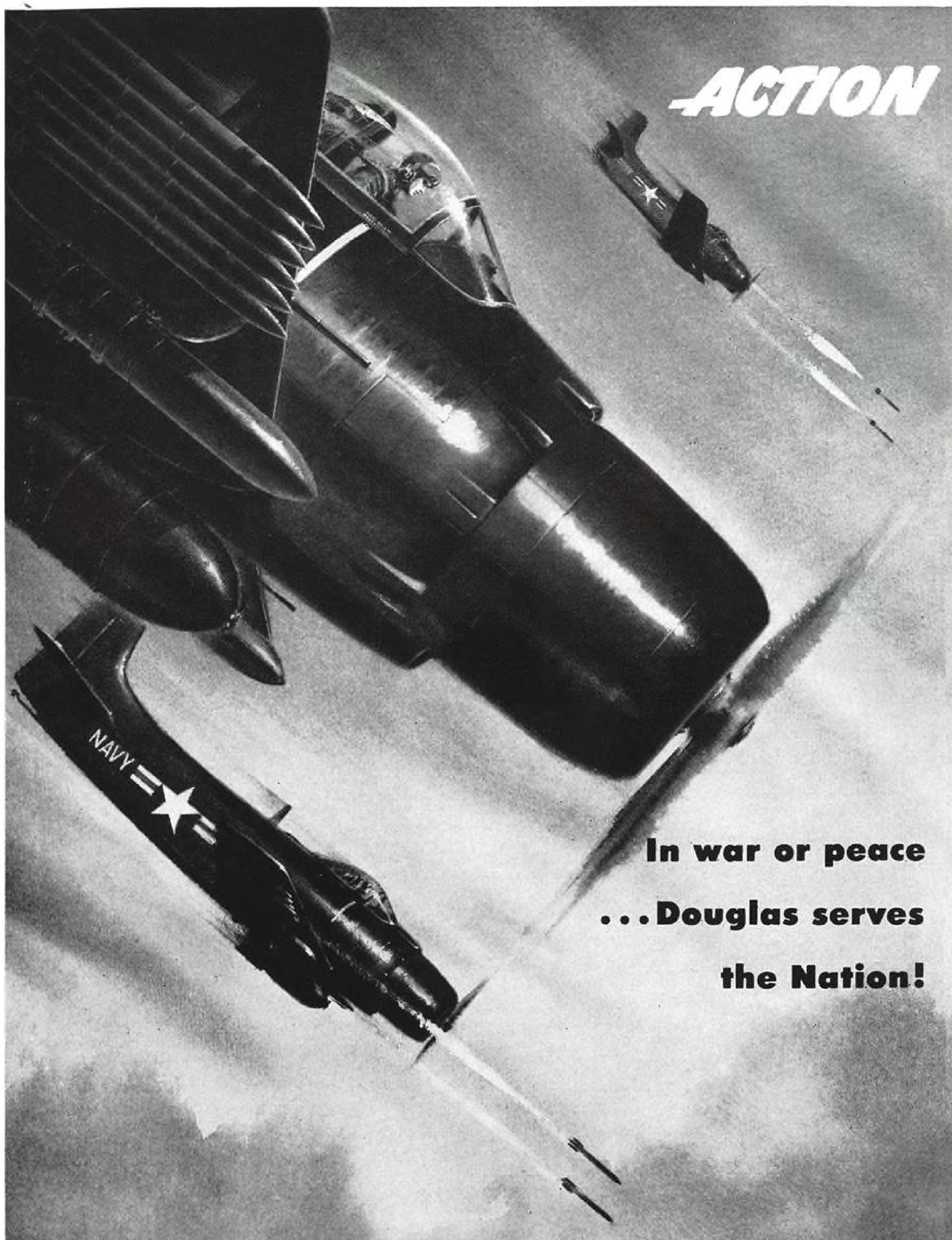

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Nearly three decades ago, Douglas built its first military airplane—a torpedo plane for the U. S. Navy. Since then, in every emergency, Douglas planes have been ready when needed.

Our SBD *Dauntless* dive-bombers, launched from U. S. carriers, turned the tide of victory at the Battle of Midway.

In Korea, Douglas AD *Skyraiders* provided effective tactical support for UN troops.

Now Douglas is meeting the expanding need for defense aircraft. Newest of the AD series, for example, is the A2D *Skyshark*, the world's most advanced turbo-prop attack bomber.

In nearly every field of aeronautics, including guided missiles, Douglas continues to pioneer, so that today—and always—America will remain *first* in the air!

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WORLD'S LARGEST BUILDER OF AIRCRAFT FOR 30 YEARS ✈ MILITARY AND COMMERCIAL TRANSPORTS
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Will Defense Production Be Caught in the Squeeze?

When Congress revised and extended the Defense Production Act, it relaxed a squeeze on business profits.

President Truman asserted that this action by Congress cripples the government in its effort to prevent inflation which, as he puts it, could lead to "enrichment and profiteering for the few, economic hardship and misery for the many."

He asked Congress to rescind its action.

This editorial—the second on problems presented by "escalator"clauses—aims to throw some light on this conflict of opinion.

The Squeeze

The squeeze on profits was imposed in the name of price stabilization. The idea behind it was simple. The *selling prices* of industrial products were to be held under a tight lid. But many industrial costs are affected by "escalator" clauses of one kind or another which tend to boost production *costs*. Thus, with rising costs and fixed prices, profits would be squeezed and much of the cost of defense would thereby be shifted from those favored by escalator clauses to business concerns.

The mechanics of this squeeze on profits were complicated. But here, in brief, is how it was to work. The first step was to require manufacturers to set ceiling prices, effective May 28, for their products.

These ceiling or maximum prices were to allow for increases in manufacturers' costs that had occurred since Korea. *But they did not allow for all increases.* Manufacturers, for example, could not include increases in indirect costs—office or selling costs. Neither could they, in calculating their new prices, include increases in the costs of materials or direct labor that had come after March 15. This was the first phase of the squeeze on profits.

The second phase was prepared by **not** putting a ceiling on costs. The Wage Stabilization Board said it could not disturb the operation of "escalator" clauses by which wage rates are geared to the cost of living. Moreover, nothing could be done to curb the operation of the farmers' "escalator" clause, the farm parity arrangement. Under it, the federal government underwrites higher prices for farm products to match increases in the cost of things farmers buy. So this left wages and many materials costs free to rise against a ceiling imposed on the prices of what industry has to sell.

Relief—at a Loss

On two conditions only would the Office of Price Stabilization permit a company to raise its prices and escape this squeeze. One of these was that increased costs had more than wiped out its profits; in other words, that it was operating at a loss. The other condition was that the industry of which the company is a part was not, as a whole, making "excess profits." That is, the industry, as a whole, could not get price relief if its overall profits before taxes were greater than 85 percent of its average profits during the best three of the four years from 1946 through 1949. Many companies expected that their profits would be cut drastically before they could get through this narrow escape hatch.

When this squeeze on profits was set up, we were told that industry as a whole was reporting record profits. But, it was equally true that wage rates and farm prices also were at record high levels. And it was also true that, under the impact of rising taxes and the dislocations caused by the defense mobilization program, profits actually were on the way down.

Profits—Going Down

By the time Congress acted to relax the squeeze, corporate profits, after taxes, were running at a rate 20 percent lower than they had been six months before. And the clear prospect was that they would continue to decline.

So the issue put up to Congress was simply this. Should business firms stand so much of the brunt of the defense costs while "escalator" clauses continued to exempt organized workers and farmers from paying their share of those costs?

But this question actually is much broader than one of fairness or unfairness alone. One certain effect of such a squeeze on profits would be to undercut the capacity of private industry to install the new plants and equipment needed for our mobilization effort. Today—unlike World War II—private industry is financing almost all of our huge program to expand production. And about two-thirds of the money that has been plowed into the expansion and improvement of our industrial machine since World War II has come out of profits.

In view of all this, Congress decided last summer to relax the pressure on profits. This was done by the controversial Capehart Amendment to the Defense Production Act. This amendment has serious administrative weaknesses. But some measure with the same purpose is needed to maintain profits at a high enough level to finance the huge and continuing expansion of our industrial machine that is now underway.

Basic Issues

As soon as the amendment was enacted, the President asked Congress to revise the law again. The heart of his proposal was to restore to the Administration the powers it used last spring to arrange the squeeze on profits outlined here.

This controversy will continue. There can be no final answer to it as long as we have the economic controls made necessary by mobilization.

But if we look beneath the surface of this technically complicated controversy, we shall see clearly that the basic issues are:

1. Whether we really shall make an effort to distribute fairly the burdens of inflation caused by our defense mobilization—

2. Whether farmers and organized workers should be exempted from these sacrifices by escalator clauses—at the expense of the nation as a whole—

3. Whether profits should be squeezed still more—at the risk of putting a fatal squeeze on the effort of industry to build new plants and install new tools. These new facilities are essential to maintaining American living standards—and they are the heart of our ability to defend ourselves and the rest of the free world.

Americans face no more important economic issues at this time.

McGraw-Hill Publishing Company, Inc.

SURPLUS TOOLS—$80-million worth of them—are still stored in USAF depots at Marietta and Omaha, where they can be inspected by defense contractors and subcontractors. Available are about 5,000 gear and grinding machines, welding and other equipment.

AF Still Has Surplus Tools—*But Hurry*

● USAF wants depots back in production picture.

● So stored machines must be out by year's end.

BRIEFING is given contractors before they are turned loose in depot.

Machine tool-hungry USAF prime and subcontractors have pretty well cleaned out the huge Marietta, Ga., and Omaha, Neb., surplus machinery depots.

What's left has been released to Army and Navy contractors—and it isn't much, to hear them tell it.

But then it must be remembered that the Air Force firms have been swarming through the two former World War II plants for months and hardly passed up anything they thought they could use, either as was or with some modification.

► **Phase Out**—The process, materially speeded by recent changes in USAF policy which allowed qualified firms to make on-the-spot selections, has cleared out of the depots all but about 5,000 gear and grinding machines, welding and miscellaneous equipment valued at about $80 million.

Air Force wants the remainder out of the way by year's end so that the World War II-built plants can be put back into defense production. Lockheed will put the Marietta facility to work modifying B-29s at first, later will build B-47 Stratojet bombers there; the Omaha plant is slated for an as-yet-undisclosed production assignment.

► **'Gold Mine'**—Despite early reports of "obsolescence," there is good evidence that the depots have proved a "gold mine" for the aviation industry.

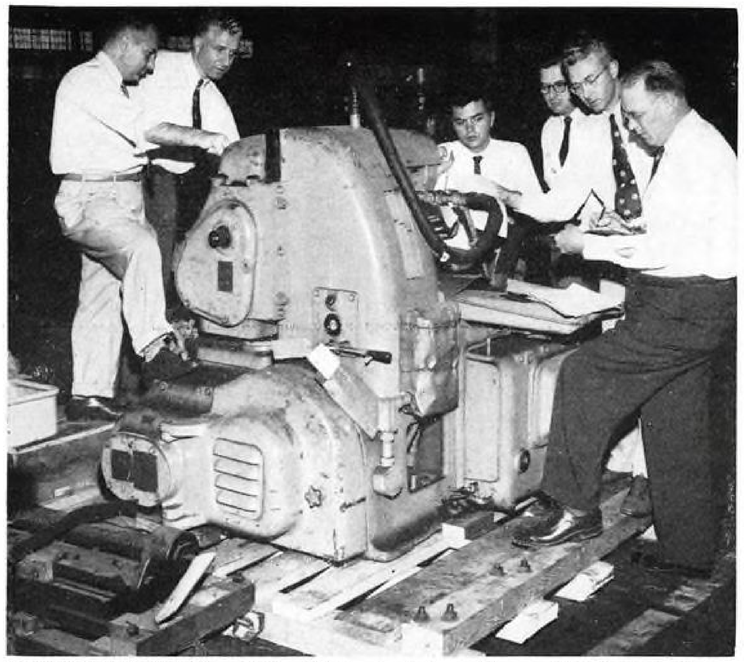
Wright Aeronautical Corp.'s experiences bear this out. The big East Coast engine maker has garnered some 2,000 valuable tools during its searches through both facilities—most of which required little more than cleaning prior to operation.

On its last excursion, several weeks back, WAC picked up 107 machines for itself, in addition to supervising selections for some of its subcontractors.

► **Many Types**—It values its acquisitions at from one to $1.5 million. They include such machines as internal and cylindrical grinders, automatic lathes, gear testers, Multimatics, thread mills, and apparatus such as chain hoists, electric hoists, trucks, Magnaflux equipment, spare electrical motors and the like.

Wright didn't get everything it wanted—radial drills, engine and turret lathes weren't available; and some of the machines that WAC selected were awarded to other firms with higher AF priority. At Marietta, Wright got 52 out of 107 tools selected by its representatives; the score at Omaha was 55 out of 155.

Wright appears pleased with its



REPRESENTATIVES from Bell and Solar check how miller would fit in their plans.

ASSORTMENT OF GRINDERS offers many finds for manufacturers' inspection teams.

acquisitions from the depots—and there is no waiting for delivery.

In purchasing new equipment, the company must be satisfied with promise of deliveries only as "early" as December, 1952.

Canadian firms, too, have been searching through the stocks at the two depots, as have the Atomic Energy Commission and other government agencies.

▶ **Cleaned Out**—So it's understandable why the 325 representatives of Army and Navy firms who toured the installations recently under the new "open-house" policy might have found lean pickings.

Some confusion and red tape only added more aggravation. Air Force wanted the tools cleared and the Army-Navy representatives suddenly felt that they lacked the authority to okay selection.

DPA's machine tool consultant Ed Hunt added to the indecision by indicating that Defense Production Administration and the Joint Central Inventory Group would not approve some of the applicants getting the tools since a large number of them were down in the third and fourth tier of subcontracting and had too low priorities to get on list.

The priorities teams didn't represent "top brass" and hesitated to go out on a limb in approving some of the selections.

But finally about 500 tools were tagged for shipment.

What becomes of the remaining tools? They will either be picked up by firms who take the time to go down and see if there's anything there they need—or they'll be stored outside the plants.

▶ **How to Do It**—Detailed listings of the remaining tools may be obtained from the Production Equipment Joint Control Inventory Group, Old Post Office Building, Washington, D. C.

Contractors and subs should initiate arrangements for their visits to the depots through the branch of the service for which they are producing, with USAF contractors processing their requests through the nearest AF regional office.

The tools are leased by the responsible branch to the contractor at a fixed monthly cost.

Reoccupies Plant

Glenn L. Martin Co. has begun reoccupation of the government-owned 1,449,375 sq. ft. plant utilized by the company during World War II for B-26 Marauder production. About 2,000 persons are now employed in the plant, located on Martin Airport, Baltimore, Md.

What's doing at JACK & HEINTZ

Special Products Developed for Systems Application

3 DEVICES INDICATE CONTROL POSSIBILITIES

An impressive array of products developed by Jack & Heintz engineers for special application in aircraft electrical systems, is now sharing the spotlight with J & H's widely used starters, motors, generators, actuators and inverters. Much of the success and acceptance of J & H Systems can be traced to the important role each accessory-device plays.

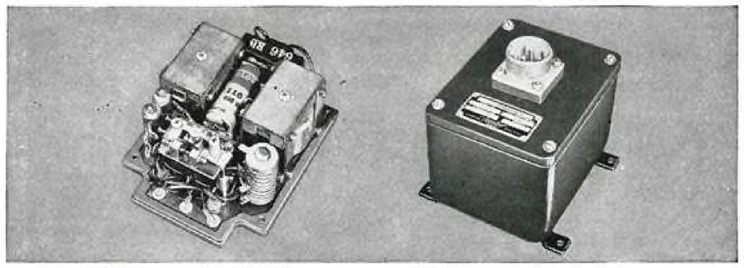
Typical of these devices is the new GC20 Frequency Sensitive Relay which offers protection from the effects of low frequency to equipment such as automatic pilots, gyros, computers and radar using 400-cycle power, as well as the source supplying that power. A frequency drop, occuring in an idling, grounded aircraft may cause extensive damage to this equipment.

The GC20 will remove power from the equipment, relieve load on the 350/400-cycle source, when frequency drops below limits, and will put load back only when frequency increases to the set pickup of the relay. It can be furnished to operate on either 120 or 208 volts, or as a single interchangeable unit that can be used on either voltage. It closes contacts at a given frequency and opens them at another lower frequency. Pickup and drop-out frequencies can be adjusted as close as 3 and as far as 20 cycles apart.

Another new device, the GC50 Overvoltage Protection Relay, protects a 120/208-volt, 3-phase, 400-cycle alternator. When overvoltage occurs, the relay closes its contacts and energizes the 24-volt, d-c coils of an exciter field relay and an alternator circuit breaker.

The GC57 Phase Sequence Relay, another new device, is used on a 120/208-volt, 3-phase, a-c system, operating through a frequency range from 100 to 1000 cycles per second. It consists of a 3-phase sensing motor, and a contact mechanism coupled together by the magnetic drag or eddy-current principle. The phase sequence sensing mechanism includes both fixed and movable contacts, the latter operated by a magnetic drag disc.

The fixed contacts form part of a single-pole, double-throw switch, one contact providing an out-of-phase indication, the other the normal-in-phase condition. The movable contact engages the fixed contacts and closes a circuit when in either extreme position. In a nonoperating condition, the movable contact is held in a center-off position. The introduction of a reversed-phase power source shifts the movable contact against the fixed indicating contact. If desired, it lights a warning indicator in the operating compartment. When the reversed-phase power is removed, the sensing device again assumes the normal "off" condition.



GC20 Frequency Sensitive Relay — GC50 Overvoltage Protection Relay

Chief Engineer's Corner

Our J&H Engineering Department is organized to design and develop special aviation products you may need. And our Engineering Lab is equipped to build prototypes of these devices in a minimum of time, and to test them, under all environmental conditions to your specifications. Here, we develop special materials and build apparatus to meet specifications we could not hope to meet with materials available from other sources.

Typical, is our new J&H 28000 Solenoid, custom-built for use with a turbojet-engine accessory. This solenoid had to operate in an ambient temperature of 500° F. However, available insulating varnishes had a top limit of only 300° F.

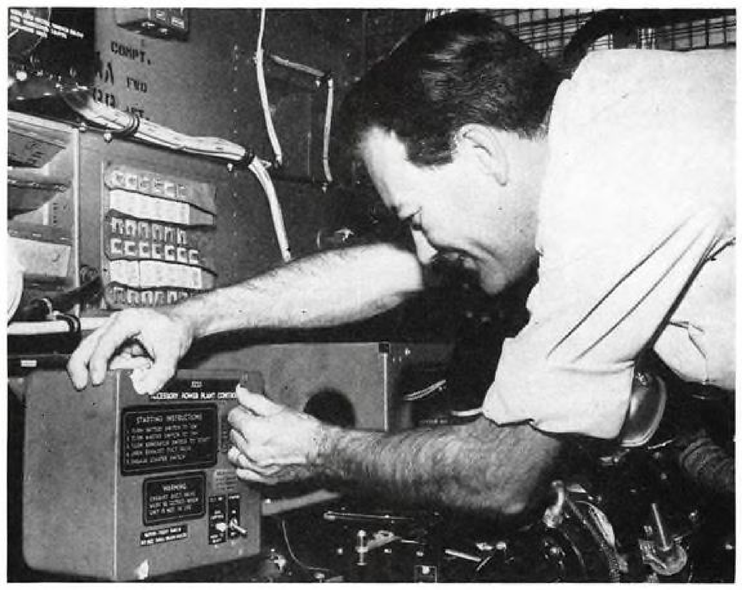
J&H 28000 Solenoid

To maintain compactness, J & H developed a special impregnating varnish. This solenoid, utilizing the new varnish, actually operates at 600° F.

If you have any special aircraft products in mind, please submit your requirements, including all available environmental and application data. Our engineers will be glad to work with you. Write JACK & HEINTZ, INC., Cleveland 1, Ohio.

JACK & HEINTZ *Rotomotive* EQUIPMENT

means electrical, hydraulic or mechanical devices designed to solve unusual problems of developing power, controlling it, or using it.



AS MANY AS 2,000 Metal-Cals go into big Boeing airplanes such as the KC-97E.

Market Widens for Metal Decals

The thin aluminum applique developed by the Boeing Airplane Co. in 1946 to replace paper decals mounted by the hundreds inside and outside most airplanes is being put to an increasing number of uses in many industries. It now is being produced not only by Boeing but by a Boeing-licensed firm in Seattle, Wash.

Trade-named "Metal-Cal," the product is standard equipment on almost every major aircraft type built in the United States and on hundreds of non-aircraft applications. Each new B-50 or C-97, for example, needs from 1,500 to 2,000 Metal-Cals.

► **Abrasion-Resistant**—Big advantage of aluminum over paper is that Metal-Cals are almost abrasion-proof. Subjected to a process in which an object is rotated like a phonograph record under an abrasive arm, Metal-Cals have remained legible after 18,000 wearing cycles while the best of conventional paper decals became illegible within 1,000 cycles. When produced in quantity, they are little more expensive than the paper decals.

The most recent Metal-Cal is a "postage stamp" type, developed with the cooperation of the Minnesota Mining & Manufacturing Co. It sticks solidly and easily to any smooth, clean surface. The cement backing is covered with cellophane.

Boeing makes Metal-Cals for its own Seattle division's needs while the C&H Supply Co. makes them for such companies as Westinghouse, General Electric, Trans World Airlines, Northwest Airlines, United Air Lines, Braniff Airways, Emerson Radio & Phonograph Corp., Montgomery Ward, Emerson Electric, RCA's Victor division. A. O. Smith, True Temper Corp., Foote Bros., Leeds & Northrup Co. and Benson Manufacturing Co. C&H also supplies Boeing's Wichita division.

The process consists of creating a color retentive coating on the surface of the .003-in. thick aluminum stock by chemical reaction. Printing then is applied by a standard Multilith offset process, in any color, die-fast.

C&H has produced more than 50 million Metal-Cals since 1948, for everything from golf clubs to refrigerators. The company has delivered more than 3,500 types of Metal-Cals to Boeing's Wichita division for use on the B-47.

How Small Is Small Business?

How small is small business?

U. S. Dept. of Commerce has come up with a new standard for classifying manufacturers by size. The new guide sets up these size criteria.

- **Aircraft manufacturer,** 2,500 employes or less.
- **Aircraft equipment** company, 250 employes or less.
- **Aircraft propeller** company, 1,500 employes or less.
- **Aircraft engine** company, 2,500 employes or less.

Special Tool Speeds Metal Cutting Study

A specially equipped lathe designed to speed the study of metal cutting problems has been developed by the Monarch Machine Tool Co. of Sidney, Ohio.

The lathe recently was used in a research project aimed at bringing about improvements in the machinability of various metals—particularly new high-temperature alloys. The project was carried out by Curtiss-Wright Corp., under contract with the Air Force. Other participants were the Ford Motor Co., Massachusetts Institute of Technology and Metcut Research Associates of Cincinnati.

The lathe simplified a wide variety of speeds and feeds required in making the tests. As Monarch explains it, the machine supplies the "fundamental relationship between a moving workpiece and a fixed, stationary, single-point tool. It meets all the essentials for successful machinability testing, including simplicity in instrumentation, flexibility of operation and a minimum consumption of testing time and materials."

Basically a 13 x 42 in. Mona-Matic, the lathe's normal spindle speed of 130 to 3000 rpm. was stepped up to 6000 rpm. through special gearing and the use of a 20-hp variable-speed drive. For tests, several tachometers are mounted on top of the lathe headstock to permit selection and monitoring by the operator of the exact surface speed required. To measure both cutting and thrust forces created by turning operations during tests, the lathe is equipped with a mechanical, two-component dynamometer attached to the cross slide.

OUR EXPANDING INDUSTRY

Ziegler Steel Service Co. has established an aircraft steels warehouse at Wichita, Kan. Company also has plants at Los Angeles and Oakland, Calif.

Pittsburgh Plate Glass Co. has established a fiber glass division and will manufacture strand and super-fine fiber under license agreement with Owens-Corning Fiberglas Corp.

Kirkhill Rubber Co. has moved into its new office and factory at Brea, Calif. Company is rubber parts supplier. New plant will have 200,000 sq. ft. when completed.

Temco has awarded a contract for additional construction at its new Major Field overhaul base at Green-

(*Continued on p. 65*)

Tactical Airlift- Pratt & Whitney Powered!

U. S. Air Force's Combat Cargo Command in Korea Hits New Marks in Air Support of Ground Troops

FROM the outbreak of the Korean War, United Nations strategists were faced with the tremendous problem of transporting troops and supplies to hastily organized bases thousands of miles from home.

To help meet this emergency, military planners drew on their experience with previous airlifts, and almost overnight established the Combat Cargo Command of the Far East Air Forces. Its mission was to carry troops, evacuate wounded and supply ground forces on a scale never before undertaken.

Men and planes were drawn from Air Force units, the U. S. Marine Corps and the Royal Hellenic Air Force. The aircraft were Curtiss C-46s, Douglas C-47s and C-54s, and Fairchild C-119 Packets.

The world at large has heard of such Combat Cargo Command feats as the paradrop of over 3,900 troops, jeeps, howitzers, guns and supplies which cut off enemy troops at Pyongyang . . . the complete supplying for 12 days of 20,000 U. N. forces isolated in the Chosin Reservoir area . . . the airdrop of a 16-ton bridge that saved millions in supplies . . . and the rescue of over 4,000 casualties in the Chosin area.

But as much as these accomplishments stand out, it was the steady day-by-day operations which contributed most heavily. In its first 145 days of existence, for instance, the Combat Cargo Command flew 32,851 sorties, airlifted 130,948 tons of cargo, carried 156,207 military passengers, and evacuated by air 73,151 persons.

What the Combat Cargo Command has been doing in Korea is even more remarkable in the face of the limited time that was available for training crews in specialized duties, the crude fields from which aircraft were forced to operate, and the fact that flying was on a 24-hour a day, all-weather basis.

That these obstacles were overcome so successfully is a tribute to the rugged aircraft used to undertake the job, to the skill of the men who manned them, and to the dependable Pratt & Whitney engines which powered them all.

Pratt & Whitney Aircraft

ONE OF THE FOUR DIVISIONS OF
UNITED AIRCRAFT CORPORATION
EAST HARTFORD, CONNECTICUT

(*Continued from p. 59*)

ville, Tex. Company now has a payroll of 750 at Greenville engaged in overhauling C-54s. New buildings are expected to be ready this month.

Fairchild Camera and Instrument Corp. has announced it will build a $3,000,000 plant at Jericho, Long Island, to fill defense orders for aerial cameras, radio direction-finders and other equipment for the armed forces.

Chrysler Corp. has received a multi-million-dollar contract for the production of Hamilton Standard propellers, under license agreement, at its Dodge plant at San Leandro, Calif. A 750,000-sq. ft. addition is under construction at the Dodge facility for the new Navy production job.

Bendix Aviation Corp.'s Red Bank N. J., division will double its employment when the new 70,000-sq. ft. addition now under construction is completed early next year. The new facility will manufacture rotating electrical equipment, such as motors, generators, inverters and dynamotors.

Marmon-Herrington Co., Indianapolis, has received an Air Force contract in excess of $10 million for the production of Model 0-10 crash trucks.

AMC Sets Up New Production Sections

Dayton—Air Force has made a number of organizational changes in the procurement setup at Air Materiel Command headquarters to place heavier accent on production.

The Directorate of Procurement and Production replaces former Directorate of Procurement and Industrial Planning. Mailing symbol remains the same, MCP, and directorate is headed by Maj. Gen. Mark E. Bradley, Jr.

Directorate component changes include:

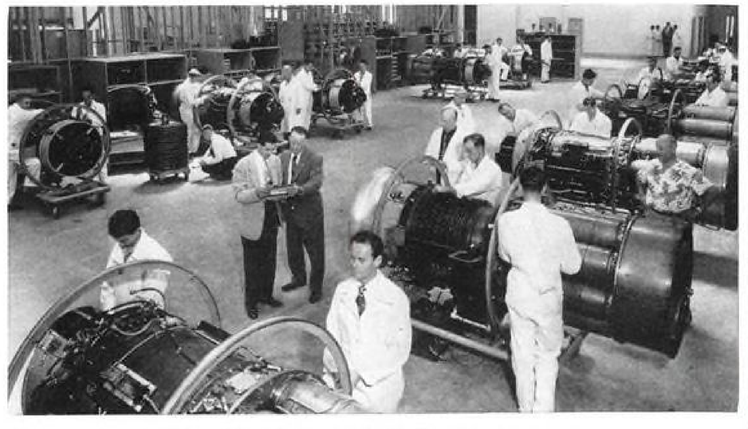
• **New** production division, MCPR, headed by Col. Beverly H. Warren, former chief of Southern Air Procurement District. Division will maintain surveillance over production of materiel to satisfy AF requirements and will be composed of three sections—Aircraft and Missiles Production section, MCPRXA; Aeronautical Equipment Production section, MCPRXE, and Materiel Production section, MCPRXG. Col. Warren's office will be in Building 15, Area B.

Segment locations have not been determined.

• **New** Production Analysis section, MCPZXP, to analyze placement of contracts and contract delivery schedules in relation to program requirements, plus forecasting of critical materiel.

• **Set up** Requirements and Distribution Control office, MCPPXB, as staff office within Procurement division. Activities include: 1. Plan, schedule and compute aircraft (except CFE) and GFP requirements; 2. Direct distribution of GFP; 3. Control GFP configuration, and 4. Maintain technical surveillance over GFP specialized activities.

• **Changed** Production Resources name to Industrial Resources division. MCPB, with no change in organization components and functions.



GE EXPANDS J-47 OVERHAUL SHOP

Latest view of General Electric's Los Angles aviation service center shows a portion of the J-47 repair and modification shop, which also works on aircraft generators, turbosuperchargers, armament computers and airborne instruments. The firm has spent $75,000 in improving these facilities in anticipation of a general expansion in GE's western activities, with USAF stepping up use of J-47-powered aircraft in the west. The shop also runs a school for training GE and AF personnel.

PanAm Building DC-6B Flight Simulator

● Success of Stratocruiser trainer inspires new unit.

● But company has to build this one itself.

By George L. Christian

Pan American World Airways feels that its electronic flight simulators have paid off so well, that the airline is proceeding with the construction of a "mock simulator" for the DC-6Bs it will soon put into operation.

Samuel H. Miller, PanAm's operation manager, Atlantic division, recently authorized the construction of the unit, he told Aviation Week.

PAA purchased the nose section of a DC-6 into which it will build an accurate replica of all the instruments, controls, switches and quadrants of a DC-6B cockpit. The entire system will be engineered and assembled by PAA personnel.

▶ **Partial Simulation**—Miller does not anticipate going to full simulation of all DC-6B functions initially. At first, the only units to function will be the airspeed and manifold pressure instruments, flight instruments and emergency gear. Stick forces, for instance, will not be duplicated at first. The completed unit, if full simulation is installed, will cost between $150,000-200,000.

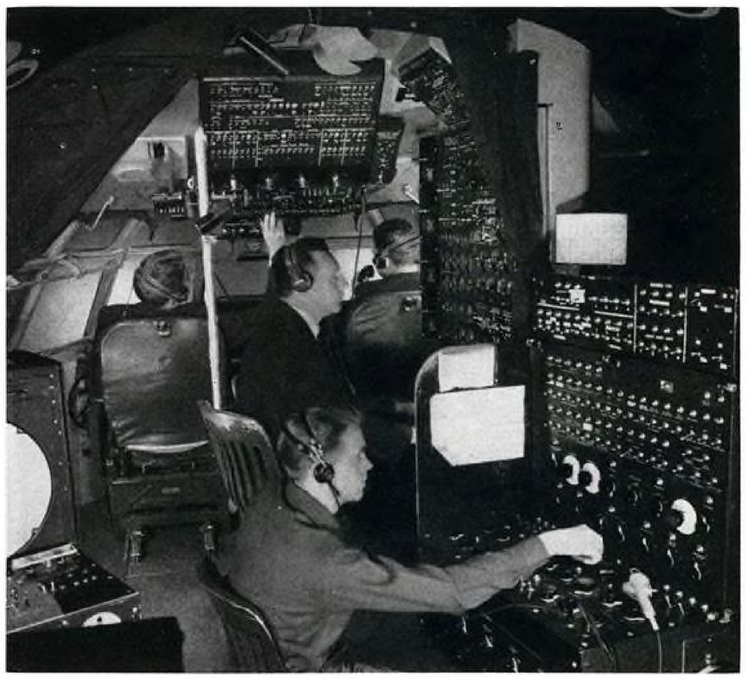
One problem facing PAA is obtaining the necessary bits and pieces from Douglas. Because of this, Miller does not foresee the completion of the unit before 8-12 months.

Miller said that PanAm flight crews, pleased with the results obtained from the Dehmel Trainer for the Boeing 377, underwrite the company's decision to go ahead with the DC-6B unit.

▶ **Training Economy**—PanAm figures that it has cut its crew flight training costs by about 60% since activating its Curtiss-Wright Dehmel program.

The more than 200 flight crews who have been trained in the Dehmel have had their actual flight training checkout time reduced from ten hours to four—and one hour's flight time on a PanAm Stratocruiser stands at $600.

Installed at PAA's LaGuardia Field base, the electronic simulator has just turned in 10,000 hr. of operation since activated in November, 1948. PanAm engineers estimate that during the 2½ years of operation the trainer lost less than 50 hr. for maintenance. This was despite utilization periods which ran as high as 24 hr. a day.



STRATOCRUISER simulator at PanAm with "flight condition" operator behind crew.

▶ **Act Right**—Greatest asset of the simulator, according to Paul Pritzlaff, PAA's chief flight simulator supervisor, is to drill flight crews in as perfect cockpit coordination as possible. Then everything else, such as procedures, handling techniques, phraseology, safety requirements, etc., falls in line almost automatically. And, above all, you achieve a "silent cockpit," so highly desirable at all times but especially during an emergency. Each crew member performs his assigned task with quiet efficiency; the confusion of uncertainty is eliminated.

▶ **Talk Right**—The simulator has also paid for itself in standardizing cockpit phraseology. A captain's orders to a co-pilot or flight engineer might mean something completely different from the sense intended.

Case in point was when a captain, seeing that he was badly undershooting his final approach in a simulated flight called for "takeoff power." The flight engineer thought the captain was being literal and took away power, he chopped the throttles. Result—"crash."

PanAm immediately established uniform phraseology for a request for more power: "full power," which could not be misinterpreted.

Still another point uncovered by the Dehmel was gyro horizon failures. While studying the causes for a number of simulator "crashes," PAA officials found many of them attributable to failures of the gyro horizon which were undetected by the pilot while flying under instrument conditions. When brought to the attention of the instrument's manufacturer, the latter promptly devised a small warning flag which alerted the crew if the gyro operation was faulty.

▶ **Safe Emergency**—The perfection of crew coordination, especially under emergency conditions of fire, engines out, severe icing and the like, can be achieved better with the simulator than with the actual aircraft, PAA feels. More realistic and dangerous conditions—which occasionally result in a "crash"—can be setup in the simulator than in the plane itself. The realism of the simulator, is intense, complete with

engine noise, sleet slapping the windshield, control forces varying with air speed, trim unbalance with assymetrical power conditions, etc.

► **Complete Course**—PanAm has worked up an extensive series of syllabuses to cover every aspect of training for its flight crews. Here are some examples:

• **Initial check out** (total of 35 hr.) consists of 16 lessons covering up to 30 items per lesson. Sample items are: fail horizon after takeoff at 100 ft.; set turbo on fire during run-up; give propeller de-icer failure while in holding pattern; indicate fire in No. 2 engine, zone 1—progress to zone 2 and 3. Break fire out again in a few minutes. The lessons also include such routine items as making route clearances and flying ILS and GCA approaches and landings.

• **Six month's refresher** and check syllabus.

• **Pilot's training** at the flight engineer's panel to acquaint the pilot with engineer's duties.

• **Crew members' refamiliarization** course given after a vacation of one month's duration or longer.

Currently, PAA requires its cockpit flight personnel (including the flight engineer) to take a 12-hour refresher course in the simulator every six months. This is accompanied by one actual flight in the aircraft.

Not only has PAA trained flight crews from its Atlantic, Latin-American and Pacific-Alaska divisions, it has also indoctrinated flight personnel of British Overseas Airways Corp. and the Military Air Transport Services.

Rain-Proof Plug

Champion Spark Plug is offering a shielded automotive spark plug to the airline industry. Big advantage of the unit the manufacturer feels is that it will end drowning out of engines on ramp automotive equipment left out in the rain.

Plug is also explosion proof. The shielded unit will be made in all heat ranges, and can be fitted to existing ignition systems without changing harnesses, company says.

Leak Detector Spots Gas Contaminants

General Electric Co. says its Type H leak detector, an instrument with a long, thin probe generally used to discover small leaks in pressure systems, has assisted at least one company in putting the finger on contaminating halogen vapors that have gotten into empty oxygen containers, improperly sealed or damaged in shipment.

The user is Zep Aero Co., which reconditions and refills oxygen bottles and tanks used in military planes. This firm, says GE, has found the leak detector can snoop deep inside the containers and flush out the minutest traces of halogens, such as chlorine. The vapors are purged before the bottle is refilled.

Oleo Drag Struts Soften 4-0-4 Landing

Oleo drag struts on the main landing gear are a feature of the new Martin 4-0-4.

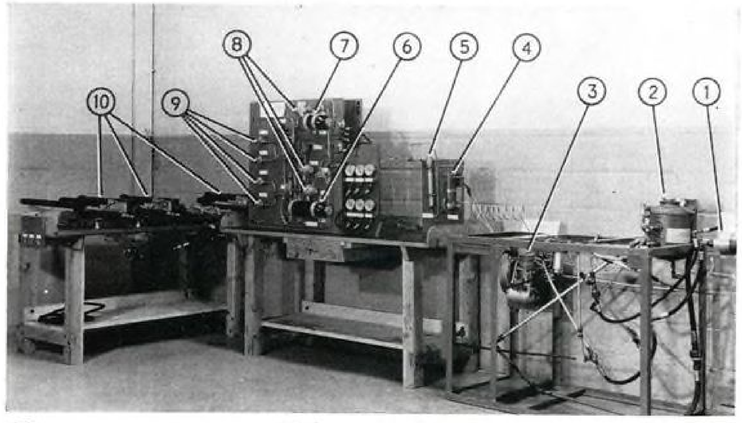
Similar in design and identical in purpose to the units on Lockheed Constellation, this is one of the first applications of the device to a medium-size transport. The Martin unit resulted from a Navy development program contract.

The simple lightweight device reduces high "spin-up" and "spring-back oscillatory loads imposed on the landing gear at touch down. Spin-up loads are "reduced by approximately one-third, spring-back loads are virtually eliminated, and the number of fore-and-aft landing gear oscillations were materially reduced," say Martin engineers.

► **How it works**—The oleo drag strut is built into the vertical shock absorber support linkage.

A steel piston in an aluminum cylinder allows the main gear to spring back approximately seven in. on landing, resulting in less strain on the structure and more comfort for passengers and crew. Oil in the cylinder is bled through a small orifice in the piston head when fore-and-aft forces are applied to the landing strut.

Air in the cylinder supplies the cushioning effect. The unit is completely independent of the aircraft's main hydraulic system and operates at 1,000 psi.



Compressor Powers Gun Charger

The first application of Walter Kidde's 4-cfm., 3,000-psi., airborne compressor to a production aircraft has just been announced by that company. Compressor will probably go on the Republic F-84 series.

Hydraulically driven, the radial, 4-cylinder, 4-stage, piston-type compressor is the prime power supply for the Kidde automatic gun charger for the plane's .50 caliber machine guns.

Its output is also used as emergency power for landing gear, flaps, etc., according to company.

Features of the system:

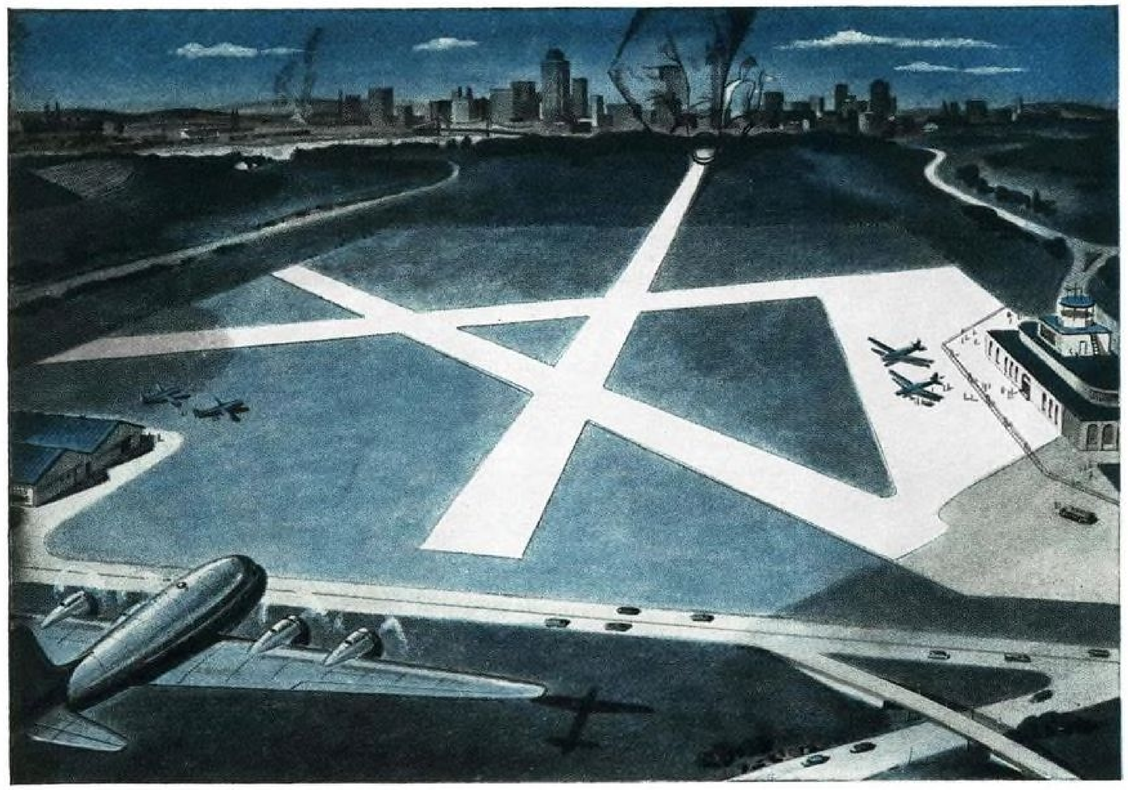
• **Dual pressure layout,** 1,500 and 3,000 psi. (Note two storage bottles on mock-up board.)

• **Pneumatic fuses** to shut off automatically any part of the system which becomes damaged.

• **Mechanical moisture separator** in series with chemical drier to keep air dry.

Each compressor is run in for 17 hr., disassembled, inspected and reassembled before shipment, according to the manufacturer. Unit weighs approximately 15 lb. and measures 11 X 8 X 5 in.

Westinghouse Decelostat®

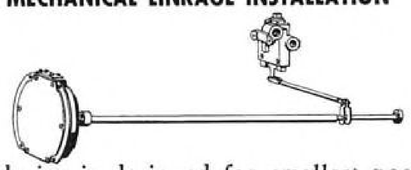


IT HELPS TO S-T-R-E-T-C-H THE RUNWAY

You put a substantial "extension" on every landing strip when you equip a plane with Westinghouse Decelostat Controller Equipment.

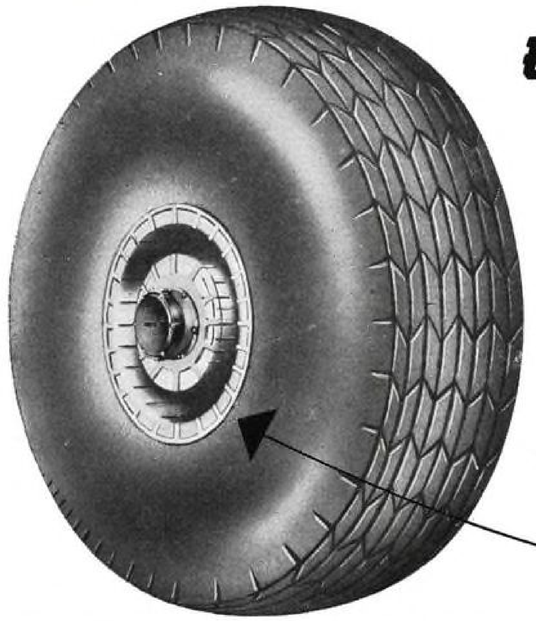
The pilot applies the selected brake pressure. The Decelostat eases and restores this pressure, as dictated by the runway condition. Slipping is banned. Tire life is increased many fold. Skidding on snow and ice is eliminated. And the maximum retardation permitted by the particular surface situation is always automatically attained.

LIGHTWEIGHT—SIMPLE—FOOLPROOF—POSITIVE MECHANICAL LINKAGE INSTALLATION



This device is designed for smallest possible size, lightest possible weight, complete simplicity and top dependability. There are no delicate parts, no complicated mechanisms.

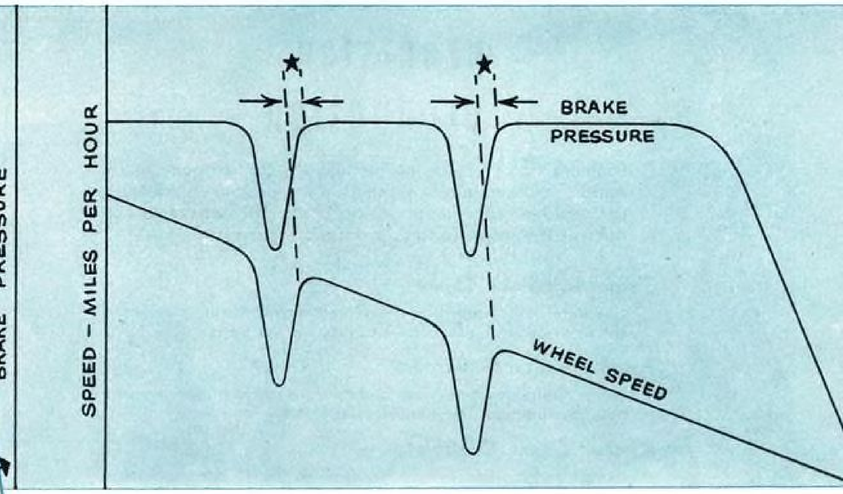
Controller Brake Equipment



ELIMINATES SKIDDING UNDER ALL RUNWAY CONDITIONS

PRODUCES MAXIMUM RETARDATION PERMITTED BY RUNWAY CONDITION...

MAXIMUM EFFECTIVE BRAKE PRESSURE AT EVERY POSSIBLE INSTANT UNDER ALL RUNWAY CONDITIONS



This diagrammatic sketch, shows at a glance the full brake pressure provided by the Decelostat's principle of operation. This full brake pressure is maintained at the wheel at all times. The Decelostat eases this pressure to conform to runway conditions—with full restoration as soon as normal adhesion is re-established.

We'll be glad to tell you more about this important Development. Write for Literature.

AIRCRAFT DIVISION of **Westinghouse Air Brake Company**
WILMERDING, PA.

NWA Confirms Order For Sperry Analyzers

Northwest Airlines is proceeding immediately with the installation of Sperry airborne engine analyzers in its fleet of 10 Boeing Stratocruisers. Don O. Benson, NWA's manager of engineering, confirmed the story appearing in AVIATION WEEK Oct. 1, p. 35.

Order adds up to 15 airborne units and one portable instrument. Included in this total is one airborne analyzer originally on consignment to NWA for the last year (performance of which was the basis of the airline's order).

Sperry is rushing one analyzer to NWA by Nov. 15 so that it may be installed in the plane which mounts the Hytrol anti-skid device on its main wheels. Reason for the rush is that the airline wants the ship with both devices installed and working to use for its survey flight to Tokyo scheduled for early December.

Sperry will deliver the balance of the analyzers on a two-a-month schedule.

NWA, almost committeed to purchasing the Sperry instrument two months ago, paused in its decision to evaluate the Scintilla analyzer because of its reduced cost. Final decision was to go along with the Sperry unit, however.

Total bill is reported to be $72,000.

Small Jet Starter

A 380-hp. jet engine starter with enough muscle to wind up Sapphire's turbine compressors to 2,000 rpm. in 3½ seconds has been announced by the Eclipse-Pioneer division, Bendix Aviation Corp.

The starter, the size of an average typewriter, and weighing 75 lb., develops as much torque as two Cadillac cars, according to the manufacturer.

NEW AVIATION PRODUCTS

Jet Engine Dolly

A "rollover" dolly, designed to facilitate production and maintenance work on jet engines, is one of the recent developments of Towsley Trucks, Inc.

The rig already has added to the production-line efficiency of leading jet engine manufacturing plants, according to the firm. Guide brackets can be installed under the dolly frame for assembly line conveyor belt operation.

Two steel rings, from which the engine is suspended, are carried on rollers in the dolly frame. The rollers permit the rings with engine to be rotated to any work position. Rings are held rigid at the desired position by a locking foot-brake, operable from either side of the dolly.

Further security against accidental upsetting of the engine is insured by special hold-down clamps on the rings, company claims. The complete dolly weighs 570 lb.

Towsley Trucks Inc., 1766 Elmore St., Cincinnati 23.

Hydraulic Clamp

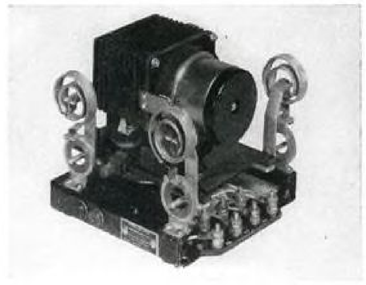
A new split-flange clamp, designed to permit simpler coupling of hydraulic lines, has been developed by the Anchor Coupling Co., Inc.

The part eliminates threaded joints, simplifies installation, and positively seals against leaks, says the firm. A small, automotive type wrench for assembly takes the place of big pipe wrenches and thread compounds when

this clamp is used, it explains.

The clamp can be used for high, medium or low pressure service with either clamp or pressed-on type couplings in straight or angle styles for one- or two-wire braid hose from ½ to 2 in. i.d. The clamp incorporates an O-ring seal that eliminates the need for tapered threads. There is no wedging action to cause distortion of valve bodies, cylinders, and other hydraulic components, the company states.

Anchor Coupling Co., Inc., Libertyville, Ill.



GE, BuAer Mount

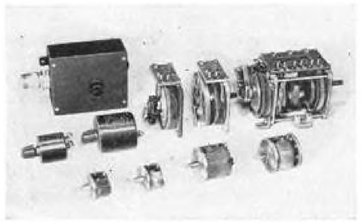
A new "center-of-gravity" mount for aircraft d.c. voltage regulators, exhibiting a novel spring support and providing "superior vibration resistance in all attitudes of mounting," has been developed by the General Electric Co. in cooperation with the Navy Bureau of Aeronautics.

The new vibration isolation mount, said to have constant characteristics over a wide temperature range, is designed to meet requirements of AN17R21 and ANB30. It is capable of withstanding a shock or sustained acceleration of 10G, will absorb vibration deflections of 0.6 in. (total travel) when subjected to simple harmonic motion at frequencies of 10 to 55 cps. and amplitudes corresponding to 10G from 60 to 200 cycles. It also meets 25-hour salt-spray tests.

The voltage regulator is isolated from vibration by four phosphor-bronze laminated spiral springs with copper braid sleeves. Located at the corners of a movable base, the springs at their inner ends are equidistant and in the same plane as the c.g. of the device to be protected. The outer end of each spring is secured to a rigid mount, and the inner end to a movable base. This arrangement permits the regulator to be mounted in any plane and subjected to shock in any direction, say GE engineers. They explain that since the c.g. of the device is equidistant from the movable ends of the springs and in the same plane, unbalanced movements of the device are eliminated.

Excellent vibration-damping effect is attained, GE says, by constructing the springs so the natural frequency of the inner lamination is different from that of the outer, allowing one lamination to snub the other if it becomes resonant. Four silicone rubber grommets inserted in the spring supports act as stops under severe shock conditions.

General Electric Co., Schenectady 5, N. Y.



Aircraft Transformer

A line of space-saving, lightweight variable transformers for high frequency duty in aircraft have been placed on the equipment counter by Superior Electric Co.

A variety of units (as shown above) are available in a multitude of voltage and current ratings in single and polyphase models. Called "Powerstat" variable transformers, they are built for operation at frequencies of 400 cycles and higher.

Superior Electric Co., Bristol, Conn.

New Refrasil Uses

Important new uses for "Refrasil," fibrous silica insulation developed for use with jet engines, are seen by the manufacturer, H. I. Thompson Co.

The product originally was developed in batt form to Air Force specifications to meet a need for a lightweight, removable insulation blanket capable of protecting personnel and aircraft structures against high heat generated by jet engines. According to Thompson, it gives maximum protection up to 1800 F, at less than one-half the weight of comparable materials.

Refrasil now is available in a number of forms—cloth, tape, sleeving, batt,

bulk fiber and cordage. The material is said to be applicable to thermal and electrical insulation problems, encountered with avionic equipment. Among sleeving applications, it has served as electrical space separators in thermocouple leads. Braided sleeving has the chemical properties of vitreous silica, is recommended where minimum bulk, lightweight and flexibility under high temperature conditions are essential.

Timing Drive

A "second-to-month" multispeed timing drive, providing a wide range of speeds in one simply constructed device, has been developed by Gorrell & Gorrell.

The unit can be used as an instrument drive, for disc- or chart-moving in research activities, time and sequence control, and can be incorporated into equipment of your own make. It is a synchronous motor-driven, geared power drive. One knob selects the speed desired. Straightforward mechanical design keeps maintenance down, says the designer. Various speed ratios are obtained with only two moving shafts.

The unit, called "SM" drive, has 13 speeds, ranging from one turn of the output shaft each second to one turn per month. The shaft delivers 20 oz. in. torque at every speed. The unit is priced at $65. Simpler drives also are available.

Gorrell & Gorrell, Haworth, N. J.

ALSO ON THE MARKET

Klystron d.c. power supply voltage regulator keeps output at 18,000v. d.c. for load current variations from 0 to 100ma. and line voltage variations from 105 to 135v. a.c. Unit has all-magnetic amplifier circuit—no vacuum tubes. General Magnetics, Inc., 135 Bloomfield Ave., Bloomfield, N. J.

Plastic traffic markers for airports, eliminate painting lines, are said to retain original brightness over long period. Cost of markers, which can be laid by two men at rate of 100 per hr. and spaced two ft. apart, can be amortized against cost of original painted line and first repaint job, says maker, Traffic Safety Supply Co., N. E. Sandy Blvd., at 27th, Portland 12, Ore.

Shell molding, formerly known as the "C" Process, is discussed in an eight-page booklet. The process calls for a dry sand mixture containing special phenolic resins and is being widely used in aviation and other industries. Write Borden's, Chemical division, 350 Madison Ave., New York.

FINANCIAL

Collins Rides Up on Avionics Boom

• Here is a company that concentrated its postwar efforts on military electronics—and found it paid off.

• For example: $175-million backlog is nearly four times 1950's, and sales are on the way to passing 1944 peak.

Spectacular gains in the aircraft industry are by no means confined to the large giants. One of the more interesting growth situations in the fast developing avionics field is Collins Radio Co. This is highlighted by the company's recently released annual report for the year ended July 31, 1951.

►**Backlog Boom.**—Unfilled orders at that date reached $175 million, compared with only $45 million a year earlier, and but $21 million on July 31, 1949. This substantial backlog has been developed on a net worth equity of slightly more than $6 million on July 31, 1951, increasing modestly from the $5.1 million shown two years earlier.

> **This would indicate a measure of unfilled orders to equity of about 29 to 1 for Collins. This same measure for other major avionics companies average around 5 to 1.**

Collins attributes its progress to concentration on a wide range of new electronic products for the military in the immediate postwar period.

To meet production demands, Collins is expanding its facilities at Cedar Rapids, Iowa, establishing new facilities at Dallas, and resorting to extensive subcontracting.

►**Sales Rising**—It is believed that the company is now moving into volume production which promises to dwarf the total sales of $19,495,577 reported for the year ended July 31, 1951. Sales for the six months ended Jan. 31, 1951, totalled $5,853,000, indicating billings of more than $13.6 during the subsequent six months. Unfilled orders are reported to represent contracts for some equipment on which peak production rates had been reached, some in the build-up phase, and others in various stages of development.

The impact on earnings of expenditures to attain volume output is reflected in the low profits ratio reported for the past fiscal year. The tooling or "start up" costs were represented chiefly by the industrial engineering and planning, factory re-arrangement, training of personnel, placement of subcontracts and related activities.

As a result, the net operating profit, before taxes, for the year ended July 31, 1951, was $1,098,000, or 5.6%, on a sales volume of $19.6 million. This compared with an operating profit of $1,144,000, or 9.1% on sales of $12.6 million for the previous year.

►**Fixed-Price Squeeze**—Military contracts do not always carry assurance of profitable results. Collins, for example, reports that certain contracts currently in process or recently completed were entered into over a year ago on a fixed-price basis. As costs rose the profit margin was reduced, or completely eliminated in some cases, with losses resulting.

Most of Collins' research and development contracts have been, and continue to be, placed on a cost-plus-a-fixed-fee basis. Several, accepted on a fixed-price basis were carried out at a loss, but are expected to lead to substantial production contracts.

> **In almost all instances, current production contracts include provisions for price redetermination upon completion of an agreed portion, at which time prices may be decreased or increased.**

Ceiling limitations are applicable in some instances to price increases. This more flexible arrangement, while not affording complete protection, is considered by the company to be adequate.

In general, contracts containing these protective features have been negotiated at somewhat lower profit rates than commonly proposed for fixed-price arrangements. Greater volume, however, may be expected to produce an improved level of earnings. As with all government contractors, most of Collins' military orders will be subject to over-all renegotiation as well as individual contract repricing.

►**Credit Lines**—To help meet its increased level of activity, Collins has arranged for various bank credits. The main credit is represented by a $10-million V-loan established in May of this year. At July 31, 1951, $6.3 million of this amount was drawn down. This total credit is guaranteed to the extent of 85% by the Air Force.

In addition, a term credit of $1.5 million was negotiated earlier this year to finance expanded equipment requirements. This loan is secured by a first mortgage on the company's Cedar Rapids plant and on machinery and equipment. Only $846,000 of this credit was drawn down by July 31, 1951.

As of that date there were other borrowings of $900,000, but the company's other loan agreements provide that this debt be retired by Nov. 10, 1951, presumably through the V-loan arrangement.

For the fiscal year just ended, Collins received certificates of necessity for facilities at Cedar Rapids and Dallas, aggregating $1,680,649. Of this total, 80% will be subject to a five-year special amortization.

►**Improving Position**—The company shows a progressive improvement in its financial position. Net working capital amounted to $4,556,794 at July 31, 1951, compared with $4,206,440 a year earlier. Net worth was at an all-time peak, $6,076,967, or $17.10 per common share at the last fiscal year-end.

Collins has a simple capitalization. Preceding the 310,116 shares of common outstanding are 16,280 shares of preferred. It is known that the Collins family owns more than 50% of the common stock. The business was founded in 1933 and incorporated in 1937.

A graphic measure of the company's growth is revealed by sales of $2.2 million in the fiscal year ended July 31, 1941 reaching a war-time peak of $47.3 million in 1944.

This top is now well on the way to being surpassed during the current fiscal year.

►**Avionics Interest**—Collins' success stems from extensive development work in equipment for radio communication. This equipment has many peacetime as well as military uses, including areonautical ground station and airplane communications equipment for commercial airlines, air traffic control systems, shore to ship radio telephone service, interzone police networks, emergency communication apparatus for railroads, plantations, forest reserves and oil fields.

> **At present, however, the military are the main customers of the company.**

But management remains cognizant of the commercial markets and reports that it is agressively pursuing its development in this field as well.

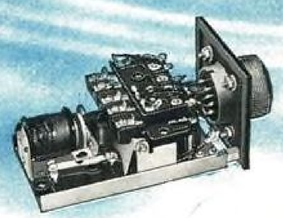
The rapid growth of Collins is a reflection of the creation of improved and more advanced products which, in a large measure, have created new markets. —Selig Altschul

The A-C Control Panel includes an automatic voltage regulator, an exciter control relay, an exciter protection relay, and three differential current protection relays.

Aircraft alternator voltage regulator

Partially disassembled differential relay protection assembly

Circuit breaker (Cover Removed)



Exciter control relay (Cover Removed)

Exciter protection relay (Cover Removed)

Current transformer

Millions of Air-Borne Kilowatthours Protected by Westinghouse A-C Control

Westinghouse offers actual service-tested components for complete control and protection of a-c power systems. Exciter field relays, circuit breakers, differential relays, exciter protection relays and voltage regulators have accumulated millions of successful operating hours under flight conditions.

As individual units, or built into compact control panels, their design reflects years of engineering and operating experience.

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Our latest plug-in control panels, for example, offer space and weight savings, simplified airplane wiring and installation. They minimize ground time and reduce maintenance costs.

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Westinghouse

LEADER IN AVIATION EQUIPMENT

Do Nonskeds Hurt the Airlines?

Revenue passenger traffic comparison, 1949-50, shows that regular airlines' business grows fastest on the two most competitive routes, served also by the nonsked air coaches.

	March			September		
	1949	1950		1949	1950	
N. Y.-Los Angeles routes, AAL, TWA, and UAL	6,661	8,175	Up 23%	7,877	11,202	Up 42%
All other routes of the same airlines	502,969	438,705	Down 13%	658,972	714,353	Up 8%
N. Y.-Miami route, National and Eastern	21,124	38,887	Up 84%	11,159	18,151	Up 63%
All other routes of the same airlines	208,996	231,445	Up 10%	200,770	235,704	Up 17%

SOURCE: Figures from dissent of CAB Member Joseph Adams in Transcontinental Coach decision; taken from official CAB Surveys of Traffic Origination and Destination, March and September, 1949 and 1950.

CAB Kills Coast-to-Coast Nonskeds Plea

● Certificates denied to 4 lines; sked service praised.

● But Adams hits Board's 'wait and see' attitude.

By F. Lee Moore

CAB has slammed the door in the face of any new transcontinental air coach certificates as "destructive and unnecessary competition" to existing long-established transcontinental airlines.

► **Praise Low Fares**—The official policy ruling by a 4-1 vote forecast that the new CAB investigation into what to do about nonsked airlines would doom further large-scale supplemental service.

Specifically the Board denied the applications for certificates filed by four nonsked airlines: Air America, California Eastern, Trans American and Great Lakes Airlines. But it made clear that these were rejected without considering their individual merits. In a blanket policy decision, CAB said that any supplementary coach service whatever, beyond that which the regular airlines see fit to schedule, is not in the public interest.

At the same time in its remarks the Board's coach opinion praised the air coach development work of American and TWA so far, and took an indirect swipe at United for holding back on coach-type service. It was the strongest Board expression yet for low-cost air coach service. The opinion even plugged for "extension of the benefits of low-fare coach services to the less profitable shorthaul operations and smaller cities . . . insofar as it may be economically attainable."

Air Coach Load Factors of Regular Transcontinental Airlines*

MONTH	AMERICAN	TRANS. WORLD
July, 1950	91	89
August	92	89
September	91	86
October	84	82
November	78	74
December	84	77
January, 1951	85	83
February	84	77
March	91	86
April	91	87
May	89	87

* Load factor is percentage of aircraft seating capacity used. United Air Lines is not listed because of its limited experience to-date with transcontinental coach. *SOURCE: Civil Aeronautics Board, Form 41 reports, cited by CAB Member Joseph Adams in Transcontinental Coach case dissent.*

► **Adams Dissents**—CAB Member Joseph P. Adams made fact-packed dissent to the Board's generalized policy opinion, although he concurs in the decision not to grant an unlimited certificate to any of the applicants in the case.

A leading airline attorney in Washington commented that CAB's strong stand for coach development is a signal achievement of the nonsked airline pressure on the Board; thus, he pointed out, the nonskeds have contributed to the national welfare and, ironically, the scheduled airline welfare. But he added that the majority opinion is "shockingly devoid of supporting data and appears to be timed to escape congressional fire, in that the announcement was held some months until Congress should recess." (CAB Member Adams started writing his dissenting opinion last June.)

One former CAB member asked for comment stated that, although he had not studied the case carefully, its problems appear analogous to the air freight case settled two years ago. In that case, CAB voted to certificate nonsked air freight carriers. CAB then reasoned that although there would be increased competition for the regular airlines, opening up the air freight "potential" would mean that "everyone's freight business would increase and the public welfare would be enhanced," the former CAB member said.

► **Policy Challenged**—Adams' dissent in the transcontinental coach case challenges the Board's policy opinion on many counts, among them:

● **Not granting special exemptions** to one or more applicants to operate a "demand type" coach service subject

to CAB control over flight frequency.

• **Forgetting the public demand** for such service as evidenced by 450,000 nonsked passengers carried 760 million passenger miles in 1950—nine times the potential passenger business CAB previously figured was enough to warrant granting a transcontinental route to Northwest Airlines.

• **Hesitant attitude of CAB** in waiting for the subsidized airlines to ask to tray "experimental" air coach service on a limited basis, and continuing to wait for them now to fill the "vacuum" they have left—about a million passengers now carried annually by the nonskeds. Says Adams (quoting the Civil Aeronautics Act): "The duty of the Board is to see to it, in such a situation, that service is provided."

And he adds: "As this is being written, the second largest metropolitan area on the entire Pacific Coast, the San Francisco-Oakland Bay area is completely without transcontinental certificated air carrier coach service of any kind after five years of initial air coach operation by some irregular carriers."

• **Absence of figures or proof** in the CAB majority opinion, on the question of whether or not the non-subsidized air coaches create more business for the regular lines than they divert from them. "At no point in the majority's decision can I find, for example, even an allusion to the substantial volume of traffic generated by operators such as the applicants in this case. Such an omission, in the light of other Board decisions both before and after the war, is patently unfair and unexplicable, unless, of course, the majority feels that on this point, the less said the better."

Adams, in his opinion, submits the only specific figures appearing in the CAB decision (see tables). These show that on the two routes where nonskeds have concentrated, the traffic of the competing scheduled airlines has increased an adverage of five times as much as on all other routes of the same scheduled airlines.

This disproves the contention, says Adams, of the CAB majority that nonsked or specialized air coach operations must of necessity divert more traffic from than they give to the established airlines. Additional data by Adams shows that American Airlines' transcontinental air coach service has run an extraordinary 99% load factor consistently and TWA has done almost as well.

Needed: New Yardstick for Pilots

UAL head says: Sure, airplanes aren't worth a nickel without men to fly them—but let's get the right men.

Airline management's old argument for selection of pilots on the basis of psychological and physiological standards, bitterly opposed by Air Line Pilots Assn., has been revived by W. A. Patterson, president of United Air Lines.

Patterson recently told a group of aviation writers that there is an "urgent need" for development of a scientific method of pilot selection, but added that human variables are very intangible and a stable yardstick has yet to be established.

► **Erratic Mind**—"If you find an erratic instrument on an airplane, you ground it," he pointed out, "but how do you know an erratic mind is not piloting it?"

A $4-million aircraft is not worth 5¢ without a human mind in it, he added, but "just because a man can fly a plane doesn't mean he is an airline pilot."

Airlines must see to it that pilots maintain a continuous, abiding interest in their profession of flying, Patterson said. He believes that with only 70 hr. a month flying, pilots are tempted to develop outside interests—real estate, radio shops, etc.—which take their minds from their all-important job of flying a commercial plane.

He emphasized that pilots need adequate rest, but said they also should keep abreast of latest flying developments. He cited United's Rube Wagner as an example of a pilot who has been flying for many years and who has kept himself a modern pilot by constantly keeping abreast of new techniques.

UAL's president reasoned that with pilot salaries ranging up to $18,000, the airlines should get the best.

► **Discipline**—While he said he had nothing against Dave Behncke, Patterson expressed hope the shakeup in ALPA would result in a better relationship between management and the union. "We must be able to get together with the new organization."

United's expenditure of $65,000 and four years to make final the dismissal of a pilot involved in a fatal crash was pointed to as an example of management's problems with a union. Such costly and lengthy procedure, Patterson said, develops timidity on the part of management in maintaining discipline. "The union should be as anxious as the airline to get rid of an incompetent man."

On the physiological side, Patterson pointed out that the cost of UAL's medical department equals the cost of only one Pratt & Whitney engine; and the cost of giving one pilot a physical examination is negligible compared to overhauling one engine.

► **On New Planes**—Turning to the subject of new equipment, he said it is obvious the next move will be to the jet or turboprop transport. But, he warned, the jet is potentially a dangerous piece of equipment, and with its advent an airline will have to change completely the minds and mental processes of thousands of employes.

All employes will have to discard a great deal of their previous training and ways of doing things and adapt themselves to the new machines. One current feature pilots will be reluctant to give up is the reversible pitch propeller.

And management's problem is the tremendous gamble an airline makes when it commits itself to the purchase of a new type of aircraft. He estimated that the jet transport UAL eventually will cost between $2 and $4 million. "And if you guess wrong, you can go bust."

► **Cost Data**—Patterson does not think any one airline or airframe manufacturer can afford the approximately $20-million cost of building a jet transport prototype. He said it might be done as a joint effort, but pointed out that the $20-million figure is a manufacturer's estimate and "I always find it well to add 50% to the estimate."

He said it probably would be a wasteful effort to install turboprop powerplants on DC-6 type aircraft, because "the engine wants to fly high but the wing wants to fly low."

UAL's president conceded that the British are currently ahead of us in jet transport development, but sees no cause for anxiety. The terrific expense of being first might annul the advantage. It's a big gamble, but if the British jet accident rate is comparable to that of piston-engine aircraft and the cost of operation is reasonable, the British will have a definite advantage.

But if the contrary is true, the advantage of being first will be costly.

► **Jet Specs**—Patterson does not see the possibility of a commercial jet in production quantities in the U. S. for seven years. UAL undertook its own research to develop specifications for a pure jet and a turboprop transport a month ago.

Following the same philosophy which resulted in the DC-4, United is choosing a panel of leading specialists to draw up the specs, which will be turned over to an unspecified manufacturer. He estimates it will take about five years to develop and build the prototype and another two years to get into production. If the British get too far ahead, U. S. airlines might be forced to buy some British aircraft in the interim.

As to size, Patterson pointed out that when the DC-4 was designed for 50 passengers, the airlines were carrying about 44% of first class travelers. Now they carry 54%, so the seating capacity should be increased in that proportion.

► **Less Maintenance**—Theoretically, a turboprop or jet aircraft should cost 50% less to maintain than a piston-engine plane because of reduction in the number of moving parts and because decreased vibration is easier on airframe, instruments and components, according to Patterson.

He believes it is essential that commercial and military requirements be dovetailed because of limited manufacturing facilities for jet transports.

Tracing the increased costs of aircraft to the expected $2-to-$4-million jet, Patterson said cost of UAL's first plane was $7,000, rose to $70,000 for the Boeing 247, $90,000 for the DC-3, $300,000 for the DC-4 and $1 million for the DC-6B. "In the old days, if you guessed wrong (as we did on the 247) you could survive your error," he added.

—GLC

DC-6 Credited

Development of the DC-6 is credited by United Air Lines' president, W. A. Patterson, with bringing the "big four" U. S. airlines out of federal subsidies and into self-sufficiency.

Patterson said use of the larger planes and establishment of a 45¢ a ton mile mail rate has made it possible for the major airlines to operate at a reasonable profit for themselves and the Post Office Department.

The sole remaining point of possible outside criticism in the way of unpaid assistance, according to the UAL chief, is the airlines' use of federally supported airways. He said carriers pay enough to cover a portion of this expense, but added that a fair, workable formula should be established so that all users, including military, scheduled and nonscheduled airlines, private and executive aircraft pay their proportionate share of the expenses.

When such a formula has been devised, Patterson said UAL is prepared to pay its share.

Italian Airlines Ask Aid to Buy Planes

(*McGraw-Hill World News*)

Rome—Italian Air Line (LAI), partially owned by Trans World Airlines, has asked the government to finance purchase of two additional DC-6s and a series of Martin 4-0-4s to replace DC-3 equipment now used in Europe.

Counting Noses

• ATA to try continuing sample survey of traffic.

• If it works, system will be turned over to CAB.

Airline operators, investors, and government regulators may soon have a valuable airline economics analysis tool they haven't had before. From a continuous sample survey of airline traffic origination and destination they will be able to tell—as of less than a month before—each airline's traffic:

- To and from each city.
- Between pairs of cities.
- By length of haul.
- Any other statistics derivable from current data on every airline's traffic pattern and passenger volume distribution.

The Research Department of Air Transport Assn. is developing the sample survey technique to do this now.

First test of the continuous traffic survey is scheduled for this coming March. That is the month of the next complete CAB survey of airline traffic origination and destination.

▶Compare Samples—ATA Research Department will compare its experimental March sample with the full CAB count on every U. S. scheduled airline traveler's ticket.

If this final test of the sample technique proves the success observers expect it to be, and CAB adopts it, it may replace the present twice-yearly tallies. These past March and September analyses, if they appeared at all, have come out about 1½ years late, and have been of more historic than useful interest.

The sample survey could appear continuously all year 'round and be up to date within three to four weeks, all the time. It would also be cheaper to collect, process and publish, observers believe.

▶Surveys Needed—The regular CAB traffic surveys of each March and September have been operated by each airline sending all its March and September ticket tabulations to CAB each year. CAB then processed and printed the route analysis figures. But the Budget Bureau cut the CAB fiscal 1950 budget and indicated informally that these surveys were among the items that could stand cutting since they were so inefficiently handled.

CAB did not publish a September, 1949 survey. Because the airlines need the surveys, as late as they have been, the Air Transport Assn. decided to print the September survey on its own. Now CAB has the March, 1950 survey processed but not printed. And CAB hasn't yet finished processing the ticket stubs sent in by the airlines for September, 1950, over a year ago.

By this December, the ATA Research Department will have worked out and checked the detailed sample techniques considered adequate to cover traffic of every airline terminal in the country. These sample techniques will have been developed from and checked against known statistics of the old complete origination and destination of September, 1948, March, 1949, September, 1949, and March, 1950.

ATA Research Department will then report to the industry. If the airline industry believes the ATA-developed system will reduce cost and increase usefulness of the traffic surveys, then the system will be transmitted to the CAB. From there on it's up to the CAB.

▶Test Flight—Thus, ATA will have underwritten prototype development of the sample traffic survey system and given a production model to CAB. What CAB does with it will be up to the Board and the Budget Bureau.

Here are the advantages of the continuous sample survey over the present history-book system of CAB:

Under the present twice-yearly complete month survey system, every ticket sold in March and September has been laboriously collected by the airlines and sent to CAB. In a year or so CAB has had time to process and perhaps print the results. The tickets taken in those two months have accounted for 17% of all tickets sold in the year.

▶Sample Tickets—The job came all in a lump twice a year, requiring over-time work and caused congestion on statistical facilities.

The continuous sample surveying system now under ATA development would take a total of only 5-8% of of tickets sold. The work load would be continuous over all weeks of the year. The information would be current—not a year or two old.

The current problem ATA researchers are mulling over is the smaller terminal. In statistics, they say, the smaller the volume to be sampled, the more frequent the random sample must be to get a reasonable degree of accuracy.

ATA researchers are shooting for accuracy limits of about plus-or-minus 1%.

Although the continuous sample reports could be kept up to date within 30 days all the time, observers doubt a government office, in this case the CAB, would publish the figures that currently. But it is expected CAB would do better than 60 days.

The Airline Research Conference at Atlanta Nov. 29-30 will study and appraise ATA research on this project to date.

Airlines See Trouble From New Gasoline

Domestic and international airlines expect increased engine maintenance difficulties starting this month, as they begin getting aviation gasoline of higher lead tetraethyl content. Plug fouling will be a problem, they anticipate.

Petroleum Administration for Defense has refused to withdraw an order to refiners to raise lead content of commercial aviation gasoline. Lead content is increased to 4.0 cc. per gallon for domestic, 4.6 for international operations. It will affect airlines as local inventories are replaced by post-November refinery runs.

A PAD official says the high-octane gas shortage requiring the increased tetraethyl content probably will last six months. This depends on military flying operations and on when the Abadan, Iran, refinery again starts supplying aviation fuel.

Airport Aid Slashed

Federal aid to airport construction for fiscal 1952 will total $15,030,607—28% less than President Truman asked Congress for it.

It will be spread among 226 different

projects; it will be the 1952 addition to $166,537,603 federal money already spent in the Federal Aid Airport Program since World War II; it will be matched 92% by local and state governments, who will put up $13,821,132 to make the total '51 program $28,851,739.

Of the total federal and local airport program, $27,108,073 is for construction within the continental U. S. and $1,743,666 is territorial.

Only two states will receive over $1 million in federal aid in fiscal 1952: California with $1,048,525 federal aid split among 12 airports and Texas with $1,023,070 split among eight airports.

Near East Airlines Completes Airlift

(McGraw-Hill World News)

Tel Aviv—Near East Airlines has completed airlift of 110,000 Iraqui Jews in a mass repatriation from Bagdad to Lydda and now is evacuating between 2,000 and 3,000 Persian Jews a month in operation "Cyrus."

Officials of Jewish Agency's Immigration Department said per person cost of the Bagdad-Lydda airlift was $70, which was reported paid by the American Joint Distribution Committee. Immigrants contributed 15 dinars each for other travel expenses.

NEAL is using DC-4 Skymasters in the repatriation movement and is carrying 80-100 persons per flight.

After the Persian operation is completed, the entire 1,900-member Negro-Jewish community of Malabar province in India is expected to be airlifted.

Study Civil Aviation

(McGraw-Hill World News)

Rome—A government commission, studying the problem of reconstruction of Italian civil aviation, is expected to request financial aid for development of airport equipment and aircraft construction, following a series of meetings with officials of four major Italian companies operating international airlines.

SHORTLINES

► **All American Airways** faced a possible pilot strike last week over wages and working conditions and is seeking arbitration under the Railway Labor Act following breakdown of mediation efforts.

► **Braniff Airways** reports nine-month net profit of $1,432,000—a record nearly doubling January-September earnings of $769,000 a year ago.

► **British European Airways** reports a profit of £243,000 for the first six months of fiscal 1952. But for a labor dispute costing £150,000 and delays on introducing the new Elizabethan transports, the profit would have been £500,000, the company says.

► **California Central Airlines** has added a new daily non-stop schedule Los Angeles-San Francisco using newly acquired Martin 2-0-2s.

► **Canadian Pacific Air Lines** expects to schedule two Sydney-Honolulu flights a week with Ghost-engine jet comets to be delivered late next year. Longest single stage of route is 2,000 miles, Sidney-Fiji. Long Honolulu-West Coast flight will be by DC-6B until CPA gets the Avon-engine Comet.

► **Capital Airlines** has created a permanent safety committee to place "further emphasis on the all-important factor of safety." Employes are urged to make suggestions. Flight Operations Manager H. J. Reid is chairman.

► **Civil Aeronautics Board** has ordered nonsked New England Air Express to show cause why its letter of registration should not be revoked for alleged "deliberate disregard of the rights and welfare of the traveling public."

► **Colombian Airlines** reports a 28% increase in domestic business and 94% gain on Bermuda business for September over a year ago.

► **Continental Air Lines** President Robert F. Six says the airline approves the CAB proposal of merger with Mid-Continent. "For the past decade, Continental . . . has energetically worked toward mergers . . ." says Six.

► **Eastern Air Lines** reports net earnings of $3,890,983 or $1.62 a share for the nine months to September, in its "17th consecutive year of profitable operation." This compares with $1,746,000 or 73 cents a share a year ago.

(*Continued on page 91*)

(*Continued from page 88*)

► **El-Al,** Israel national airline, may use alternate routes from Tel Aviv to Johannesburg "if conditions in the Middle East lead to temporary difficulties on its present route."

► **Mid-Continent Airlines** reports net profit of $35,293 for September and $165,586 for nine months . . . has declared a 25-cent dividend for stockholders of record Dec. 10.

► **Midet Aviation Corp.** has CAB permit to operate between Florida and Grand Bahama island for three years. In selecting Midet, CAB said the route requires a "highly specialized local service."

► **Military Air Transport Service** traffic officers are studying traffic and cargo handling by Pan American, Slick, Flying Tiger Line and Trans World.

► **Mid-West Airlines** will get about a $1-million improvement program if CAB approves the Purdue Research Foundation proposal to buy the local service airline, according to attorney for the foundation.

► **Northwest Airlines** must pay back $645,000 mail pay for overpayment on Pacific routes Sept. 26, 1946, to Dec. 31, 1950. Domestic payments have been about right during the period, CAB says, but adds that it is a matter of "serious concern" that the airline needed its heaviest mail payment in 1950, a time when the industry generally was getting record business. . . . NWA reports net earnings of $1,464,423 for nine months to Sept. 30 this year compared with a loss of $773,721 reported a year ago.

► **Pan American World Airways** Atlantic division reports a gain of 16% to 267,439 passengers carried January-September this year compared with last. . . . On Dec. 3 PanAm starts first direct air service linking Central America with the U. S. West Coast by its new route Los Angeles-Guatemala City.

► **Seaboard and Western Airlines** reports its freight traffic more than doubled for the third quarter of this year over last, to 6,405,300 ton miles on its North Atlantic commercial route and as a contract carrier on the Pacific airlift. Biggest gain (146%) was on the commercial haul to Europe and the Middle East.

► **Slick Airways** reports low freight rates and speedy DC-6A service helped make October its record month, with 6,656,985 ton miles carried. . . . Directors have decided to consolidate and streamline its management and geographical department system.

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23	20100-11C-4-A1	Eclipse	Magnesym Wing Flap Ind.
40	23000-2A	Eclipse	Position Transmitter
25	46N2	Jaeger	24 Hour Clock

MISCELLANEOUS COMPONENTS

44	5BA25DJ4B	G. E.	DC Motor (3½ HP)
83	A4934	Delco	Motor
50	RBD2220	Holtzer Cabot	DC Motor
49	FD65-5	Diehl	Motor
47	FD65-6	Diehl	Motor
116	A371205	Dumore	Motor
780	A371206	Dumore	Motor
115	P4CA2A	Parker	Primer
80	AN3213-1	Scintilla	Ignition Switch
568	A-9 (94-32226)	Nasco	Ignition Switch
687	RS-2	Mallory	Selector Box
90	JH950-R	Jack & Heintz	Starter Motor
492	S-841 (94-32253)	Electronic Labs	Box
6	FA122	Wallace & Tiernan	Flasher
1000	T3018-A	Bendix	Interphone Box
140	K14949E	Marquette	Windshield Wiper Kit
40	3123-3A	Eclipse	Warning Unit
198	EYLC-2334	Berber-Colman	Control
11	12086-1C	Eclipse	Amplifier
174	450-0	Skinner	Gasoline Filter
250	558-1A	Eclipse	Oil Separator
100	564-2A	Eclipse	Oil Separator
100	716-3A	Eclipse	Generator (NEA-3A)
5	656536-421	Sperry	Controller Pedestal (A-12)
37	117-47	Edison	Detector
89	318	Edwards	Horn
280	921-B	Stewart-Warner	Heater (200000 BTU)
340	981280	Kidde	Co2 Cylinder
85	12924-2	Adel	Lock Valve
90	923748	Kidde	Oxygen Cylinder
80	DW98	Eclipse	Transformer
97	6041H-146A	Cutler Hammer	Relay (B-12)
22	0655-D	Aro	Oxygen Regulator
22	M-2031	Air Associates	Actuator
148	PG208AS1	Minn. Honeywell	Air Ram Switch
33	DW47	Eclipse	Transformer
11	DW33	Eclipse	Transformer
65	ASDC2	CO2 Mfg. Co.	Fire Detector
750	ND21	American Gas Accumulator Co.	Time Delay Relay
30	UA-3150	United Air Prod.	Oil Temp. Reg. 5"
29	UA-3160	United Air Prod.	Oil Temp. Reg. 6"
95	UA-3160C	United Air Prod.	Oil Temp. Reg. 6"
73	UA-6007-CF-DV5	United Air Prod.	Oil Temp. Reg. 7"
14	UA-6009-S-30	United Air Prod.	Oil Temp. Reg. 9"
11	UA-6012K-S30K	United Air Prod.	Oil Temp. Reg. 12"

★ ***Send us your material lists for screening!***

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LETTERS

Subcontracting

As a subcontractor, I was very much interested in your article on subcontracting in your Production For Air Power issue Sept. 24. I feel that while the facts were generally correct, they were misleading in that no differentiation was made between the firms that are regularly in the subcontract field and those that are brought in on an emergency basis. The statements and figures definitely do not apply to the former group.

My company is one whose business consists normally of subcontracting for the aircraft and other industries. In contradiction of the report, the following observations are based on my experience. Given substantially equal equipment for parts within their capacity, a good subcontractor, starting from scratch,

- Will be in production in half the time required by a prime contractor.
- Will produce at considerably less than the cost of the prime contractor.
- Will turn out a better product than the prime contractor—on less equipment.
- Will tool at considerably less cost than the prime contractor.
- Will meet schedules closer than the prime contractor.
- Will advise the prime contractor of engineering changes that will speed production.
- Will react to engineering changes more quickly in the shop than will the prime contractor.

VICTOR SILBER, Partner
Special Machine Tool Engineering Works
132 Lafayette St.
New York 13, N. Y.

ALPA Reprints

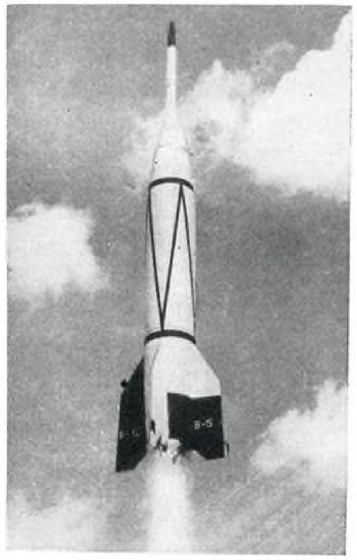
I appreciate your forwarding reprints of your ALPA series. This was an excellent job of reporting the facts. To get the facts dealing with Mr. Behncke is an accomplishment in itself. A large number of the airline pilots of the country subscribe to AVIATION WEEK. Their interest started by honest reporting of the National Airlines Strike in 1948 and this recent series confirms their faith in good reporting by AVIATION WEEK.

W. T. BABBITT, Regional Vice-President
Air Line Pilots Assn.
2012 Ponce de Leon Blvd.
Coral Gables, Fla.

F-94 Report

Your recent article by David A. Anderton, "F-94: Variations of a Lockheed Theme" . . . was so informative that I would like to know if it would be possible for us to use the material . . . in future Airmen's Information Hours. If reprints are available, I could use about twenty copies.

LT. HARRISON H. PAYNE, USAF
Special Services
Dover AFB
Dover, Del.



Corporal Missiles

Since credit should be given where it is properly due, I'm certain you will want to give recognition to the organization primarily responsible for missiles of the "Corporal" series which the Oct. 1 issue AVIATION WEEK generously credited solely to Douglas Aircraft Co.

Missiles of the Corporal series were designed by the California Institute of Technology Jet Propulsion Laboratory. The contribution of Douglas has been largely in production design and fabrication of the missiles.

We are proud to be associated not only with JPL in the Corporal series development but with Bell Telephone Laboratories, Sperry, Bendix, Ratheon and General Electric and special units of the armed services in developing a number of other missiles which we feel confident will make a material contribution to the security of the U. S.

E. P. WHEATON, Chief Project Engineer
Missiles
Douglas Aircraft Co., Inc.
Santa Monica, Calif.

A Challenge!

You will be interested to know that I can identify more than 600 aircraft from pictures which appeared in various air magazines. I wonder if any AVIATION WEEK readers could top my record! Therefore, I would like to arrange elimination contests between your readers and myself for the World Championship, the final contest of which would take place in Ottawa.

Now I want to give you my suggestions on running the eliminations. Each aero club whose members wish to compete would be in charge of the qualifying contests. The number of aircraft to be identified shall not be less than 50 and may be of any type. Each winner and runners-up would receive three aircraft sketches of his (or her) choice. For further information, contact me.

RENE CHARETTE
213 Besserer Street
Ottawa, Ontario, Canada

WHAT'S NEW

New Books

Fellowship of the Air, Jubilee Book of the Royal Aero Club, 1901-1951, by B. J. Hurren. Published for Flight magazine by Iliffe & Sons Ltd., Dorset House, Stamford St., London, S. E. 1. Price 30 shillings plus 9d postage (total $4.31). Size 9⅝ x 7½, 234 pages, including index, plus 32 pages of illustrations.

Just a little over 50 years ago, a pair of British amateur sportsmen and a young woman hit upon the idea of forming an association to band together the country's aviation enthusiasts as a means of giving their activities more formality and to better establish a spirit of camaraderie. Fittingly enough, the idea was breached while the trio was soaring at 4,000 ft. over the English countryside in a balloon piloted by Stanley Spencer which had taken off from London and was heading for Sidcup, Kent.

The Royal Aero Club which had its roots deep in the elegant Edwardian era, quite naturally became a prime factor in British private flying, and its membership comprised the aviation "aristocracy," Graham-White, Geoffrey de Havilland, Alliot Verdon-Roe, Charles Rolls, to mention a few. And as it rapidly became a force in English flying, it issued pilot's certificates, sponsored the major meets, and was intimately concerned with the improvement of the private aircraft "breed."

Much of the book is concerned with the great aviation personalities of the Club's 50 formative years, with interesting human sidelights on their achievements. It also brings to light some incidents in which the RAC had to take a stand or lose its prestige in British and international sports flying. It's a good book to read if you want authentic background of British private flying from the balloon days right up to the present.—EJB.

Publications Received

- **Air Transportation Management,** by J. L. Nicholson, published by John Wiley & Sons, Inc.
- **Helicopter Analysis,** by A. A. Nikolsky, published by John Wiley & Sons, Inc.
- **Aviation Dictionary and Reference Guide,** third edition, Aero Publishers, Inc., $7.50.
- **Inspection and Gaging,** by C. W. Kennedy, Industrial Press, $7.50.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—NOVEMBER 19, 1951

SEARCHLIGHT SECTION
(Classified Advertising)

EDITORIAL

That Gratuities Clause

(Here's the second report on what the aircraft industry is talking about, based on off-the-record interviews with company executives around the country, and on reports from our own staff members and correspondents.)

You hear everywhere in talking with industry management that the new Air Force regulations, intended to discourage procurement irregularities, are laudable in objective but unrealistic. They are almost impossible to put into practice without curtailing efficiency or inviting new, more devious subterfuges.

The new regulations, already well publicized, are being followed up with insertion of "teeth" in a new contractual clause which spells out penalties for being caught.

According to AVIATION WEEK's own correspondent in Dayton, not only will the clause go into new contracts. It is being added as a rider to contracts already in effect.

These provisions are listed under a "gratuities clause," as follows:

(a) The Government may, by written notice to the contractor, terminate the right of the contractor to proceed under this contract if it is found, after notice and hearing, by the Secretary or his duly authorized representative, that gratuities (in the form of entertainment, gifts or otherwise) were offered or given by the contractor, or any agent or representative of the contractor, to any officer or employee of the Government with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performing, of such contract; provided, that the existence of the facts upon which the Secretary or his duly authorized representative makes such findings shall be in issue and may be reviewed in any competent court.

(b) In the event this contract is terminated as provided in paragraph (a) hereof, the Government shall be entitled (i) to pursue the same remedies against the contractor as it could pursue in the event of a breach of contract by the contractor, and (ii) as a penalty in addition to any other damages to which it may be entitled by law, to exemplary damages in an amount (as determined by the Secretary or his duly authorized representative) which shall be not less than three nor more than 10 times the costs incurred by the contractor in providing any such gratuities to any such officer or employee.

(c) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

The subject of "gratuities" in connection with doing business with government has innumerable complexities. What is a "gratuity" (uttered with a slight snarl) and what is a normal act of human decency? It's a matter of motive, perhaps; but who else than the man who has it can prove it is not above reproach? In these days of inadequate government salaries and a fifty-cent dollar, does a firm with a billion in backlogs have a justifiable right to buy a dollar lunch for a military officer during a talk about the business in hand? It all becomes very confusing. Can a captain be "bought" for a single dollar lunch and a general for one costing five dollars?

One vociferous spokesman close to one aircraft firm put it something like this. Suppose a Wright Field or Pentagon officer is ordered to a distant plant in connection with a vital production problem on a high-priority warplane. He is on a per diem of $8. He pays $4 to $6 a night for hotel. He must eat breakfast. He eats lunch too. Probably he turns down an invitation to the company executive dining room so he can buy his own meal and get a receipt for it; besides, the cafeteria is cheaper. Any company executives talking business with him also eat in the cafeteria—not a conducive spot for conducting war business, incidentally. Dinner is another problem. "How many meals can you buy—and what kind—on two to four dollars a day?" this critic asked us. Not to mention any local transportation, communications or other incidental expenses.

So what will happen? Some industry people say government long-distance phone bills will skyrocket. Why should officers conduct government business with any of their own personal funds? They will try to conduct their affairs by phone, with varying degrees of complication and confusions—or they'll assign hapless second, third or fourth echelon officers to the trips to do the job they should do themselves. Then there will be more reports and memos between the echelons and between Washington or Dayton and the company, or company officers will be summoned to Washington and Dayton at the expense of plant progress and the taxpayer, for this would be an allowable cost.

Nobody disagrees with the objectives, however. And no industry people we have talked to have been other than thoroughly earnest in wanting to operate ethically. But the present situation is very close to ridiculous, no matter how much we all want to avoid graft, favor-granting, and five-percenting. The only possible benefit apparent, in contrast to the disadvantages, is that these extreme precautions will focus unprecedented publicity and emphasis on granting and acceptance of favors. This is good, but it will not last unless the rules are rigorously enforced, and they are so strict most observers think that it is impossible.

One obvious suggestion, of course, would be for Congress to increase salary levels for government people in important categories like equipment buyers and contract agencies, and to raise the limits on per diem pay for such personnel when they travel on procurement and contracting business in contact with industry. The entire subject deserves more thought than it has been given. The current rules are not the sole solution.

—Robert H. Wood

Allison Turbo-Prop Engines Power 3 New Cargo Planes—

★ **The Lockheed XC-130**

★ **The Douglas R6D**

★ **The Lockheed R7O**

While testing continues with the first U.S. Turbine Transport—the Allison Turbo-Liner, built by Convair—military contracts have been awarded for the installation of Allison Turbo-Prop engines in three additional types of transport aircraft.

★ The Lockheed XC-130—a U.S.A.F. four-engine medium cargo plane—is *the first military transport ever designed originally around Turbo-Prop power*. It won U.S.A.F. design competition over five other makes and the selection of Allison engines represents another *first* for Allison in the development of turbine transports in this country.

★ The new Navy-sponsored R6D is a modified configuration of the world-famous Douglas DC6A Liftmaster.

★ The Navy R7O is the new turbine version of the Lockheed Super Constellation.

Allison Turbo-Prop engines were selected for all three aircraft because they develop more power with less than half the weight of present engines in this power class.

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